The Role of the Pharmacist in Selecting the Best Choice of Medication Formulation in Dysphagic Patients

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Abstract: Usually, the administration of drugs by feeding tube in dysphagic patients involves handling of marketing licenses outside their term, due to the lack of suitable formulations. This circumstance has put health professionals in the dilemma of choosing the formulation whose manipulation possibly does not alter the effectiveness of the drug. In this regard, a practical guide providing indications on the prescription, handling, and administration of drugs through enteral feeding tube could be of paramount utility. For this purpose, we have considered the 1047 solid oral pharmaceutical forms included in the formulary of San Paolo Hospital (Savona, Italy). From our analysis, it emerges that 95% of medicinal products are worryingly used off-label and 40% have to be managed by the hospital pharmacists without having suitable indications by either the manufacturers or by literature studies. To fill this gap, we have compiled a detailed table containing missing indications derived from pharmacist expertise and evidence-based practices, with the aim that the sharing of our procedures will contribute to make uniform pharmacological therapies from one hospital to another. This study will allow doctors to have easy access to information on drugs that can be prescribed and nurses to become familiar only with the pharmaceutical forms that can be administered.

Keywords: hospital pharmacy; dysphagic patients; off-label prescriptions; solid oral formulations; compounding pharmacist; patient safety

1. Introduction

In the past, interest in enteral nutrition (EN) was rather low, due to the introduction of new and safer parenteral administration techniques. However, in the last two decades, EN through percutaneous endoscopic gastrostomy (PEG) has been reevaluated as a valid metabolic rebalancing therapy, both by virtue of an improvement in the quality of the tubes and nutritional mixtures used. Additionally, thanks to the recent dietary and physiological acquisitions of the digestive system, a more correct overview of the limitations of total parenteral nutrition (TPN) has been achieved [1–3]. According to the guidelines of the European Society for Clinical Nutrition and Metabolism (ESPEN) on EN in adults [4], in all the conditions in which an indication for artificial nutrition (AN) is present and where there is normal functioning of the gastrointestinal tract with the possibility of covering needs by the enteral route, EN should be considered the first choice nutritional technique. In fact, it has been demonstrated that EN is simpler, more physiological less expensive, and safer than TPN, since it avoids the risks of venous catheter infections [5]. Furthermore, it is therapeutically superior to TPN, as the nutrients perform a direct trophic action on the intestinal lumen by inducing the release of trophic hormones and supporting the structural and functional integrity of the intestinal mucosa, which seems essential for maintaining immune function [6]. In our territory, managed by the local health authority ASL 2 Savonese (Liguria, Italy), the data are confirming this trend, as from 2019 to 2021, the hospitalized
patients, both adults and pediatrics, requiring EN were 706, and 142 were EN patients in affiliated nursing homes (RSA) and 202 those at home from 2021 to April 2022.

In clinical practice, the feeding tube is also necessarily used as a route of administration for pharmacological therapies, because this route is less risky for systemic infections (septicemia) and more economical with respect to parenteral drug administrations [5]. Even considering that injectable formulations have the great advantage of ensuring the total absorption of the drug and do not require any formulation manipulations, they are not suitable for long-term use [2]. On the contrary, the administration of drugs by the feeding tube usually involves handling of marketing licenses outside their term (off-label use), due to the inadequacy of medicines on the market for this route of administration [6]. Consequently, to avoid undesired therapeutic failures, health care professionals must face daily the dilemma of choosing formulations whose manipulation does not alter drug efficacy. Although the use of enteral feeding tubes has become widely employed for the administration of both nutrients and pharmacological therapies, the lack of standardized guidelines and protocols at both national and international level is a limit to the homogeneity and appropriateness of administrations and prescriptions. Therefore, for patients subjected to EN, there are particular situations where the administration of oral medicines can be a pharmaceutical challenge.

Consequently, this study arose from the necessity to accomplish a proper therapy for dysphagic adult and pediatric patients, whose needs are usually unmet by the pharmaceutical companies. In this context, the role of the hospital pharmacist is essential in selecting and compounding the medicinal product able to ensure the best outcomes of the pharmacological therapy. In the case of patients subjected to EN, it becomes impossible to keep the medicinal product intact, since it is often necessarily crushed or diluted. Meanwhile, it would be mandatory to guarantee that such manipulations do not affect the pharmacokinetics of the drug, and that no interaction between the drug and the nutritional mixture could occur. The essential need to ensure a therapy for dysphagic patients too often pushes health-care professionals to seek impromptu solutions, in which it may happen that not all the necessary pharmaceutical items have been evaluated. In fact, the guidelines still refer to general behavior and general principles, without directing towards specific protocols. In this scenario, off-label drug administrations—sometimes adequate, others often incorrect—have been justified.

From these considerations, it is clear there is a need for shared procedures deriving from the fusion between clinical practice and what exists in the field of academic research. The aim of our study was to provide a practical guide on the correct use of solid oral formulations for patients subjected to EN through PEG. With this purpose, practical suggestions for the prescription, methods of handling, and administration of drugs through enteral feeding tube not only in hospitals but also at home have been provided in form of a reader-friendly and easily consultable table. We report advice received from manufacturers, collected from the literature, or deriving from the experience born within the pharmacy of the hospital. Particularly, we firstly asked pharmaceutical companies to share information regarding active pharmaceutical ingredient (API) stability following manipulation of the formulation and change of route of administration. Secondly, we analyzed the medicines managed by the local health authority ASL 2 Savonese, providing information about their suitability for administration by tube. In addition, extemporaneous liquid formulations of some drugs to be administered through the enteral tube are proposed, which can be of valuable help in order to make therapies uniform and to improve the quality of medical practice. Finally, we have also outlined the procedure for hospital staff to administer pharmacotherapy by tube.

2. Materials and Methods

The medicinal products considered were those available in the district area of Liguria (Italy), according to the local formulary PTRO (Prontuario Terapeutico Ospedaliero Regionale), and according to the minor formulary ASL 2 Savonese. The list of medicines
analyzed comprises 1047 solid oral pharmaceutical forms, equal formulations but with a different dosage from the same company, have been grouped together in the same line, thus obtaining a list of 701 formulations. The information regarding the splittability/crushability of the considered medicinal products was obtained by evaluating the summary of product characteristics (SmPC) of the drug (source: Italian Medicines Agency AIFA, Agenzia Italiana del Farmaco database) [7] and in particular by analyzing qualitative and quantitative composition, pharmaceutical form, posology, and method of administration.

Meantime, 124 pharmaceutical companies were contacted with a specific letter, requesting detailed information on the API’s stability upon crushing of the tablets or opening of the capsules (1), on suitability of mortar for crushing (2), and on possible recommendations for API administration via tube or alternative routes (3) (Figure 1).

Figure 1. Letter addressed to the pharmaceutical companies whose products appear on the hospital formulary.

Other eminent sources considered were the practical guidelines from the Società Italiana di Nutrizione Artificiale e Metabolismo (SINPE) and European Society for Clinical Nutrition and Metabolism (ESPEN). In particular, the SINPE guideline on Nutrizione Artificiale Ospedaliera [8] and the ESPEN guideline on home enteral nutrition [9]. In
addition, since administration via tube is a route that in most cases is not provided for in
the SmPC, some information has been extrapolated by consulting the Handbook of Drug
Administration via Enteral Feeding Tubes on behalf of the British Pharmaceutical Nutrition
Group [10] and reading published studies present in the literature (PubMed database).
Finally, indications of use were established also by analyzing the list of excipients employed
by the producer. In these instances, the directions provided are based on the pharmacist’s
practical experience and knowledge. The sources chosen to evaluate the suitability of drug
administration via tube are summarized in Table 1 in hierarchical order.

Table 1. Sources chosen to evaluate the suitability of drug administration via tube and their level
of reliability in decreasing order. The sources of the information are highlighted in different colors
according to their level of reliability. Green, level A (SmPC); light blue, level B (Guidelines); pink,
level C (literature); yellow, level D (pharmacist know-how).

| Source                                                      | Level of Reliability |
|-------------------------------------------------------------|----------------------|
| Summary of product characteristics                          | A                    |
| European and Italian guidelines on artificial nutrition      | B                    |
| Research studies available in the literature                | C                    |
| Hospital pharmacist know-how                                | D                    |

For each solid oral drug formulation listed in the hospital formulary, the Anatomical
Therapeutic Chemical (ATC) Classification System, the name of the API, the trade name,
the manufacturer, the pharmaceutical form, if the product can be administered via tube or
not, instructions for handling, and finally the sources of the information are highlighted in
different colors according to their level of reliability. An attempt was made to provide as
much information as possible: the events that the administration by tube can be carried out,
when to administer the drug, compatibility between the drug and EN, and the presence of
some particular excipients (e.g., alcohol).

Since the use of oral liquid pharmaceutical forms creates a minimal risk of tube obstruc-
tion and ensures adequate absorption of the drug, a switch from a solid oral formulation to
a corresponding one in liquid form was considered advisable whenever possible. However,
the liquid formulations may be hyperosmolar and require appropriate dilution. The volume
of water ($V$) to be added has been calculated with the following formula:

$$V_f = V_i \times \frac{mOsm_{initial}}{mOsm_{desired}}$$  \hspace{1cm} (1)

$$V = V_f - V_i$$  \hspace{1cm} (2)

where $mOsm_{desired}$ is 300–500 mOsm/kg, $mOsm_{initial}$ is the osmolality of the pharmaceutical
product, $V_i$ is the volume of the liquid pharmaceutical product before handling, and $V_f$ is
the volume of the final product with the desired osmolality.

To complete our study, we reported the most numerous extemporaneous liquid prepara-
tions intended to be administered by PEG to patients in the Neurology, Internal Medicine,
and Otorhinolaryngology departments of the San Paolo Hospital in Savona.

3. Results and Discussion

3.1. Drug Formulations for Administration by Tube: The Pivotal Role of the Pharmacist

The therapeutic process is defined as the sum of several phases, including drug
procurement, storage, preservation, stock management, prescription, preparation, admin-
istration, and the evaluation of side effects and/or benefits (Italian Ministry of Health,
recommendation n. 7 for the prevention of death, coma, or severe damage arising from
errors in drug therapy) [11]. Such definition evidences that there may be numerous factors
that can lead to an unreliable therapy, and meanwhile health-care professionals must be
able to ensure that the hospitalized patients receive the appropriate drug in the correct
pharmaceutical form and route of administration. Specifically, the skills of the hospital pharmacist, in the context of preventing errors in therapy, could play a key role in evaluating the correct and safe use of drugs, both in the prescription and in the administration phase. In fact, it has been already demonstrated that pharmacy intervention can significantly reduce the number of errors related to administering medication through the enteral feeding tube with minimal additional workload [12].

Nowadays, the need to carry out a correct manipulation of oral drugs to be administered to patients subjected to EN is an increasingly emerging problem. Before deciding whether to modify the original pharmaceutical form in any way, the compounding pharmacist refers to SmPC, but, unfortunately, the clinical studies on the bioavailability of oral pharmaceutical forms performed by the companies rarely consider administration via artificial tubes. In most cases, manufacturers lack data to support the chemical stability of tablets when crushed and dispersed in water prior to use, and there are no studies comparing the efficacy or bioavailability of split and crushed solid pharmaceutical forms, which means that no company feels able to provide recommendations on the use of drugs by means of a tube. In this study, we contacted 124 pharmaceutical companies to obtain more detailed information on drug stability after crushing or switching routes of administration. Unfortunately, only one company (0.8%) gave us further information. In most cases, companies only suggested referring to the SmPC. Indeed, drug stability assessment performed by pharmaceutical companies generally involves the testing of the drug substance or drug product using a stability-indicating method in order to establish the retest period (for premarket stability) and shelf life (for commercial stability). Since the companies had not carried out any evaluation of the stability of the drug after handling and/or change of administration route, they avoided taking any kind of responsibility in giving us advice. However, before resorting to off-label use, the general indications stress first of all evaluation of the existence of formulations suitable for alternative routes to oral administration. Table 2 shows APIs for which there are multiple options of routes of administration.

When such alternatives are not suitable, as indicated in the column of limitations, or only oral formulations are available, the PEG also becomes a unique access route for drug administration. In these cases, the SINPE guideline for Hospital Artificial Nutrition states that the administration of drugs by enteral tube preferably requires the use of liquid pharmaceutical forms, when available, or as a last resort the trituration of the solid forms and their dispersion in a suitable solvent [8]. It must be considered that switching from one formulation to another may involve dose adjustment and careful monitoring of the plasma levels of the drug for imperfect equivalence between the different formulations (e.g., liquid phenytoin vs. tablets) [13]. This raises a number of issues regarding the responsibility of such administrations and of any adverse effects that the patients may experience.

Many members of health-care teams, especially pharmacists, are in a position to raise the awareness of potential drug–nutrient interactions and incompatibilities that may derive from the off-label use of a drug. Pharmaceutical incompatibility arises in dosage forms where the release of API is controlled by enteric or delayed coatings. In these cases, the manipulation (i.e., trituration) of the medicinal product leads to an immediate release and absorption of the API with overdose at the start of treatment and subtherapeutic dosages thereafter. As shown in Figure 2, modified-release tablets are the fourth most numbered formulation and all the modified-release solid oral formulations, including gastroresistant ones, represent the 12% of the total medications included in the Savona hospital formulary.

Pharmacological incompatibility manifests itself with an alteration in pH, motility, or gastrointestinal secretions resulting from a pharmacological effect of the drug and generally alters the tolerance or absorption of enteral nutrition and/or the absorption of other drugs administered in polypharmacy. It is the case of drugs with anticholinergic effect that relax smooth muscle and inhibit gastric motility, such as antihistamines (promethazine, diphenhydramine, etc.), tricyclic antidepressants (amitriptyline, imipramine, maprotiline, trimipramine, etc.), phenothiazines (chlorpromazine, etc.), and antiparkinsonians (biperiden, trihexyphenidyl, bornaprine, orphenadrine, etc.).
Table 2. APIs endowed with formulations alternative to oral administration.

| Administration Route   | API                  | Limitations                                                                 |
|------------------------|----------------------|-----------------------------------------------------------------------------|
| Intramuscular (i.m.)   | Ampicillin/sulbactam | Expensive                                                                    |
|                        | Lorazepam            | Invasive procedure                                                          |
|                        | Prednisolone         | Inappropriate in immunocompromised or bleeding-prone patients               |
|                        | Dexamethasone        | Only feasible with expert help                                              |
|                        | Digoxin              | Inappropriate in immunocompromised or bleeding-prone patients               |
|                        | Phenytoin            | Only feasible with expert help                                              |
| Intravenous (i.v.)     | Hydromorphone        | Expensive                                                                    |
|                        | Methotrexate         | Invasive procedure                                                          |
|                        | Morphine             | Only feasible with expert help                                              |
|                        | Prometazin           | Low compliance                                                               |
|                        | Salbutamolo          | Inappropriate in patients with heart disease, immunocompromised, rectal surgery or bleeding |
| Inhalation             | Nicotina             | Unavailable, not to be used if there is trauma to the upper airway         |
|                        | Zanamivir            |                                                                              |
|                        | Aspirin              |                                                                              |
|                        | Bisacodil            |                                                                              |
| Rectal                 | Caffeine/ergotamin   | Expensive                                                                    |
|                        | Lactulose            | Low compliance                                                               |
|                        | Morphine             | Inappropriate in patients with heart disease, immunocompromised, rectal surgery or bleeding |
|                        | Prochlorperazine     |                                                                              |
|                        | Prometazin           |                                                                              |
|                        | Sodium polystyrene sulfonate |                                                                 |
| Subcutaneous           | Fentanyl             | Expensive                                                                    |
|                        | Hydromorphone        | Invasive procedure                                                          |
|                        | Morphine             | Absorption of the drug may be slower than via i.v or i.m.                   |
|                        | Estradiol            | Inappropriate in immunocompromised patients                                  |
|                        | Fentanyl             | Only feasible with expert help                                              |
|                        | Nicotine             | Inappropriate in patients with cutaneous rash, dermatitis or open lesions   |
|                        | Nitroglycerin        | Risk of skin irritation, itching, contact dermatitis                        |

Pharmacokinetic interactions can occur following the simultaneous administration of drugs and EN blends since the nutritional mixtures can alter the processes of release, absorption, distribution, metabolism, and excretion of drugs, which, in turn, can alter the kinetics of nutrients. Clinically, the most significant drug–enteral feeding interactions concern phenytoin and carbamazepine. The greatest number of compatibility studies with EN preparations have been performed for phenytoin [14]. The plasma levels of the drug were lower (70–80%) when administration was associated with EN, while they increased when EN was interrupted 2 h earlier and restored 2 h later. The mechanisms proposed were different, from the joining of the drug to the proteins or electrolytes of the nutrition mixture to the alteration of the solubility. It was observed that the interaction was more evident when phenytoin was introduced directly at the jejunal level, perhaps due to a decrease the time of intestinal transit. It is well known that the absorption of theophylline varies according to the composition of the diet; therefore, to avoid a 60–70% decrease in drug absorption, due to the increased metabolism that some diets (rich in proteins and low in carbohydrates) cause, it is necessary to suspend enteral feed at least 1 h before administration and restore it 2 h after. For the sake of completeness, we point out that some drugs are optimally absorbed only on an empty stomach (e.g., tetracyclines, penicillins, rifampicin, verapamil, atenolol, captopril).

Pharmacodynamic interactions occur when alterations in the action of the drug are related to pharmacological antagonism at the receptor site. The vitamin K content of nutritional preparations can determine an antagonism towards the therapeutic action of
oral anticoagulants, such as warfarin. Initially, it was thought that this antagonism was only to be attributed to the quantity of vitamin K contained in the nutritional mixtures and therefore preparations with low doses of the same (less than 75–78 mg/1000 kcal) were recommended. Recently, this antagonism has also been observed for preparations with minimal contents of vitamin K and therefore the decrease in the therapeutic effect of the drug has been related to an alteration of its absorption probably attributable to its union with soy proteins and caseinates. This makes monitoring the prothrombin time necessary to guarantee the anticoagulant effect, as well as the indication to prefer heparin in critical clinical conditions [15].

Figure 2. Solid oral dosage forms included in the Savona hospital formulary.

3.2. The Feasibility of Drug Administration by Enteral Feeding Tube
3.2.1. Liquid Formulations

The best choice of a formulation to be administered via tube could be represented by a liquid one. Indeed, the liquid formulations can be easily administered with sufficient tranquility by means of a tube and generally they are immediately diluted in gastric juices and promptly absorbed. However, the assumption that liquid formulations are the first choice may be questionable. Cosolvents, such as ethanol, glycerol, and propylene glycol, may be present in all drug formulations being used and the acceptable daily intake (ADI) may be easily exceeded. Therefore, before shifting from a solid dosage form to a liquid, it is recommended to consider this worrying issue, i.e., ranitidine syrup (Ranidil 150 mg/10 mL) [16].
Another noteworthy aspect relates to the osmolality of liquid formulations, which is one of the physical characteristics that most affect individual tolerance to a preparation. Osmolality values close to those of intestinal secretions are better tolerated (100–400 mOsm/kg H$_2$O) [13]. Formulations having osmolality values higher than 6000 mOsm/kg H$_2$O if administered without dilution could cause intolerance phenomena, especially if introduced at high speed or with tubes located in the duodenum or jejunum. This type of interaction is sometimes misinterpreted as the symptoms tend to be attributed to an intolerance to nutritional support or to gastrointestinal infections resulting in an incongruous interruption of the enteral feeding. Sorbitol is a case in point. Sorbitol is a common excipient of liquid formulations, often used as a stabilizer and sweetener. High amounts (>10 g/day) can cause intraluminal production of gas and abdominal tension, and, at higher doses (>15 g/day), important secondary effects, such as abdominal spasms and diarrhea. Pharmaceutical forms with a high sorbitol content include iron protein succinylate oral solution (Rekord Ferro 40 mg/15 mL) [17] and acyclovir oral suspension (Aciclovir Dorom 400 mg/5 mL) [18]. In cases where antiviral therapy at 400 mg five times a day is required, it is easy to exceed sorbitol ADI. Mannitol may provide the same undesirable reactions. This often happens when using the oral route for medicinal products with exclusive parenteral indication. In routine practice, when the osmolality of the preparations is not known, it is advisable to dilute the medicine with at least 30 mL of water to make the administration in the stomach compatible, thus preventing diarrheic phenomena by osmotic effect. Moreover, some suspensions and syrups may be too viscous and lead to the obstruction of the tube, such as clotrimoxazole, amoxicillin–clavulanic acid, which should always be diluted with at least 100–150 mL of water and introduced through tubes of appropriate diameter. These drugs, in fact, in addition to the risk of obstruction, have a high tube-crossing time that leads to a delay in the administration time, resulting in a possible decrease in the dose effectively administered.

Also, formulations in drops are frequently hyperosmolar (e.g., clonazepam, digoxin), and the amount of water used for drug dilution must then be obviously counted in the water–electrolyte balance. In some cases, their administration is not recommended for the adhesion of the drug to the plastic walls of the tube, resulting in therapeutic ineffectiveness (e.g., diazepam [19], carbamazepine suspension [20]). Some other liquid medical solutions cause gastric motility to slow down, and the formation of insoluble gelatins in the presence of acids predispose to the formation of bezoars (indigestible deposits that can form in the stomach). In patients in coma, sedated or with altered state of consciousness and with gastroesophageal reflux, such aggregates can cause obstruction of the esophagus with sometimes impossibility of removal of the enteral probe itself (e.g., liquid sucralfate) [21].

3.2.2. Solid Formulations

Recommendation n.19 by the Italian Ministry of Health deals with the risks related with the crushing and splitting of oral solid formulations [22]. Capsules and tablets require necessarily manipulation for their administration via PEG tube. In addition, particular attention should be paid to the choice of enteral mixtures, because those characterized by a high protein concentration, especially containing caseinates, interact with numerous drugs, and, due to the high viscosity, cause clots obstructing the tube. Once again, to avoid tube obstruction, it is the responsibility of the pharmacist to carefully evaluate the components of the formulation (Figure 3).

Regarding the methods of administration via PEG, it should be noted that the infusion technique is very influential. In fact, the continuous-release mode (even if conducted with pumps) more frequently predisposes to clogging of the tubes because it does not allow washing between meals, as well as not leaving free margins for drug absorption in the fasting state. Therefore, bolus and intermittent techniques are preferable. For flushing the tube, no solution has been shown to be superior to water in preventing occlusion. Obstruction may arise also from inadequately crushed tablets, precipitate formation caused by interaction between feed and drug formulation, or between drugs, and consequently it
is always suggested to give each API separately, avoiding the fixed formulations [23,24]. In addition, many known interactions between drugs and conventional foods are also applicable to EN. For example, amoxicillin and digoxin are adsorbed to the fiber contained in nutritional mixtures, aluminum salts induce the precipitation of dietary proteins, tetracyclines and ciprofloxacin form complexes with calcium, paracetamol is adsorbed by pectins, and phenytoin and warfarin bind to proteins [25].

Figure 3. (a) Obstruction of a tube. (b) Obstruction of a PEG with breakage of the terminal bumper.

3.3. Analysis of the Solid Oral Formulations Present in the Hospital Formulary

From the analysis of the solid oral formulations of the 701 drugs included in the hospital formulary, 339 (48%) cannot be crushed or administered via tube; however, for 211 of these (30%) alternative dosage forms or other routes of administration are possible (Figure 4). For the remaining 52% of active ingredients, however, their suitability for administration via PEG was found, but only for 5% of these, the possibility of crushing the tablet into a fine powder or opening the capsule in patients unable to swallow is indicated in the SmPC. This means that 95% of the drugs are given outside the terms of their product license.

Figure 4. Feasibility of drug administration via enteral feeding tube of the solid oral dosage forms included in the Savona hospital formulary.
Medication management is not so obvious. It often represents an area in which there can be many differences from one hospital to another due to the lack of standardized protocols. At San Paolo Hospital in Savona, the key role played by the hospital pharmacist is particularly evident from Figure 5, where the pharmacist’s expertise in administering a feeding tube therapy is necessary for the management of 40% of the formulations present in the hospital formulary. These data arose from the analysis of Table 3, which contains embedded all the collected information. Particularly, the different colors, both in Figure 5 and in Table 3, are indicative of the sources behind the decisions on the feasibility of using a solid pharmaceutical form administered by tube, and each color refers to a level of reliability, as reported in Table 1.

![Figure 5. The weight of pharmacist skill in the administration of a therapy by feeder tube. The different colors are indicative of the sources behind the decisions on the feasibility of using a solid pharmaceutical form administered by tube.](image)

The practical suggestions embedded in Table 3 are partly available in the SmPC or were supplied by the companies at our request (green lines), partly present in the literature (pink lines), partly suggested by guidelines (light blue lines), and partly developed in the hospital pharmacy according to pharmacists’ knowledge (yellow lines). When the SmPC does not include information about the change in administration route, the suitability of a formulation to be administered via tube was taken, firstly considering the SINPE and ESPEN guidelines, where it is clearly stated that it is dangerous to break up prolonged-release drugs (retard formulations) or gastroresistant preparations, whose manipulation can cause overdoses or reduction of the therapeutic effect. Moreover, if the drug is in form of soft capsules, it is not possible to crush them nor is it advisable to pierce them to suck the content. The guidelines also suggest switching from the oral solid dosage form to the corresponding liquid form where possible and to administer one drug at a time. If any of these conditions are present, the pharmacist has to act accordingly (light blue lines). Instead, pink lines are representative of drugs, whose administration via tube was already experienced and reported in the literature, while the yellow colored lines report all cases where the pharmacist’s experience is essential to the preparation of the medicinal product. The importance of the pharmacist’s expertise in the administration of a therapy by the feeder tube is evident. Indeed, 40% of medicinal products have to be managed by the pharmacist without any data provided by the manufacturer, research studies, or evidence-based practices present in the literature.
| ATC    | API (Strength) | Brand Name (Manufacturer) | Dosage Form       | Via Tube | Operative Information                                                                 | Ref. |
|--------|----------------|---------------------------|-------------------|----------|---------------------------------------------------------------------------------------|------|
| A02AD01| Aluminum hydroxide Magnesium hydroxide (800 mg) | MAALOX (SANOFI) | Chewable tablets  | No       | Interaction with dietary proteins  
Tube obstruction  
Use alternative medications | |
| A02AH  | Sodium bicarbonate (500 mg) | SOD BIC NAR (NOVA ARGENTIA) | Tablets           | No       | Use other routes of administration  
Use alternative medications | |
| A02BA02| Ranitidine hydrochloride (150 mg) | RANIDIL (A.MENARINI) | Effervescent tablets | Yes  | The tablet should be diluted with at least 75 mL of water (to be avoided in patients on a low sodium diet or with phenylketonuria)  
Alternatives: liquid formulation to be diluted with 60 mL of water (contains ethyl alcohol), or sugar-free galenic preparation | |
| A02BA02| Ranitidine hydrochloride (150 mg) | ZANTAC (GLAXOSMITHKLINE) ZANTAC SOLUB (GLAXOSMITHKLINE) RANITIDINA MYL (MYLAN) RANITIDINA RATIO (RATIOPHARM) RANITIDINA TEV (TEVA) | Coated tablets  
Effervescent tablets | No       | The effervescent tablets are the first choice (to be avoided in patients on a low sodium diet or with phenylketonuria)  
Alternatives: liquid formulation to be diluted with 60 mL of water (contains ethyl alcohol), or Ranitidine 15 mg/mL galenic preparation | [8,9]|
| A02BB01| Misoprostol (200 µg) | CYTOTEC 200 (PFIZER) | Tablets           | Yes      | Crush the tablet in a mortar, add 15 mL water, draw the suspension into the syringe and administer immediately  
Rinse the mortar with 15 mL water, draw this water into the syringe and administer  
Due to the poor stability of the API better an alternative therapy (Ranitidine or Lansoprazole)  
Open the capsule, suspend the granules contained therein with 20 mL water and then administer after 15–20 min in a tube >8 Fr  
The granules must not be crushed  
For children the galenic preparation of omeprazole suspension 2 mg/mL is required | [10]|
| A02BC01| Omeprazole (20 mg) | ANTRA (ASTRAZENECA) | Gastro-resistant capsules | Yes  | | [26]|
| A02BC01| Omeprazole (10 mg) | OMEPRAZOLO TEV (TEVA) | Gastro-resistant capsules | Yes  | | |
| A02BC02| Pantoprazole sodium sesquihydrate (20, 40 mg) | PANTORC (TAKEDA) | Gastro-resistant tablets | No       | Change route of administration or substitute API with Omeprazole or Lansoprazole | [8,9]|

**Table 3.** General suggestions for the oral solid medications listed in the Savona hospital formulary given by tube. The sources of the information are highlighted in different colors according to their level of reliability. Green, level A (SmPC); light blue, level B (Guidelines); pink, level C (literature); yellow, level D (pharmacist know-how).
Table 3. Cont.

| ATC     | API (Strength)        | Brand Name (Manufacturer) | Dosage Form              | Via Tube | Operative Information                                                                 | Ref.               |
|---------|-----------------------|---------------------------|--------------------------|----------|--------------------------------------------------------------------------------------|--------------------|
| A02BC03 | Lansoprazole (15, 30 mg) | LANSOX (TAKEDA)           | Orodispersible tablets   | Yes      | Disperse in a small amount of water and administer through a nasogastric tube or oral syringe | SmPC               |
| A02BC03 | Lansoprazole (15, 30 mg) | LANSOX (TAKEDA)           | Capsules                 | Yes      | Open the capsule, suspend the granules with water and administer after 20 min         | [26]               |
| A02BC04 | Rabeprozole sodium (10, 20 mg) | PARIET (JANSSEN CILAG)    | Gastro-resistant tablets | No       | Do not grind gastro-resistant tablets Alternatives: esomeprazole, lansoprazole or omeprazole | [8,9]              |
| A02BC05 | Esomeprazole magnesium trihydrate (10 mg) | NEXIUM (ASTRAZENECA)      | Gastro-resistant granules | Yes      | To a dose of 10 mg add 15 mL water, mix and leave to thicken for a few minutes        | SmPC               |
| A02BC05 | Esomeprazole magnesium trihydrate (10 mg) | LUCEN (MALESCI)           | Gastro-resistant granules | Yes      | Do not crush the granules, withdraw the suspension with a syringe and inject through the tube of 6 Fr caliber or greater | SmPC               |
| A02BX02 | Sucralfate (2 g)       | SUCRALFIN (SANOFI)        | Granules for oral suspension | No       | Risk of tube occlusion, bezoar formations                                              | [10,21]            |
| A02BX13 | Sodium alginate Sodium bicarbonate (250 + 133.5 mg) | GAVISCON (RECKITT BENCKISER) | Chewable tablets         | No       |                                                                                      | [8,9]              |
| A03AA05 | Trimebutine maleate (150 mg) | DEBRIDAT (SIGMA TAU)      | Soft gels                | No       | Alternatives: solution for injection or suppositories                                  | [8,9]              |
| A03AA06 | Rociverin (10 mg)      | RILATEN (LABORATORI GUIDOTTI) | Coated tablets           | Yes      | Tablet can be triturated and administered with water                                  |                    |
| A03AX13 | Simethicone (40 mg)    | MYLICONGAS (JOHNSON & JOHNSON) | Chewable tablets         | No       | Alternative: drops to be diluted with 50 mL water and given immediately               | [8,9]              |
| A03BB01 | Scopolamine methyl bromide (10 mg) | BUSCOPAN (BOEHRINGER INGELHEIM) | Coated tablets           | Yes      | Tablet can be triturated Alternative: solution for injection                          |                    |
Table 3. Cont.

| ATC       | API (Strength)                        | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-----------|---------------------------------------|---------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| A03FA01   | Metoclopramide hydrochloride monohydrate (10 mg) | PLASIL (SANOFI)           | Tablets     | No       | Alternative: syrup which must be diluted and given away from EN                        | [8,9]|
| A03FA03   | Domperidone maleate (10 mg)            | DOMPERIDONE AGE (ANGENERICO) | Tablets     | No       | Alternatives: suppositories or oral suspension (to be diluted with water and administered at least 15 min before the start of EN) | [8,9]|
| A03FA03   | Domperidone (10 mg)                    | PERIDON (ITALCHIMICI)     | Coated tablets | No       | Alternatives: suppositories or oral suspension (to be diluted with water and administered at least 15 min before the start of EN) | [8,9]|
| A04AA01   | Ondansetron hydrochloride (4 mg)       | ZOFRA (GLAXOSMITHKLINE)   | Coated tablets | No       | Prefer orodispersible tablets, syrup or solution for injection                         | [8,9]|
| A04AA01   | Ondansetron (8 mg)                     | ZOFRA (GLAXOSMITHKLINE)   | Orodispersible tablets | Yes     |                                                                                       |      |
| A04AA01   | Ondansetron hydrochloride (4, 8 mg)    | ONDANSETRON TEV (TEVA)    | Coated tablets | No       | Alternative: Zofran syrup                                                              | [8,9]|
| A04AA02   | Granisetron hydrochloride (2 mg)       | KYTRIL (ROCHE)            | Coated tablets | No       | Alternative: solution for injection                                                   | [8,9]|
| A04AD12   | Aprepitant (125, 80 mg)                | EMEND (MSD)               | Capsules     | No       | Open the capsule and administer the granules with water without crushing                 |      |
| A05AA02   | Ursodeoxycholic acid (450, 150 mg)     | DEURSIL (CHEPLAPHARM ARZNEIMITTEL) | Modified release capsules | No       | Alternatives: granules for oral suspension, capsules                                  | [8,9]|
| A05AA02   | Ursodeoxycholic acid (450, 150 mg)     | URSILON (I.B.GIOVANI LORENZINI) | Capsules     | Yes      | Open the capsule and suspend the granules in 20 mL water then administer immediately   | [10] |
| A05BA03   | Silymarin (70 mg)                      | LEGALON (MEDA PHARMA)     | Coated tablets | Yes      |                                                                                       |      |
| A06AB06   | Senna leaves (12 mg)                   | PURSENNID (GLAXOSMITHKLINE) | Coated tablets | No       | Prefer other laxatives in syrups                                                       | [10] |
| A06AB58   | Sodium picosulfate Magnesium oxide Anhydrous citric acid | PICOPREP (FERRING)       | Powder for oral solution | Yes      | Dissolve the powder in 150 mL of water                                                 |      |
Table 3. Cont.

| ATC   | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|-------|----------------|---------------------------|-------------|----------|------------------------|------|
| A06AD11 | Lactulose (10 g) | LAEVOLAC EPS (ROCHE) | Granules for oral solution | Yes | Dilute with at least 60 mL water |      |
|        |                | PAXABEL (IPSEN) |                      |        | Avoid high doses, risk of diarrhea and malabsorption of dietary nutrients |      |
|        |                | REGOLINT (LABORATORI BALDACCI) |                      |        |                        |      |
|        |                | LAXIPEG (ZAMBON) |                      |        |                        |      |
| A06AD15 | Macrogol 4000 (4, 9.7, 10 g) | LAXIPEG (ZAMBON) | Powder for oral solution | Yes | Dissolve the powder in 125 mL water and administer immediately |      |
|        |                |                    |                      |        | Seek dietary advice in case of chronic constipation |      |
| A06AD65 | Macrogol 4000 Sodium sulfate Sodium chloride Potassium chloride (17.4, 34.8 g) | ISOCOLAN (GIULIANI) | Powder for oral solution | Yes | Dissolve the powder in 250 mL water then shake and administer immediately | SmPC |
| A06AD65 | Macrogol 3350 Sodium bicarbonate Sodium chloride Potassium chloride (13.8 g) | MOVICOL (NORGINE) | Powder for oral solution | Yes | Dissolve the powder in 125 mL water, shake and administer immediately |      |
|        |                | MOVIPREP (NORGINE) |                      |        |                        |      |
| A07AA06 | Paromomycin sulfate (250 mg) | HUMATIN (PFIZER) | Capsules | No | Alternative: syrup to be diluted in at least 60 mL water and then given immediately | [8,9] |
| A07AA09 | Vancomycin hydrochloride (250 mg) | MAXIVANIL (GENETIC) | Capsules | No | Alternatives: powder for oral solution or for infusion | [10] |
| A07AA11 | Rifaximin (200 mg) | NORMIX (ALFA WASSERMANN) | Coated tablets | No | Alternative: oral suspension | [8,9] |
| A07AA12 | Fidaxomicin (200 mg) | DIFICLIR (ASTELLAS) | Coated tablets | Yes | Grind the tablet, suspend the powder in water and administer immediately | [27] |
| A07BC05 | Diosmectite (3 g) | DIOSMECTAL (MALESCI) | Powder for oral solution | Yes | Dissolve the powder in half a glass of water and then administer |      |
### Table 3. Cont.

| ATC   | API (Strength)               | Brand Name (Manufacturer)                  | Dosage Form          | Via Tube | Operative Information                                                                 | Ref. |
|-------|------------------------------|--------------------------------------------|----------------------|----------|----------------------------------------------------------------------------------------|------|
| A07DA03 | Loperamide hydrochloride (2 mg) | LOPERAMIDE HEX (SANDOZ)                    | Capsules             | No       | Use other dosage form                                                                |      |
| A07DA03 | Loperamide hydrochloride (2 mg) | DISSENTEN (SOC.PRO.ANTIBIOTICI)           | Tablets              | Yes      |                                                                                       |      |
| A07EA06 | Budesonide (3 mg)           | ENTOCIR (ASTRAZENECA)                     | Modified release capsules | No       | Alternative: suppositories                                                            | [8,9]|
| A07EA07 | Beclomethasone dipropionate (5 mg) | CLIPPER (CHIESI FARMACEUTICI)             | Gastro-resistant tablets | No       | Alternative: rectal preparations for distal ulcerative colitis | [8,9]|
| A07EC01 | Sulfasalazine (500 mg)      | SALAZOPYRIN EN (PFIZER)                   | Gastro-resistant tablets | No       |                                                                                       |      |
| A07EC02 | Mesalazine (400, 500, 800, 1200 mg) | PENTASA (FERRING)                        | Modified release tablets | Yes      | Break the tablet and let it disintegrate in water. Alternatives: suppositories or rectal suspension | SmPC|
| A07EC02 | Mesalazine (400, 500, 800, 1200 mg) | MESAVANCOL (GIULIANI) PENTACOL (SOFAR)    | Modified release tablets | No       | Do not crush Alternatives: rectal suspension or suppositories                           | [8,9]|
| A07FA02 | Saccharomyces boulardii (5 bn) | CODEX (ZAMBON)                            | Capsules             | No       |                                                                                       |      |
| A09AA02 | Pancrelipase (150, 300 mg)   | CREON 25000 (BGP PRODUCTS)                | Powder for oral suspension | No       | Open the capsule without grinding the granules, suspend them in 20 mL water or in liquids, with a pH <5.5 such as apple, pineapple juice or yogurt, then administer immediately |      |
| A10BA02 | Metformin hydrochloride (500, 850, 1000 mg) | GLUCOPHAGE (BRUNO FARMACEUTICI)           | Coated tablets       | Yes      | Grind the tablet, suspend the powder in 20 mL water, and administer immediately        | [10] |
| A10BA02 | Metformin hydrochloride (500, 850, 1000 mg) | ZUGLIMET (ZENTIVA)                        | Coated tablets       | Yes      | Grind the tablet, suspend the powder in 20 mL water, then administer immediately       |      |
| A10BB01 | Glibenclamide (5 mg)        | DAONIL (SANOFI)                           | Tablets              | Yes      | Grind the tablet, suspend the powder in 10 mL water, then administer immediately       |      |
| A10BB09 | Gliclazide (30, 60 mg)      | DIAMICRON (SERVIER)                       | Modified release tablets | No       | Stop EN at least 30 min before drug administration                                      | [8,9]|


| ATC     | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|---------|----------------|---------------------------|-------------|----------|------------------------|------|
| A10BB09 | Gliclazide (30, 60 mg) | DIAMICRON (SERVIER)     | Modified release tablets | No       | Grind the tablet and suspend the powder in 10 mL water, then administer immediately Stop EN at least 30 min before drug administration Divisible tablet. | [8,9] |
| A10BB09 | Gliclazide (80 mg) | GLICLAZIDE (ZENTIVA)     | Tablets     | Yes      |                        | [10] |
| A10BB12 | Glimepiride (2 mg) | GLIMEPIRIDE ACC (ACCORD HEALTHCARE) GLIMEPIRIDE SAN (SANDOZ) AMARYL(SANOFI) | Tablets     | Yes      | Disperse the tablet in 10 mL water until a fine dispersion is created Administer before the main meal | [10] |
| A10BD02 | Metformin hydrochloride Glibenclamide (500 + 5 mg) | GLICONORM (ABIOGEN PHARMA) | Coated tablets | No       | Administer the two drugs separately Flush with 10 mL water between each one | [8,9] |
|         | Metformin hydrochloride Glibenclamide (400 + 2.5/500 + 5 mg) | GLIBOMET (LABORATORI GUIDOTTI) | Coated tablets | No       |                        | [8,9] |
|         | Metformin hydrochloride Glibenclamide (400 + 2.5 mg) | SUGUAN (SANOFI) | Coated tablets | No       |                        | [8,9] |
|         | Pioglitazone | COMPETACT (TAKEDA) | Coated tablets | No       |                        | [8,9] |
| A10BD07 | Sitagliptin phosphate monohydrate Metformin hydrochloride (50 + 850 mg) | JANUMET (MSD) | Coated tablets | Yes      |                        |      |
| A10BD08 | Vildagliptin Metformin (50 + 1000 mg) | EUCREAS (NOVARTIS) | Tablets | No       |                        | [8,9] |
| A10BD10 | Saxagliptin hydrochloride Metformin hydrochloride (2.5 + 850 mg) | KOMBOGLYZE (ASTRAZENECA) | Coated tablets | No       |                        | [8,9] |
| ATC | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|-----|---------------|---------------------------|-------------|---------|-----------------------|------|
| A10BF01 | Acarbose (50, 100 mg) | GLUCOBAY (BAYER) | Tablets | Yes | The tablets do not disperse easily in water but require gentle stirring for 5 min. A fine suspension is obtained which must be administered immediately, then continue with EN | [10] |
| A10BG03 | Pioglitazone hydrochloride (15, 30 mg) | PIOGLITAZONE ACV (ACTAVIS) | Tablets | Yes |  | |
| A10BH01 | Sitagliptin phosphate monohydrate (100 mg) | TESAVE (ADDENDA) | Coated tablets | Yes |  | |
| A10BH01 | Sitagliptin Phosphate Monohydrate (50, 100 mg) | JANUVIA (MSD) | Coated tablets | Yes | Check the glycemia | |
| A10BH02 | Vildagliptin (50 mg) | GALVUS (NOVARTIS) | Tablets | No |  | |
| A10BH03 | Saxagliptin hydrochloride (5 mg) | OONGLYZA (ASTRAZENECA) | Coated tablets | No |  | |
| A10BX02 | Repaglinide (0.5, 1 mg) | REPAKLINIDE EG (EG) | Tablets | Yes |  | |
| A11AA03 | Vitamins Mineral salts | SUPRADYN (BAYER) | Effervescent tablets | Yes | Dissolve in water and administer at the end of the effervescence | |
| A11CC04 | Calcitriol (0.25 µg) | DIFIX (PROMEDICA) | Soft gels | No | Drug adheres to the walls of the tube, risk of loss | [8,9] |
| A11DA01 | Thiamine hydrochloride (300 mg) | BENERVA (TEOFARMA) | Gastro-resistant tablets | No |  | [8,9] |
| A11DB | Cyanocobalamin Pyridoxine hydrochloride | BENEXOL B12 (BAYER) | Coated tablets | No | Alternative: solution for injection | [8,9] |
| ATC   | API (Strength)                                                                 | Brand Name (Manufacturer)                           | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-------|--------------------------------------------------------------------------------|-----------------------------------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| A11DB | Thiamine hydrochloride                                                         | TRINEVRINA B6 (LABORATORI GUIDOTTI)                 | Coated tablets | No       | Alternative: solution for injection                                                   | [8,9]|
|       | Cyanocobalamin                                                                 |                                                      |             |          |                                                                                        |      |
|       | Pyridoxine hydrochloride                                                        |                                                      |             |          |                                                                                        |      |
|       | (300 mg)                                                                       |                                                      |             |          |                                                                                        |      |
|       | Pyridoxine hydrochloride                                                        | BENADON (BAYER)                                     | Gastro-resistant tablets | No       | Alternative: solution for injection                                                   | [8,9]|
|       | (400 IU)                                                                       | RIGENTEX (BRACCO)                                   | Soft gels   | No       |                                                                                        |      |
|       | Alpha-Tocopherol (400 IU)                                                       |                                                    |             |          |                                                                                        |      |
| A11HA02| Sodium Citrate                                                                  | BIOCHETASI (SIGMS TAU)                              | Effervescent granules | Yes      |                                                                                        |      |
|       | Potassium Citrate                                                               |                                                      |             |          |                                                                                        |      |
|       | Thiamine diphosphate                                                            |                                                      |             |          |                                                                                        |      |
|       | Riboflavin-5 monophosphate                                                      |                                                      |             |          |                                                                                        |      |
|       | monosodium                                                                      |                                                      |             |          |                                                                                        |      |
|       | Pyridoxine hydrochloride                                                        |                                                      |             |          |                                                                                        |      |
|       | Cicatric acid                                                                   |                                                      |             |          |                                                                                        |      |
|       | Calcium Carbonate (1000 mg)                                                     | CALCIODIE (SPA)                                     | Effervescent tablets | Yes      | Dissolve in 20 mL water and administer at the end of the effervescence at least 1 h before or 2 h after the NE | [8,9]|
|       | Calcium Carbonate (400 mg)                                                      | METOCAL VIT.D3 (MEDA PHARMA)                        | Chewable tablets | Yes      |                                                                                        |      |
| A12BA01| Potassium Chloride (600 mg)                                                      | KCL-RETARD (ASTELLAS)                               | Modified release tablets | No       | Change route of administration                                                        | [8,9]|
| A12BA30| Potassium Citrate                                                               | POTASSION (ACARPIA)                                 | Effervescent granules | Yes      | Dissolve in water, and administer at the end of the effervescence                      |      |
|       | Potassium Succinate                                                             |                                                      |             |          |                                                                                        |      |
|       | Potassium Malate                                                                |                                                      |             |          |                                                                                        |      |
|       | Potassium Tartrate                                                              |                                                      |             |          |                                                                                        |      |
|       | Potassium Bicarbonate                                                           |                                                      |             |          |                                                                                        |      |
| A16AA02| Ademetionine Butanedisulfonate (400 mg)                                         | SAMYR 400 (BGP PRODUCTS)                            | Gastro-resistant tablets | No       | Alternative: solution for injection                                                   | [8,9]|
Table 3. Cont.

| ATC       | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                                                                                                                                                 | Ref. |
|-----------|----------------|---------------------------|-------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| B01AA03   | Warfarin sodium (5 mg) | COUMADIN (BRISTOL-MYERS SQUIBB) | Tablets     | Yes      | Grind the tablet and suspend the powder in 10 mL water, then administer immediately. Stop feeding at least 1 h before and 2 h after drug administration. Avoid supplementation with vitamin K. Warning: drug-EN interaction, continuous monitoring and dosage adjustment. If possible administer low molecular weight heparins. If necessary, administer EN immediately. | [10] |
| B01AA07   | Acenocumarol (1, 4 mg) | SINTROM (MERUS LABS LUXCO II SARL) | Tablets     | Yes      | Grind the tablet, dissolve in 10 mL water and administer immediately. Trituration can alter bioavailability. Check for clotting and prothrombin time.                                                                 | [10] |
| B01AB11   | Sulodexide (250 LSU) | VESSEL (ALFA WASSERMANN) | Soft gels   | No       | Oily excipients do not guarantee correct administration. Alternative: solution for injection.                                                                                                                          | [8,9]|
| B01AC04   | Clopidogrel besylate (75 mg) | CLOPIDOGREL AURO (ACTAVIS) | Coated tablets | No       | Crush the tablet and disperse the powder in 10 mL water. Administer by an 8 Fr tube.                                                                                                                                     | [10] |
| B01AC04   | Clopidogrel besylate (75, 300 mg) | PLAVIX (SANOFI) | Coated tablets | Yes      | Grind the tablet, disperse the powder in 20 mL water, and administer immediately preferably concurrently with EN to avoid gastrointestinal adverse effects.                                                                 | [10] |
| B01AC05   | Ticlopidine hydrochloride (250 mg) | TIKLID (SANOFI) | Coated tablets | Yes      | The tablet must not be crushed to avoid irritating effects on the intestine. Alternatives: effervescent tablets, chewable tablets, granules for oral solution.                                                                  | [8,9]|
| B01AC06   | Acetylsalicylic Acid (100 mg) | ACIDO ACETILSALICILICO SAN (SANDOZ) | Gastro-resistant tablets | No       | Grind the tablet, dissolve the powder in 10 mL water, and administer immediately concurrently with EN. Dilute with at least 60 mL of water and administer immediately in conjunction with EN.                              | [8,9]|
| B01AC06   | Acetylsalicylic Acid Magnesium Hydroxide Algedrate | ASCRIPITIN (SANOFI) | Tablets     | Yes      | Dilute with at least 60 mL of water and administer immediately in conjunction with EN.                                                                                                                                    | [10] |
| B01AC06   | Lysine Acetylsalicylate (75, 100, 160 mg) | CARDIRENE (SANOFI) | Powder for oral solution | Yes      | Dilute with at least 60 mL of water and administer immediately in conjunction with EN.                                                                                                                                    | [10] |
| B01AC07   | Dipyridamole (75, 200 mg) | PERSHRANTIN (BOEHRINGER INGELHEIM) | Coated tablets | Yes      | Dilute with at least 60 mL of water and administer immediately in conjunction with EN.                                                                                                                                    | [10] |
| B01AC07   | Dipyridamole (75 mg) | PERSHRANTIN R (BOEHRINGER INGELHEIM) | Modified release capsules | No       | Dilute with at least 60 mL of water and administer immediately in conjunction with EN.                                                                                                                                    | [8,9] |
| ATC     | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form       | Via Tube | Operative Information                                                                 |
|---------|---------------------------------|---------------------------|-------------------|----------|---------------------------------------------------------------------------------------|
| B01AC10 | Indobufen (200 mg)              | IBUSTRIN (PFIZER)         | Tablets           | Yes      | Grind the tablet and administer immediately                                            |
| B01AC22 | Prasugrel hydrochloride (100 mg)| EFIENT (DAIICHI SANKYO)   | Coated tablets    | Yes      | Highly photosensitive hygroscopic drug                                                 |
| B01AC24 | Ticagrelor (90 mg)              | BRILIQUE (ASTRAZENECA)    | Coated tablets    | Yes      | Crush the tablet to a fine powder, transfer it in half a glass of water and administer |
|         |                                 |                           |                   |          | Rinse the tube with water                                                              |
| B01AC30 | Dipyridamole Acetylsalicylic Acid (200 + 25 mg) Dabigatran etexilate mesylate (75, 110, 150 mg) | AGGRENOX (BOEHRINGER INGELHEIM) PRADAXA (BOEHRINGER INGELHEIM) | Modified release capsules | No | The granules can block the tube
Alternatives: change dosage form or route of administration
The opening of the capsule increases drug bioavailability by 75%
Bleeding risk
Switch to another anticoagulant |
| B01AE07 | Dabigatran etexilate mesylate (90 mg) | PRADAXA (BOEHRINGER INGELHEIM) | Capsules         | No       | Crush the tablet, dissolve the powder in water, then administer immediately
The drug administration should be followed immediately by EN
Crush the tablet and suspend the powder in 60 mL water or 5% dextrose water solution, then administer immediately
The crushed tablets are stable up to 4 h when stored at 30 °C |
| B01AF01 | Rivaroxaban (10, 15, 10 mg)     | XARELTO (BAYER)           | Coated tablets    | Yes      | Crush the tablet, dissolve the powder in water, then administer immediately
Rinse the tube with water
The drug administration should be followed immediately by EN
The tablet and the suspension in 60 mL water or 5% dextrose water solution, then administer immediately
The crushed tablets are stable up to 4 h when stored at 30 °C |
| B01AF02 | Apixaban (2.5, 5 mg)            | ELIQUIS (BRISTOL-MYERS SQUIBB) | Coated tablets    | Yes      | Crush the tablet, dissolve the powder in water, then administer immediately
Rinse the tube with water
The drug administration should be followed immediately by EN
The tablet and the suspension in 60 mL water or 5% dextrose water solution, then administer immediately
The crushed tablets are stable up to 4 h when stored at 30 °C |
| B02BX05 | Eltrombopag olamine (25, 50 mg) | REVOLADE (NOVARTIS)       | Coated tablets    | No       | Crush the tablet, dissolve the powder in water, then administer immediately
Rinse the tube with water
The drug administration should be followed immediately by EN
The tablet and the suspension in 60 mL water or 5% dextrose water solution, then administer immediately
The crushed tablets are stable up to 4 h when stored at 30 °C |
| B03AA01 | Ferrous (II) glycine sulphate (100 mg) | NIFEREX (UCB PHARMA)     | Capsules          | No       | Risk of tube occlusion                                                                  |
| B03AA03 | Ferrous (II) gluconate (80 mg)   | PRONTOFERRO (IBSA FARMACEUTICI) | Effervescent tablets | Yes      | Dissolve the tablet in water, administer before EN
Alternatives: ampoules or syrup                                                           |
| B03AA07 | Ferrous (II) sulfate (105 mg)    | FERROGRAD (TEOFARMA)      | Modified release tablets | No      | Alternative: ampoules                                                                  |
| B03BB01 | Folic Acid (5 mg)               | FOLINA (TEOFARMA)         | Capsules          | No       | Alternative: liquid formulation                                                        |
| B06AA   | Promelase (30 mg)               | FLAMINASE (GRUNENTHAL)    | Gastro-resistant tablets | No       | Alternative: liquid formulation                                                        |
| C01AA05 | Digoxin (0.0625, 0.125 mg)      | LANOXIN (ASPEN PHARMA)    | Tablets           | Yes      | Grind the tablet, dissolve it in 10 mL of water, administer immediately
Stop NE 2 h before and 2 h after the drug administration
Inaccurate dosage, change in bioavailability: monitor the patient
Preferably give liquid formulation                                                  |
| ATC       | API (Strength)          | Brand Name (Manufacturer)                     | Dosage Form       | Via Tube | Operative Information                                                                 | Ref.                |
|-----------|-------------------------|------------------------------------------------|-------------------|----------|---------------------------------------------------------------------------------------|---------------------|
| C01AA05   | Digoxin (0.1, 0.2 mg)   | EUDIGOX (TEOFARMA)                            | Soft gels         | No       | Alternative: liquid formulation                                                       | [8,9]               |
| C01AA08   | Methyl Digoxin (0.1 mg)| LANITOP (RIEMSER PHARMA)                       | Tablets           | Yes      | Grind the tablet, dissolve it in 10 mL water and administer immediately Preferably give drops |                     |
| C01BA     | Dihydroquinidine hydrochloride (250 mg) | IDROCHINIDINA R (TEOFARMA) | Capsules           | Yes      | Open the capsule, suspend the powder in 10 mL water, then administer immediately        |                     |
| C01BC03   | Propafenone hydrochloride (325 mg) | RYTMONORM (BGP PRODUCTS) | Modified release capsules | No       | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Interaction with EN: the effect can be enhanced by the presence of food Alternative: solution for injection | [8,9]               |
| C01BC03   | Propafenone hydrochloride (150, 300 mg) | RYTMONORM (BGP PRODUCTS) | Coated tablets     | Yes      | Interaction with EN: the effect can be enhanced by the presence of food Alternative: solution for injection |                     |
| C01BC04   | Flecanide Acetate (100 mg) | ALMARYTM (MEDA PHARMA) | Tablets            | Yes      | Disperse the tablet in 10 mL water for 2 min The suspension must be administered immediately | [10]                |
| C01BC04   | Flecanide Acetate (100 mg) | FLECAINIDE TEV (TEVA) | Tablets            | Yes      | Divisible tablets                                                                    |                     |
| C01BD01   | Amiodarone hydrochloride (200 mg) | CORDARONE (SANOFI)         | Tablets            | Yes      | Divisible tablets                                                                    |                     |
| C01BD07   | Dronedarone hydrochloride (400 mg) | MULTAQ (SANOFI)       | Coated tablets     | Yes      |                                                                                       |                     |
| C01DA08   | Isosorbide dinitrate (5 mg) | CARVASIN (TEOFARMA)    | Sublingual tablets | No       | Reduction of the absorption of the drug due to the hepatic first pass effect Administer sublingually only if the patient is conscious | [8,9]               |
|           | Isosorbide mononitrate (60 mg) | DURONITRIN (ASTRAZENECA) | Modified release tablets |         | Do not grind                                                                         |                     |
|           | Isosorbide mononitrate (60 mg) | MONOKET MULTITAB (CHIESI FARMACUTEUTICI) | Modified release tablets |         |                                                                                       |                     |
|           | Isosorbide mononitrate (20 mg) | MONOKET (CHIESI FARMACUTEUTICI) | Modified release tablets |         |                                                                                       |                     |
| ATC     | API (Strength)                | Brand Name (Manufacturer)                                                                 | Dosage Form                  | Via Tube | Operative Information                                                                 | Ref.                  |
|---------|-------------------------------|------------------------------------------------------------------------------------------|------------------------------|----------|----------------------------------------------------------------------------------------|-----------------------|
| C01DA14 | Isosorbide mononitrate (50 mg) | MONOKET RETARD (CHIESI FARMACEUTICI)                                                     Modified release capsules  | No       | Alternative: Nitroglycerine transdermal formulation                                       | [8,9]                 |
|         | Isosorbide mononitrate (20, 40, 50, 80 mg) | MONOCINQUE R (IST.LUSOFARMAOI)                                                           Modified release capsules  |          |                                                                                        |                       |
| C01EB17 | Ivabradine hydrochloride      | PROCORALAN (SERVERI)                                                                     Modified release capsules  | No       |                                                                                         |                       |
|         | Ivabradine hydrochloride      | CORLENTOR (STRODER)                                                                      Modified release capsules  | No       |                                                                                         |                       |
| C01EB18 | Ranolazine (375, 500, 750 mg) | RANEXA (A.MENARINI)                                                                     Coated tablets               | Yes      | Crush the tablet, suspend in water and administer immediately                           | [8,9]                 |
| C02AB01 | Methyldopa (250 mg)           | ALDOMET (IROKO PRODUCTS)                                                                 Coated tablets               | No       | Change antihypertensive drug                                                             |                       |
| C02AC01 | Clonidine hydrochloride       | CATAPRESAN (BOEHRINGER INGELHEIM)                                                       Tablets                      | Yes      | Grind the tablet, dissolve the powder in 10 mL water and administer immediately          | [10]                  |
| C02CA04 | Doxazosin mesylate (2, 4 mg)   | CARDURA (PFIZER)                                                                         Tablets                      | Yes      | Grind the tablet, dissolve the powder with 10 mL sterile water and administer immediately | [10]                  |
|         |                               |                                                                                         |                              |          | Monitor the patient and adjust the therapy                                              |                       |
| C02DC01 | Loniten (5 mg)                | MINOXIDIL (PFIZER)                                                                      Tablets                      | Yes      | The tablet is dispersed in water to give a fine suspension which must be administered immediately | [10]                  |
| C02KX01 | Bosentan monohydrate (62.5, 125 mg) | TRACLEER (ACTELION PHARMA)                                                              Coated tablets               | Yes      | Crush the tablet and dissolve it in at least 50 mL water, it is not very soluble        |                       |
|         |                               |                                                                                         |                              |          | Use individual protections for handling Dispersible tablets (Tracleer 32 mg) for pediatrics  |                       |
| C02KX02 | Ambriesentan (5 mg)           | VOLIBRIS (GLAXOSMITHKLINE)                                                               Coated tablets               | No       | Crush the tablet into a fine powder and add water, to have a suspension (drug not soluble) |                       |
|         |                               |                                                                                         |                              |          | Rinse the tube several times after administration Use individual protections for handling Teratogen drug |                       |
| C02KX04 | Macitentan (10 mg)            | OPSUMIT (ACTELION PHARMA)                                                                Coated tablets               | Yes      |                                                                                         |                       |
| C02KX05 | Riociguat (2.5 mg)            | ADEMPAS (MSD)                                                                            Coated tablets               | Yes      | The tablet can be crushed and mixed with water SmPC                                     |                       |
| C03AA03 | Hydrochlorothiazide (25 mg)   | ESIDREX (NOVARTIS)                                                                      Tablets                      | Yes      |                                                                                         |                       |
| ATC     | API (Strength)             | Brand Name (Manufacturer)       | Dosage Form | Via Tube | Operative Information                                                                 | Ref.  |
|---------|-----------------------------|---------------------------------|-------------|----------|----------------------------------------------------------------------------------------|-------|
| C03BA04 | Chlorthalidone (25 mg)      | IGROTON (AMDIPHARM)             | Tablets     | Yes      | The tablet disperses in water within 2 min                                               | [10]  |
|         | Metolazone (5, 10 mg)       | ZAROXOLYN (TEOFARMA)            | Tablets     | Yes      | Grind the tablet, dissolve it with 10 mL water and administer immediately                 | [10]  |
|         |                             |                                 |             |          | Monitor the patient, drug bioavailability variable                                      |       |
| C03CA01 | Furosemide (25 mg)          | FUROSEMIDE (LAB.FARMACOLOGICO MILANES) | Tablets     | Yes      | Grind the tablet, dissolve it in 10 mL water and administer immediately preferably concomitantly with EN to minimize gastrointestinal effects |       |
|         |                             | LASIX (SANOFI)                  |             |          | It is recommended to use the liquid form                                                 |       |
|         |                             | FUROSEMIDE TEV (TEVA)           |             |          |                                                                                         |       |
|         |                             | TORASEMIDE TEV (TEVA)           |             |          |                                                                                         |       |
| C03DA01 | Spironolactone (100 mg)     | ALDACTONE (SANOFI)              | Coated tablets | Yes      | Grind, dissolve the powder in 10 mL water and administer immediately                       | [10]  |
|         |                             | ALDACTONE (SANOFI)              |             |          | Pay attention to concomitant administration with potassium.                              |       |
|         |                             | Open the capsule, dissolve in 10 mL of water and administer immediately      |             |          |                                                                                         |       |
| C03DA03 | Canrenone (50, 100 mg)      | URACTONE SPA (SOC.PRO.ANTIBIOTICI) | Tablets     | Yes      | Pay attention to concomitant administration with potassium.                              |       |
|         |                             | LUVION (THERABEL GIENNE PHARMA) |             |          |                                                                                         |       |
| C03EA01 | Amiloride hydrochloride     | MODURETIC (MSD)                 | Tablets     | Yes      | Grind, dissolve in 10 mL of water and administer immediately.                             | [10]  |
|         | Hydrochlorothiazide (5 + 50 mg) |                                |             |          |                                                                                         |       |
| C03EA14 | Potassium Canrenoate Butizide (5 + 50 mg) | KADIUR (THERABEL GIENNE PHARMA) | Tablets     | No       | Administer the two drugs separately                                                    | [8,9] |
|         | Furosemide (500 mg)         |                                 |             |          | Flush with 10 mL water between each one                                                  |       |
| C03EB01 | Spironolactone (25 + 37 mg) | LASITONE (SANOFI)               | Capsules    | No       |                                                                                         | [8,9] |
|         | Pentoxifylline (400 mg)     | TRENTAL (SANOFI)                | Modified release tablets | No       |                                                                                         | [8,9] |
Table 3. Cont.

| ATC   | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|-------|----------------|----------------------------|-------------|----------|-----------------------|------|
| C05CA53 | Diosmin Hesperidin (500 mg) | DAFLON (SERVIER) | Coated tablets | Yes | Grind the tablet, dissolve the powder in 10 mL of water and administer it immediately |         |
| C05CX  | Escin (40 mg) | EDEVEXIN (I.B.L.GIOVANNI LORENZINI) | Coated tablets | No | Alternatives: solution for injection or cutaneous gel |         |
| C07AA05 | Propranolol hydrochloride (40 mg) | INDERAL (ASTRAZENECA) | Tablets | Yes | Grind the tablet, dissolve the powder in 10 mL water by shaking for 5 min, then administer immediately | [10] |
|        |                |                            |             |          | Alternative: galenic preparation (Propranolol 2 or 5 mg/mL oral suspension) |      |
| C07AA07 | Sotalol hydrochloride (80 mg) | RYTMOBETA (BGP PRODUCTS) | Tablets | Yes | Grind the tablet, dissolve the powder in 10 mL water by shaking for 5 min, then administer immediately | [10] |
|        |                |                            |             |          | Stop EN 2 h before and 2 h after drug administration Follow the same administration schedule |      |
| C07AA12 | Nadolol (80 mg) | NADOLOLO SFV (SANOFI) | Tablets | Yes | Grind the tablet, dissolve the powder in 10 mL water and administer immediately If possible, use another beta blocker available in liquid form | [10] |
| C07AB02 | Metoprolol tartrate (100 mg) | LOPRESPOR (DAIICHI SANKYO) METOPROLOLO HEX (SANDOZ) | Coated tablets Tablets | Yes | It is recommended to use a beta blocker liquid preparation If Metoprolol is non-replaceable, prepare an extemporaneous suspension of Metoprolol 10 mg/mL with simple syrup, or grind the tablet and dissolve it in 10 mL of water. | [10] |
|        |                |                            |             |          | Grind the tablet, dissolve the powder in 10 mL water under shaking for 5 min, then administer immediately Stop EN 30 min before and 30 min after drug administration Divisible tablets |      |
| C07AB03 | Atenolol (100 mg) | ATENOLOLO RAT (RATIOPHARM) ATENOLOLO HEX (SANDOZ) | Coated tablets | Yes | Grind the tablet, dissolve the powder in 10 mL water, then administer immediately | [10] |
|        |                |                            |             |          | Stop EN 30 min before and 30 min after drug administration |      |
| C07AB07 | Bisoprolol fumarate (10 mg) | CONCOR (BRACCO) | Tablets | Yes | Grind the tablet, dissolve the powder in 10 mL water under shaking for 5 min, then administer immediately preferably in the morning after EN | [10] |
|        |                |                            |             |          | |
| ATC    | API (Strength)          | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|--------|-------------------------|---------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| C07AB12| Nebivolol hydrochloride (5 mg) | NEBIVOLOLO SAN (SANDOZ) TRANDATE (TEOFARMA) | Tablets     | No       | Alternative: Atenolol                                                                  |      |
| C07AG01| Labetalol hydrochloride (100 mg) | TRANDATE (TEOFARMA)      | Tablets     | No       |                                                                                       |      |
| C07AG02| Carvedilol (6.25 mg) | OMERIA (MEDIOLANUM FARMACEUTICI) | Tablets     | Yes      | Administer with EN to reduce the risk of orthostatic hypotension                      |      |
| C07AG02| Carvedilol (25 mg)   | Carvedilol ZTV (ZENTIVA)  | Tablets     | Yes      | Administer with EN to reduce the risk of orthostatic hypotension                      |      |
| C08CA01| Amlodipine besylate (5, 10 mg) | AMLODIPINA WIN (ZENTIVA) | Tablets     | Yes      | Dissolve the tablet in 10 mL water and administer immediately concurrently with EN to minimize the gastrointestinal side effects | |
| C08CA02| Felodipine (5 mg) | FELODIPINA WPI (ZENTIVA)  | Modified release tablets | No      | Do not grind, use the liquid formulation (Nifedircor 20 mg/mL drops) to be diluted with 60 mL water and administer immediately | [8,9]|
| C08CA05| Nifedipine (20, 30, 60 mg) | ADALAT CRONO (BAYER) ADALAT (BAYER) | Modified release tablets | No      | Alternative: Nifedircor 20 mg/mL drop solution to be diluted with 60 mL of water | [8,9]|
| C08CA06| Nimodipine (30 mg)   | NIMOTOP (BAYER)           | Coated tablets | Yes      | Photosensitive drug, use amber syringe Not compatible with PVC tube Drug poorly soluble in water and photosensitive |      |
| C08CA09| Lacipidine (4 mg)    | LACIPIL (GLAXOSMITHKLINE) | Coated tablets | No       | Divisible tablets Alternative: Amlodipine formulations                                 |      |
| C08CA11| Manidipine hydrochloride (20 mg) | MANIDIPINA MYL (MYLAN) MANIDIPINA TEV (TEVA) | Tablets     | No       |                                                                                       |      |

Grind the tablet, dissolve the powder in 10 mL water under shaking for 5 min, then administer immediately preferably in the morning after EN. Divisible tablet.
| ATC       | API (Strength)                   | Brand Name (Manufacturer)                     | Dosage Form               | Via Tube | Operative Information                                                                 | Ref. |
|-----------|--------------------------------|-----------------------------------------------|---------------------------|----------|----------------------------------------------------------------------------------------|------|
| C08CA13   | Lecardipine hydrochloride (10 mg) | ZANEDIP (RECORDATI)                         | Coated tablets           | Yes      | Administer away from EN Alternative: Amlodipine formulations                            |      |
| C08DA01   | Verapamil hydrochloride (40, 80, 180 mg) | ISOPTIN (BGP PRODUCTS)                        | Coated tablets           | Yes      |                                                                                        | [10] |
| C08DA01   | Verapamil hydrochloride (120 mg)  | (BGP PRODUCTS) ISOPTIN R (BGP PRODUCTS)       | Modified release tablets | No       | Do not grind Alternative: solution for injection                                       | [8,9]|
| C08DB01   | Verapamil hydrochloride (120 mg)  | ALTIAZEM (SANDOZ)                            | Modified release tablets | No       |                                                                                        |      |
|           | Diltiazem hydrochloride (120 mg)  | ALTIAZEM (IST.LUSOFARMACO)                   | Modified release tablets | No       | Alternative: 60 mg Diltiazem divisible tablets dosage form                              | [8,9]|
|           | Diltiazem hydrochloride (300 mg)  | ALTIAZEM (IST.LUSOFARMACO)                   | Modified release capsules|          |                                                                                        |      |
|           | Diltiazem hydrochloride (200, 300 mg) | TILDIEM (SANOFI)                             | Modified release tablets | No       |                                                                                        |      |
|           | Diltiazem hydrochloride (60, 120 mg) | TILDIEM (SANOFI)                             | Modified release tablets | No       |                                                                                        |      |
| C09AA01   | Captopril (25, 50 mg)             | CAPTOPRIL RAT (RATIOPHARM)                   | Tablets                   | Yes      | Grind, dissolve the tablet in 10 mL water and administer immediately Stop EN at least two h before drug administration. Divisible tablets | [10] |
| C09AA02   | Enalapril maleate (5, 20 mg)      | ENAPREN (MSD)                                | Tablets                   | Yes      | Grind the tablet, dissolve the powder in 10 mL sterile water and administer immediately | [10] |
| C09AA03   | Lisinopril dehydrate (5, 20 mg)   | ZESTRIL (ASTRAZENECA)                        | Tablets                   | Yes      | It is possible to prepare an extemporaneous galenic solution/suspension: stable for 30 days at 2–8 °C | [10] |
| C09AA04   | Lisinopril dehydrate (20 mg)      | LISINOPRIL WPI (ZENITIVA)                    | Tablets                   | Yes      |                                                                                        |      |
| C09AA04   | Perindopril arginine (5 mg)       | COVERSYL (SERVIER)                          | Coated tablets            | Yes      |                                                                                        |      |
| C09AA04   | Perindopril tosilate (5 mg)       | PERINDOPRIL TEV (TEVA)                       | Coated tablets            | No       | Switch to another ACE inhibitor                                                        |      |
| C09AA05   | Ramipril (10 mg)                  | QUARK (POLIFARMA)                           | Tablets                   | Yes      | Dissolve the tablet in 20 mL water and administer immediately                            | [10] |
| C09AA13   | Moexipril hydrochloride (15 mg)   | FEMIPRES (UCB PHARMA)                       | Coated tablets            | No       |                                                                                        | [10] |
### Table 3. Cont.

| ATC     | API (Strength)                                                                                                                                                                                                 | Brand Name (Manufacturer)                                                                 | Dosage Form | Via Tube | Operative Information                                                                                                                                                                                                 | Ref.          |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| C09AA15 | Zofenopril calcium (30 mg) Perindopril arginine Indapamide (2.5 + 0.625/5 + 1.25 mg) Perindopril arginine Indapamide (5 + 1.25 mg)                                                                                     | BIFRIL (IST.LUSOFARMACO) PRETERAX (SERVIER) PRELECTAL (STRODER)                           | Coated tablets | Yes      | Grind, dissolve the tablet in 10 mL water and administer immediately                                                                                                                                                  |              |
| C09BA04 | Ramipril Piretanide (5 + 6 mg)                                                                                                                                                                                                                                                | PRILACE (SANOFI)                                                                           | Coated tablets | No       | Divisible tablets                                                                                                                                                                                                     | [8,9]        |
|         | Quinapril hydrochloride hydrochlorothiazide (20 + 12.5 mg)                                                                                                                                                                                                                        | ACEQUIDE (RECORDATI)                                                                       | Coated tablets | Yes      | Crushable and divisible tablets                                                                                                                                                                                      |              |
| C09BA09 | Ramipril Piretanide (5 + 6 mg)                                                                                                                                                                                                                                                | PRILACE (SANOFI)                                                                           | Coated tablets | No       | Switch to another ACE inhibitor                                                                                                                                                                                      | [8,9]        |
| C09CA01 | Losartan Potassium (50 mg)                                                                                                                                                                                                                                                     | LORTAAN (MSD)                                                                             | Coated tablets | Yes      | Grind, dissolve the tablet in 10 mL water and administer immediately                                                                                                                                                  | [10]         |
| C09CA03 | Valsartan (40 mg) Valsartan (80, 160 mg) Ibersartan (150, 300 mg) Ibersartan (150 mg)                                                                                                                                                                                       | TAREG (NOVARTIS)                                                                          | Coated tablets | Yes      | The tablet is dispersed in 10 mL water under stirring for 5–10 min No blockage risk with an 8 Fr tube Stirring to disperse the tablet                                                                                   |              |
| C09CA04 | Ibersartan (150, 300 mg) Ibersartan (150 mg)                                                                                                                                                                                                                                  | APROVEL (SANOFI) KARVEA (SANOFI)                                                          | Tablets       | Yes      | Grind the tablet, dissolve the powder in 10 mL water and administer immediately                                                                                                                                   |              |
| C09CA06 | Candesartan Cilexetil (8 mg) Candesartan Cilexetil (16 mg) Candesartan Cilexetil (8, 16 mg) Telmisartan (20, 80 mg)                                                                                                                                                          | RATACAND (ASTRAZENECA) BLOPRESS (TAKEDA) CANDESARTAN TEV (TEVA) PRITOR (BAYER)            | Tablets       | Yes      | Grind the tablet, dissolve the powder in 10 mL water and administer immediately. Alternative: Ibersartan                                                                                                                 | [10]         |

References: [8,9,10]
**Table 3. Cont.**

| ATC   | API (Strength)                      | Brand Name (Manufacturer)                        | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-------|-------------------------------------|--------------------------------------------------|-------------|----------|----------------------------------------------------------------------------------------|------|
| C09CA07 | Telmisartan (20, 40, 80 mg)          | MICARDIS (BOEHRINGER INGELHEIM)                  | Tablets     | Yes      | Dissolve the tablet in 5 mL water under stirring and administer immediately              | [10] |
|       | Olmesartan medoxomil (10, 20 mg)    | OLPRESS (MENARINI)                               | Coated tablets | No       | Hygroscopic drug                                                                       |      |
|       | Olmesartan medoxomil (10, 20, 40 mg)| PLAUNAC (MENARINI)                               |             |          |                                                        |      |
| C09DA08 | Olmesartan medoxomil Hydrochlorothiazide (20 + 12.5 mg) | PLAUANAZIDE (MENARINI)                           | Coated tablets | No       | Administer the two drugs separately                                                   | [8,9] |
|       | Olmesartan medoxomil Hydrochlorothiazide (20 + 25/40 + 25 mg) | OLPREZIDE (MENARINI)                             |             |          |                                                        |      |
|       | Olmesartan medoxomil Amlodipine besylate (40 + 5 mg) | SEVIKAR (IST.LUSOFARMACO)                        | Coated tablets | No       | Alternative: administer separately another angiotensin II antagonist drug (eg Irbesartan) and the calcium channel blocker | [8,9] |
| C09XA02 | Aliskiren hemifumarate (150, 300 mg) | RASILEZ (NOVARTIS)                              | Coated tablets | Yes      |                                                        |      |
|       | Simvastatin (10, 20 mg)             | SINVACOR (MSD)                                   | Tablets     | Yes      | Grind the tablet, dissolve the powder in 10 mL water and administer immediately, preferably together with the last course of EN | [10] |
|       | Simvastatin (10, 20 mg)             | SIMVASTAT.RAT (RATIOPHARM)                       |             |          |                                                        |      |
|       | Simvastatin (10 mg)                 | SIMVASTAT.TEV (TEVA)                             |             |          |                                                        |      |
|       | Simvastatin (40 mg)                 | SIMVASTAT.ZTV (ZENTIVA)                          |             |          |                                                        |      |
|       | Pravastatin sodium (20 mg)          | PRAVASTAT.RAT (TEVA)                             |             |          |                                                        |      |
| C10AA03 | Atorvastatin calcium trihydrate (10, 20, 40 mg) | TORVAST (PFIZER)                                | Coated tablets | Yes      | The tablet is dispersed within 2–5 min in 10 mL water                                    | [8,9] |
|       | Fluvastatin sodium (80 mg)          | LESCOL (NOVARTIS)                               | Modified release tablets | No       | Amount not affected by the presence of food                                             | [8,9] |
| C10AA05 | Amlodipine besylate (40 + 5 mg)     | SEVIKAR (IST.LUSOFARMACO)                        | Coated tablets | Yes      |                                                        |      |

[10] Additional information or notes related to the table entries.
Table 3. Cont.

| ATC Code | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|----------|----------------|---------------------------|-------------|----------|-----------------------|------|
| C10AA07 | Rosuvastatin calcium (5, 10, 20 mg) | CRESTOR (ASTRAZENECA) | Coated tablets | Yes | Disperse the tablet in water, after 5 min a milky pink dispersion is obtained, then administer immediately. Better to use Atorvastatin | [10] |
| C10AB04 | Gemfibrozil (600, 900 mg) | LOPID (PFIZER) | Coated tablets | Yes | Crushable tablets |
| C10AB05 | Fenofibrate (145 mg) | FULCROSPRA (BGP PRODUCTS) | Coated tablets | No |
| C10AC01 | Fenofibrate (200 mg) | FENOFIBRATO SAN (SANDOZ) | Capsules | No |
| C10AX06 | Cholestyramine hydrochloride (4 g) | SEACOR (SOC.PRO.ANTIBIOTICI) | Powder for oral suspension | No | Risk of occlusion of the tube due to the formation of a semi-solid mass. Possible interference with the absorption of other drugs |
| C10AX09 | Ezetimibe (10 mg) | EZETROL (MERCK SHARP & DOHME) | Tablets | Yes | Disperse the tablet in 10 mL water under stirring. Administer the suspension immediately |
| C10BA02 | Ezetimibe Simvastatin (10 + 10 mg) | INEGY (MERCK SHARP & DOHME) | Tablets | No | Administer the two drugs separately. Flush with 10 mL water between each one |
| D01BA02 | Terbinafine hydrochloride (250 mg) | TERBINAFINA SAN (SANDOZ) | Tablets | Yes | Disperse the tablet under stirring in 10 mL water for 5 min, to give a fine dispersion that must be immediately administered. Divisible tablets. Be careful when handling. |
| D05BB02 | Acitretin (10, 25 mg) | NEOTIGASON (AUROBINDO) | Capsules | Yes | Open the capsule, disperse the content in water and administer immediately together with EN. If possible change the drug |
| D10BA01 | Isotretinoin (10 mg) | ISOTRETINOINA DIF (DIFA COOPER) | Soft gels | No |
| D11AH04 | Alitretinoin (30 mg) | TOCTINO | Soft gels | No |
| ATC   | API (Strength)               | Brand Name (Manufacturer)      | Dosage Form | Via Tube | Operative Information                                                                 | Ref.   |
|-------|------------------------------|--------------------------------|-------------|----------|---------------------------------------------------------------------------------------|--------|
| G02AB01 | Methyleneprazine maleate (0.125 mg) | METHERGIN (NOVARTIS)            | Coated tablets | No       | Alternative: solution for injection                                                   |        |
| G02CB01 | Bromocriptine mesylate (2.5 mg)   | PARLODEL (MEDA PHARMA)          | Tablets     | Yes      | Administer together with EN                                                           | [10]   |
| G02CB03 | Cabergoline (0.5 mg)          | DOSTINEX (PFIZER)               | Tablets     | No       |                                                                                      |        |
| G03AA10 | Ethinylestradiol Gestodene  | GINODEN (BAYER) ESTINETTE (EFFIK) NORLEVO (LABORATOIRE HRA PHARMA) | Coated tablets | No       | Alternative: transdermal patches                                                     | [8,9]  |
| G03AD01 | Levonorgestrel (1.5 mg)        | PROGEFFIK (EFFIK)               | Tablets     | No       | Alternative: transdermal patches                                                     | [8,9]  |
| G03DA04 | Progesterone (100, 200 mg)    | Capsules                       | No          |          | Alternatives: insert the capsule vaginally or use the solution for injection          | [8,9]  |
| G03DB04 | Nomegestrol acetate (5 mg)     | LUTENYL (RATIOPHARM)           | Tablets     | No       |                                                                                      |        |
| G03DC02 | Norethisterone acetate (10 mg) | PRIMOLUT NOR (BAYER)            | Tablets     | Yes      | Disperse the tablet in 10 mL water under stirring for 5 min, to give a fine dispersion that must be immediately administered. Be careful when handling. | [10]   |
| G03HA01 | Cyproterone acetate (50 mg)   | ANDROCUR (BAYER) MIFEGYNE (EXELGYN) | Tablets     | Yes      | Grind, disperse the tablet in 10 mL water and administer immediately. Where possible switch to intramuscular administration |        |
| G03xB01 | Mifepristone (200 mg)         | Tablets                        | Yes         |          |                                                                                      |        |
| G03xB02 | Ulipristal acetate (5 mg)      | ESMYA (GEDEON RICHTER)         | Tablets     | Yes      | Crushable tablets                                                                    |        |
| G04BD  | Flavoxate Propyphenazone (200 + 30 mg) | CISTALGAN (MEDA PHARMA)       | Coated tablets | No       |                                                                                      | [8,9]  |
| G04BD04 | Oxybutynin hydrochloride (5 mg) | DITROPLAN (SANOFI) VESIKER (ASTELLAS) | Tablets     | Yes      |                                                                                      |        |
| G04BD08 | Solifenacin succinate (5 mg)   | Tablets                        | Yes         |          |                                                                                      |        |
| G04BD12 | Mirabegron (50 mg)            | BETMIGA (ASTELLAS)             | Modified release tablets | No       |                                                                                      | [8,9]  |
Table 3. Cont.

| ATC       | API          | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref.          |
|-----------|--------------|---------------------------|-------------|----------|---------------------------------------------------------------------------------------|---------------|
| G04BE03   | Sildenafil citrate (20 mg) | REVATIO (PFIZER) | Coated tablets | No       | Alternative: oral suspension                                                              |               |
| G04BE03   | Sildenafil citrate (50, 100 mg) | VIAGRA (PFIZER) | Tablets      | Yes      | Grind, disperse the tablet in 10 mL water and administer immediately                      |               |
| G04BE08   | Tadalafil    | CIALIS (ELI LILLY)       | Coated tablets | No       |                                                                                         |               |
| G04CA01   | Alfuzosin hydrochloride (2.5 mg) | MITTOVAL (SANOFI) | Modified release tablets | No       | Alternative: Doxasozin                                                                   | [8,9]         |
| G04CA01   | Alfuzosin hydrochloride (2.5 mg) | XATRAL (SANOFI) | Coated tablets | Yes      | Alternative: Doxasozin                                                                   |               |
| G04CA02   | Tamsulosin hydrochloride (0.4 mg) | PRADIF (BOEHRINGER INGELHEIM) | Capsules | No       | Risk of blockage of the tube                                                           |               |
| G04CA03   | Terazosin hydrochloride (5 mg) | TERAPROST (MALESCI) | Tablets | Yes      | Alternative: Doxasozin                                                                   |               |
| G04CA04   | Silodosin (4, 8 mg) | UROREC (RECORDATI)     | Capsules      | Yes      | Open the capsule and suspend the content in water                                       |               |
| G04CB01   | Finasteride (5 mg) | FINASTERIDE (NEOPHARMED GENTILI) | Coated tablets | Yes      | Crushable tablets                                                                     | [10]          |
| G04CB02   | Dutasteride (0.5 mg) | AVODART (GLAXOSMITHKLINE) | Capsules | No       | Content of the capsule liquid, irritant and teratogen                                  |               |
| H01BA02   | Desmopressin acetate (60, 120 µg) | MINIRIN/DDAVP (FERRING) | Sublingual tablets | No       | Do not crush the tablet                                                                 | [8,9]         |
| H02AB01   | Betamethasone sodium phosphate | BENTELAN (SIGMATAU) | Effervescent tablets | Yes      | Dissolve the tablet in 10 mL water and administer immediately                          | SmPC          |
| H02AB04   | Methylprednisolone (4, 16 mg) | MEDROL (PFIZER) | Tablets      | Yes      | Grind the tablet, dissolve it in 10 mL water and administer immediately                  | [10]          |
| ATC      | API (Strength)          | Brand Name (Manufacturer)          | Dosage Form | Via Tube | Operative Information                                                                 | Ref.   |
|----------|-------------------------|------------------------------------|-------------|----------|--------------------------------------------------------------------------------------|--------|
| H02AB07  | Prednisone (5, 25 mg)   | DELTACORTENE (BRUNO FARMACEUTICI)  | Tablets     | Yes      | Grind the tablet, dissolve it in 10 mL water and administer immediately                | [10]   |
| H02AB07  | Prednisone (5 mg)       | LODOTRA (MUNDIPHARMA)              | Modified release tablets | No      | Alternative: Deltacortene 5 mg                                                       | [8,9]  |
| H02AB09  | Hydrocortisone (5, 20 mg) | PLENADREN (SHIRE)                | Modified release tablets | No      |                                                                       | [8,9]  |
| H02AB10  | Cortisone acetate (25 mg) | CORTONE ACETATO (TEOFARMA)        | Tablets     | Yes      |                                                                       |        |
| H03AA01  | Levothyroxine sodium (50, 100 µg) | TIROSINT (IBSA FARMACEUTICI)     | Tablets     | Yes      | Grind the tablet, dissolve it in 10 mL water. Interaction with EN: suspend it 1 h before and resume it 2 h later drug administration Alternative: Tirosint oral solution which is not affected by simultaneous food intake | SmPC   |
| H03AA01  | Levothyroxine sodium (25, 50, 75, 100 µg) | EUTIROX (MERCK SERONO) LEVOTIROXINA TEV (TEVA) | Tablets     | Yes      | Grind the tablet and dissolve it in 10 mL water, then administer immediately Suspend EN 1 h before and resume it 2 h later drug administration Monitor TSH levels | [10]   |
| H03BB02  | Thiamazole (Methimazole) (5 mg) | TAPAZOLE (TEOFARMA)               | Tablets     | Yes      | Grind the tablet and disperse it in 10 mL water, then administer immediately Divisible tablets |        |
| H05BX01  | Cinnalcalce hydrochloride (30, 60, 90 mg) | MIMPARA (AMGEN) ZEMPLAR (ABBVIE)  | Coated tablets | No      | Alternative: Zemplar solution for injection |        |
| H05BX02  | Paricalcitol (1 µg, 2 µg) | ZEMPLAR (ABBVIE)                  | Capsules    | No       |                                                                       |        |
| J01AA02  | Doxycycline hyclate (100 mg) | BASSADO (PFIZER)                 | Tablets     | Yes      | Grind the tablet and dissolve it in 10 mL water. Administer immediately with plenty of water to prevent irritation | [10]   |
| J01A008  | Minocycline hydrochloride (100 mg) | MINOCIN (TEOFARMA)               | Capsules    | No       | Alternative: powder for solution for injection |        |
| J01A01   | Ampicillin (500 mg)     | AMPLITAL (PFIZER)                 | Capsules    | No       | Alternatives: switch to other formulations (drops, oral suspension, powder for oral suspension) |        |
| J01CA04  | Amoxicillin trihydrate (1 g) | ZIMOX (PFIZER)                   | Tablets     | No       | Dissolve the tablets in a half glass of water                                       | SmPC   |
| J01CA04  | Amoxicillin trihydrate (1 g) | ZIMOX (PFIZER)                   | Chewable tablets | Yes |                                                                       |        |
### Table 3. Cont.

| ATC       | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-----------|----------------|----------------------------|-------------|----------|----------------------------------------------------------------------------------------|------|
| J01CR02   | Amoxicillin trihydrate Clavulanate potassium (875 + 125 g) | ABBA (FIDIA FARMACEUTICI) AUGMENTIN (GLAXOSMITHKLINE) | Powder for oral suspension | Yes | Dissolve the powder in 50 mL water. Administer together with EN to minimize the gastrointestinal side effects | SmPC |
| J01CR02   | Amoxicillin trihydrate Clavulanate potassium (875 + 125 g) | NEODUPLAMOX (VALEAS) | Coated tablets | No | Alternatives: switch to other formulations (suspension, powder for oral suspension) | [8,9] |
| J01CR04   | Sultamicillin tosylate (750 mg) | UNASYN (PFIZER) KEFORAL (CRINOS) CEPOREX (TEOFARMA) | Tablets | No | Alternatives: powder for oral solution, or solution for injection | [8,9] |
| J01DB01   | Cephalexin monohydrate (1 g) | Cephalexin (1 g) | Coated tablets | No | Switch to another cephalosporin or use the oral suspension available on the market | [8,9] |
| J01DC02   | Cefuroxime acetoxyethyl (250 mg) | ZINNAT (GLAXOSMITHKLINE) | Coated tablets | No | Use the syrup which must be diluted with 60 mL water and administered immediately | [8,9] |
| J01DD08   | Cefixime (400 mg) | UNIXIME (F.I.R.M.A.) CEFODOX (SCHARPER) | Coated tablets | No | Alternatives: dispersible tablets or oral suspension. Stop the EN at least 1 h before and resume it 2 h after drug administration | [8,9] |
| J01DD13   | Cefpodoxime proxetil (100, 200 mg) | Tablets | No | Better to switch to the oral suspension | [8,9] |
| J01EE01   | Trimethoprim (160 + 800 mg) | BACTRIM (ROCHE) | Tablets | No | Alternative: oral suspension | [8,9] |
| J01FA09   | Clarithromycin (250, 500 mg) | KLACID (BGP PRODUCTS) CLARITROMICINA TEV (TEVA) | Coated tablets | No | Alternatives: oral suspension, solution for injection Photosensitive drug | [8,9] |
|           | Clarithromycin (500 mg) | | | | Alternative: oral suspension which must be diluted with 60 mL water and administered immediately | [8,9] |
|           | Azithromycin monohydrate (500 mg) | AZITROMICINA EG (EG) | | | Alternative: oral suspension which must be diluted with 60 mL water and administered immediately It does not interact with EN | [8,9] |
|           | Azithromycin monohydrate (500 mg) | AZITROMICINA MYL (MYLAN) ZITROMAX (PFIZER) | | | Alternative: oral suspension which must be diluted Administer 1 h before or 2 h after EN | [8,9] |
|           | Azithromycin dihydrate (500 mg) | | | | Alternative: oral suspension which must be diluted Administer 1 h before or 2 h after EN | [8,9] |
| ATC Code | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|----------|----------------|---------------------------|-------------|----------|-----------------------|------|
| J01FA10  | Azithromycin dihydrate (500 mg) | AZITROMICINA PRG (PROGE FARM) | Coated tablets | No | Alternative: oral suspension which must be diluted | [8,9] |
| J01FA10  | Azithromycin monohydrate (500 mg) | AZITROMICINA SAN (SANDOZ) | Coated tablets | Yes | Alternative: oral suspension which must be diluted | |
| J01FF01  | Clindamycin hydrochloride (150 mg) | TROZAMIL (SO.SE.PHARM) | Coated tablets | Yes | Disperse the content in water and then administer | |
| J01MA02  | Ciprofloxacin hydrochloride monohydrate (250 mg) | CIPROFLOXAC.RAT (RATIOPHARM) | Coated tablets | No | EN-drug interaction: decreased absorption and therapeutic failure | |
| J01MA02  | Ciprofloxacin hydrochloride monohydrate (750 mg) | CIPROFLOXAC.SAN (SANDOZ) | Coated tablets | No | Alternatives: solution for infusion or granules for oral suspension | |
| J01MA12  | Levofloxacin hemihydrate (500 mg) | LEVOFLOXACINA SAN (SANDOZ) | Coated tablets | No | Alternatives: solution for injection or switch to more bioavailable Ofloxacin | |
| J01MA14  | Moxifloxacin hydrochloride (400 mg) | AVALOX (BAYER) | Coated tablets | Yes | The coating exerts only taste masking | |
| J01MA17  | Prulifloxacin (600 mg) | UNIDROX (ANGELINI) | Coated tablets | Yes | Administer immediately after dissolution of the tablet in water | |
| J01XE01  | Nitrofurantoin macrocrystals (50 mg) | NEOFURADANTIN (GRUNETHAL) | Capsules | No | Risk of tube blockage | |
| J01XX01  | Fosfomycin trometamol salt (3 g) | BERNY (SO.SE.PHARM) | Granules for oral solution | Yes | Administer away from the EN, usually at bedtime | |
| J01XX08  | Linezolid (600 mg) | ZYVOXID (PFIZER) | Coated tablets | Yes | Grind the tablet, dissolve the powder in 20 mL water then administer immediately | [10] |
| J01XX08  |  | FLUCONAZOLO EG (EG) | | | Prefer oral suspension or solution for infusion | |
| J01XX08  |  | DIFLUCAN (PFIZER) | | | Any interaction with EN | |
| ATC    | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                                                                                                                                                 | Ref. |
|--------|---------------|---------------------------|-------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| J02AC01 | Fluconazole (100 g) | FLUCONAZOLO SAN (SANDOZ)  | Capsules    | Yes     | Open the capsule, disperse the content in 20 mL water, then administer immediately. Prefer oral suspension or solution for injection. If dietary product is rich in fiber, suspend EN 1 h before and 1 h after drug administration. | [10] |
| J02AC02 | Itraconazole (100 g) | SPORANOX (JANSSEN CILAG) | Capsules    | No      | Alternatives: solution for infusion or oral solution to be diluted with water. The absorption occurs at acidic pH. Administer together with EN. | [10] |
| J02AC03 | Voriconazole (200 mg) | VFEND (PFIZER)            | Coated tablets | Yes     | Grind the tablet, disperse the powder in water and administer away from EN (1 h before or 2 h after EN). Alternatives: oral suspension or powder for solution for injection. | [10] |
| J04AB02 | Rifampicin (300, 400 mg) | RIFADIN (SANOFI)         | Capsules    | No      | Alternative: syrup to be diluted and administered away from EN | [8,9] |
| J04AC01 | Isoniazid (200 mg) | NICOZID (PIAM FARMACEUTICI) | Tablets     | Yes     | Grind the tablet, dissolve the powder in 20 mL water then administer immediately. Stop EN 1 h before and 2 h after drug administration. | [10] |
| J04AK01 | Pyrazinamide (500 mg) | PIRALDINA (BRACCO)       | Tablets     | Yes     | Grind the tablet, dissolve the powder in 10 mL water then administer immediately. | [10] |
| J04AK02 | Ethambutol hydrochloride (400 mg) | ETAPIAM (PIAM FARMACEUTICI) | Coated tablets | Yes     | Grind the tablet, dissolve the powder in 10 mL water then administer immediately 2 h after EN. | [10] |
| J04AM02 | Rifampicin Isoniazid (300 + 150 mg) | RIFINAH 300 (SANOFI)   | Coated tablets | No      | Administer the two drugs separately. Flush with 10 mL water between each one. | [8,9] |
| J04AM05 | Isoniazid Pyrazinamide Rifampicin (50 + 300 + 120 mg) | RIFATER (SANOFI)        | Coated tablets | Yes     | Suspend EN 1 h before drug administration | [8,9] |
Table 3. Cont.

| ATC     | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref.          |
|---------|----------------|---------------------------|-------------|----------|---------------------------------------------------------------------------------------|---------------|
| J05AB01 | Acyclovir (400 mg) | ACICLOVIR DRM (TEVA)      | Tablets     | Yes      | Grind the tablet, dissolve it in 30 mL water then administer immediately                 | [10]          |
|         |                |                           | Capsules    |          | Alternatives: oral suspension or solution for injection                                 |               |
|         |                |                           | Coated tablets |         |                                                                                       |               |
| J05AB04 | Ribavirin (200 mg) | REBETOL (MSD) COPEGUS (ROCHE) | Capsules    | No       | Alternative: Ribavirin (Rebetol) oral solution                                          | [8,9]         |
|         |                | RIBAVIRINA SAN (SANDOZ)   | Coated tablets |         |                                                                                       |               |
|         |                | RIBAVIRINA TEV (TEVA)     | Capsules    |          |                                                                                       |               |
| J05AB11 | Valacyclovir hydrochloride (1 g) | ZELITREX (GLAXOSMITHKLINE) VALACICLOVIR MYL (MYLAN) | Coated tablets | Yes      | Better to switch to Acyclovir                                                          |               |
|         |                |                           |             |          | The tablets are difficult to crush and the powder does not suspend well                  |               |
|         |                |                           |             |          | Alternative: galenic suspension of Valaciclovir 50 mg/mL, by triturating the tablets and using simple syrup (good stability up to 21 days at 2–8 °C) |               |
| J05AB14 | Valgancyclovir hydrochloride (450 mg) | DARILIN (ROCHE) | Coated tablets | No       | Alternative: Valgancyclovir oral suspension (Novir)                                    | [8,9]         |
| J05AE03 | Ritonavir (100 mg) | NORVIR (ABBVIE) | Coated tablets | No       | Alternative: Ritonavir oral suspension                                                | [8,9]         |
|         |                |                           |             |          | Tablets not crushable                                                                  |               |
| J05AE07 | Fosamprenavir calcium (700 mg) | TELZIR (VIIV HEALTHCARE) | Coated tablets | No       | Alternative: Fosamprenavir oral suspension (Telzir)                                     | [8,9]         |
| J05AE08 | Atazanavir sulfate (200, 300 mg) | REYATAZ (BRISTOL-MYERS SQUIBB) PREZISTA (JANSSEN CILAG) | Capsules    | Yes      | Open the capsule, dissolve the content in water, administer it via tube, then continue with EN |               |
| J05AE10 | Darunavir ethanolate (600, 800 mg) | Telaprevir (375 mg) | Coated tablets | No       | Alternative: Darunavir ethanolate oral suspension                                       |               |
| J05AE11 |                | Boceprevir (200 mg)       | Coated tablets | No       |                                                                                       |               |
| J05AE12 |                | Simeprevir (150 mg)       | Capsules    | No       |                                                                                       |               |
| J05AE14 |                |                           | Capsules    | No       |                                                                                       |               |
| ATC    | API (Strength)       | Brand Name (Manufacturer)       | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|--------|----------------------|---------------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| J05AF02 | Didanosine (250 mg)  | VIDEX 250 (BRISTOL-MYERS SQUIBB) | Capsules    | No       | Disperse the tablet in 10 mL water, a pale orange solution is obtained, then administer immediately. Prefer: Lamivudine oral solution | [10] |
| J05AF05 | Lamivudine (100 mg)  | ZEFFIX (GLAXOSMITHKLINE)        | Coated tablets | Yes      | Dissolve the tablet in 10 mL water or orange juice and administer                      | SmPC |
| J05AF08 | Adefovir dipivoxil (10 mg) | HESPERA (GILEAD SCIENCES) | Coated tablets | No       | Switch to Tenofovir                                                                   | [8,9] |
| J05AG01 | Nevirapine (400 mg)  | VIRAMUNE (BOEHRINGER INGELHEIM) | Tablets     | No       | Switch to oral suspension                                                             | [8,9] |
| J05AH02 | Oseltamivir phosphate (30, 45 mg) | TAMIFLU (ROCHE) | Capsules    | Yes      | Alternative: oral suspension                                                          | [8,9] |
| ATC   | API (Strength)                                                                 | Brand Name (Manufacturer)            | Dosage Form | Via Tube | Operative Information                                                                 | Ref.         |
|-------|-------------------------------------------------------------------------------|---------------------------------------|-------------|----------|---------------------------------------------------------------------------------------|--------------|
| J05AR01 | Lamivudine (150 + 300 mg) Zidovudine (150 + 300 mg) Abacavir sulfate (600 + 300 mg) | LAMIV+ZIDOV MYL (MYLAN)                | Coated tablets | No       | Administer the two drugs separately in liquid form                                     | [8,9]        |
| J05AR02 | Lamivudine (600 + 300 mg)                                                     | KIVEXA (VIIV HEALTHCARE)              | Coated tablets | No       | Separate preparations of the two drugs are available in the form of oral suspension  | [8,9]        |
| J05AR03 | Emtricitabine (200 + 245 mg)                                                  | TRUVADA (GILEAD SCIENCES)              | Coated tablets | Yes      | The tablets can be dissolved in about 100 mL of water, orange juice or grape juice and taken immediately | SmPC        |
| J05AR04 | Abacavir sulfate (300 + 150 + 300 mg)                                          | Lamivudine Zidovudine (300 + 150 + 300 mg) Efavirenz (VIIV HEALTHCARE) | Coated tablets | No       | Separate preparations of the three drugs are available in the form of oral suspension | [8,9]        |
| J05AR06 | Emtricitabine (600 +200 +245 mg) Emtricitabine (200 + 25 + 245 mg)             | Emtricitabine (GILEAD SCIENCES)        | Coated tablets | No       |                                                                                       | [8,9]        |
| J05AR08 | Emtricitabine (200 + 300 + 150 + 150 mg)                                     | Emtricitabine (GILEAD SCIENCES)        | Coated tablets | No       |                                                                                       | [8,9]        |
| J05AR09 | Elvitegravir (200 + 300 + 150 + 150 mg)                                       | Elvitegravir (GILEAD SCIENCES)         | Coated tablets | No       |                                                                                       | [8,9]        |
| J05AR10 | Lopinavir (200 + 50 mg)                                                        | KALETRA (ABBVIE)                      | Coated tablets | No       | Tablet crushing reduces AUC by approximately 40% Preferred alternative: Kaletra oral solution (slightly viscous, contains alcohol and propylene glycol) | [8,9]        |
| J05AX08 | Raltegravir potassium (400 mg)                                                 | ISENTRESS (MSD)                       | Coated tablets | No       | Drug insoluble in water                                                              | [8,9]        |
| J05AX09 | Maraviroc (150, 300 mg)                                                       | CELSENTRI (VIIV HEALTHCARE)            | Coated tablets | No       |                                                                                       | [8,9]        |
| J05AX12 | Dolutegravir sodium (50 mg)                                                    | TIVICAY (VIIV HEALTHCARE)             | Coated tablets | Yes      | Grind the tablet, disperse it in water and administer away from EN (2 h before or 6 h after EN) | [8,9]        |
| ATC   | API (Strength)                   | Brand Name (Manufacturer)                  | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-------|---------------------------------|--------------------------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| J05AX14 | Daclatasvir dihydrochloride (60 mg) | DAKLINZA (BRISTOL-MYERS SQUIBB)         | Coated tablets | Yes      | The coating serves only to cover the drug bitter taste                                |      |
| J05AX15 | Sofosbuvir (400 mg)             | SOVALDI (GILEAD SCIENCES)                | Coated tablets | Yes      | The tablets can be triturated and administered via tube concurrently with EN         |      |
| J05AX16 | Dasabuvir (250 mg)              | EXVIERA (ABBVIE)                        | Coated tablets | No       | Not crushable tablet                                                                 |      |
| J05AX65 | Ledipasvir Sofosbuvir (90 + 400 mg) | HARVONI (GILEAD SCIENCES)               | Coated tablets | No       |                                                                                      | [8,9]|
| J05AX67 | Paritaprevir Ritonavir (12.5 + 75 + 50 mg) | VIEKIRAX (ABBVIE)                     | Coated tablets | No       | Not crushable tablet                                                                 | [8,9]|
| L01AA01 | Cyclophosphamide (50 mg)        | ENDOXAN (BAXTER)                        | Coated tablets | No       | Alternative: solution for injection                                                  | [8,9]|
| L01AA02 | Chlorambucil (2 mg)             | LEUKERAN (GLAXOSMITHKLINE)              | Coated tablets | No       |                                                                                      |      |
| L01AA03 | Melfalan (25 mg)                | ALKERAN (ASPEN PHARMA)                  | Coated tablets | No       | Alternative: solution for injection                                                  | [8,9]|
| L01AB01 | Busulfan (2 mg)                 | MYLERAN (ASPEN PHARMA)                  | Coated tablets | No       | Alternative: galenic suspension of Busulfan 2 mg/mL by triturating the tablet       |      |
|        | Temozolomide (100 mg)           | TEMODAL (MSD)                           | Coated tablets | No       | Shelf life 30 days if stored between 2–8 °C                                           |      |
| L01AX03 | Temozolomide (100 mg)           | TEMOZOLOMIDE SUH (RANBAXY ITALIA)       | Capsules     | No       |                                                                                      |      |
|        | Temozolomide (5, 20, 140, 180, 250 mg) | Temozolomide SUH (SUN PHARMACEUTICALS)  | Capsules     | No       |                                                                                      |      |
| L01BA01 | Methotrexate (2.5 mg)           | METHOTREXATE (PFIZER)                   | Tablets      | No       | Alternative: Methotrexate solution for injection                                      | [8,9]|
|        | Fludarabine phosphate (10 mg)   | FLUDARA (GENZYME)                       | Coated tablets | No       | Tablets are divisible but not crushable                                              | [8,9]|
| L01BB05 | Fludarabine phosphate (10 mg)   | FLUDARA (GENZYME)                       | Coated tablets | No       | Alternative: solution for injection                                                  | [8,9]|
### Table 3. Cont.

| ATC  | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|------|----------------|---------------------------|-------------|----------|------------------------|------|
| L01BC06 | Capecitabine (150, 500 mg) | CAPECITABINA ACC (ACCORD HEALTHCARE) CAPECITABINA MYL (MYLAN) XELODA (ROCHE) | Coated tablets | Yes | Disperse the tablet in 200 mL warm water and then administer immediately Attention to handling, use individual protection measures | |
| L01CA04 | Vinorelbine ditartrate (20, 30 mg) | NAVELBINE (PIERRE FABRE PHARMA) | Soft gels | No | Alternative: concentrate for solution for infusion | [8,9] |
| L01XE01 | Imatinib mesylate (100 mg) Gefitinib (250 mg) | GLIVEC (NOVARTIS) IRESSA (ASTRAZENECA) | Capsules Coated tablets | Yes | Open the capsule, dilute the content in water or apple juice Attention to handling, use individual protection measures Disperse the tablet in half glass water (it takes 20 min) Administer the suspension immediately | SmPC |
| L01XE02 | Erlotinib hydrochloride (100, 150 mg) Sunitinib maleate (12.5, 25, 50 mg) Sorafenib tosilate (200 mg) | TARCEVA (ROCHE) SUTENT (PFIZER) NEXavar (BAYER) | Coated tablets | No | Attention to handling, use individual protection measures | |
| L01XE05 | Dasatinib monohydrate (50, 100, 140 mg) Lapatinib ditosylate monohydrate (250 mg) | BRISTOL-MYERS SQUIBB | Coated tablets | No | No specific data are available Attention to handling, use individual protection measures | |
| L01XE07 | Nilotinib hydrochloride (150, 200 mg) Everolimus (5, 10 mg) Pazopanib hydrochloride (400 mg) | TASIGNA (NOVARTIS) AFINITOR (NOVARTIS) VOTRIENT (NOVARTIS) | Capsules Tablets Coated tablets | Yes No No | Disperse the tablet in water without breaking it, under stirring for 15 min until a fine dispersion is obtained, then administer immediately away from the EN Be careful when handling | SmPC |
### Table 3. Cont.

| ATC    | API (Strength)           | Brand Name (Manufacturer)           | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|--------|--------------------------|-------------------------------------|-------------|----------|----------------------------------------------------------------------------------------|------|
| L01XE16| Crizotinib (250 mg)      | XALKORI (PFIZER)                    | Capsules    | No       |                                                                                        |      |
| L01XE18| Ruxolitinib phosphate (5, 15 mg) | JAKAVI (NOVARTIS)                  | Tablets     | No       |                                                                                        |      |
| L01XE21| Regorafenib (40 mg)      | STIVARGA (BAYER)                     | Coated tablets | No      |                                                                                        |      |
| L01XX05| Hydroxycarbamide (500 mg) | ONCO CARBIDE (TEOFARMA)             | Capsules    | Yes      | Attention to handling, use individual protection measures                                | [10] |
| L01XX14| Tretinoin (10 mg)        | VESANOID (CHEPLAPHARM ARZNEIMITTEL) | Capsules    | No       |                                                                                        |      |
| L01XX23| Mitotane (500 mg)        | LYSODREN (HRA PHARMA)               | Tablets     | Yes      | The company confirms that the tablet can be crushed and the API dissolves in water      |      |
|        |                          |                                     |             |          | Use gloves for handling Antineoplastic drug                                             |      |
| L01XX35| Anagrelide hydrochloride (0.5 mg) | XAGRID (SHIRE)                   | Capsules    | No       |                                                                                        |      |
| L02AB01| Megestrol acetate (160 mg) | GESTROLTEX (PHARMATEX NOMAFEN (ITALIAN DEVICES) KESSAR (ORION) | Tablets     | No       |                                                                                        |      |
| L02BA01| Tamoxifen citrate (20 mg) |                                    | Coated tablets | No      |                                                                                        |      |
| L02BB01| Flutamide (250 mg)       | FLUTAMIDE FDI (FIDIA FARMACEUTICI)  | Tablets     | Yes      | Tablet disaggregates slowly, maintain it under stirring in 10 mL water for 10 min     | [10] |
|        |                          |                                     |             |          | Attention to handling If possible use other antiandrogens administered as a subcutaneous implant |      |
| L02BB03| Bicalutamide (50, 150 mg) | CASODEX (ASTRAZENECA)               | Coated tablets | Yes     | Grind the tablet and disperse the powder in water Work in a closed system (disperse the tablet in the body of a syringe) Administer immediately after the EN  | [10] |
|        | Bicalutamide (150 mg)    | BICALUTAMIDE HIK (HIKMA FARMACEUTICA) | Coated tablets | No      | Attention to handling If possible use other antiandrogens administered by subcutaneous implant | [10] |
| ATC     | API                      | Brand Name (Manufacturer)                         | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|---------|--------------------------|--------------------------------------------------|-------------|----------|----------------------------------------------------------------------------------------|------|
| L02BB03 | Bicalutamide (50, 150 mg)| BICALUTAMIDE TEV (TEVA) ANASTROZOLO ACC (ACCORD HEALTHCARE) | Coated tablets | No       | If possible use other antiandrogens administered by subcutaneous implant                |      |
| L02BG03 | Anastrozole (1 mg)       | ANASTROZOLO ACC (ACCORD HEALTHCARE) ARMIDEX (ASTRAZENECA) | Coated tablets | No       | Data not available                                                                      |      |
| L02BG04 | Letrozole (2.5 g)        | LETROZOLO ACC (ACCORD HEALTHCARE) LETROZOLO SAN (SANDOZ) | Coated tablets | No       | Disperse the tablet in 10 mL water in a closed system (disperse the tablet in the body of a syringe) Drug slightly soluble in water |      |
| L02BG06 | Exemestane (25 mg)       | AROMASIN (PFIZER) ZYTIGA (JANSSEN CILAG)          | Coated tablets | No       | Yes                                                                                   |      |
| L02BX03 | Abiraterone acetate (25 mg) | MYFORTIC (NOVARTIS) MYFENAX (TEVA)               | Coated tablets | No       | Alternative: Mycofenolate mofetil (Cellept) oral solution                              | [8,9]|
| L04AA06 | Mycofenolate sodium (180, 360 mg) | MYFORTIC (NOVARTIS) CELLCEPT (ROCHE) MYFENAX (TEVA) | Gastro-resistant tablets | Capsules | Alternative: Sirolimus (Rapamune) oral solution                                         | [8,9]|
| L04AA10 | Mycofenolate mofetil (250, 500 mg) | MYFORTIC (NOVARTIS) | Coated tablets | No       | Alternative: Mycofenolate mofetil (Cellept) oral solution                              | [8,9]|
| L04AA13 | Leflunomide (20 mg)      | ARAVA (SANOFI)                                    | Coated tablets | Yes      | Dissolve the tablet in 10 mL water and administer immediately                         | [10] |
| L04AA18 | Everolimus (0.25, 0.75 mg) | CERTICAN (NOVARTIS)                               | Tablets     | No       | Alternative: orosoluble tablets to be dissolved in 10 mL water Stop EN 1 h before and 2 h after drug administration | [8,9]|
| L04AA27 | Fingolimod hydrochloride (0.5 mg) | GILENYA (NOVARTIS)                              | Capsules     | No       |                                                                                       |      |
| L04AA31 | Teriflunomide (14 mg)    | AUBAGIO (GENZYME)                                 | Coated tablets | No       |                                                                                       |      |
| L04AD01 | Cyclosporine (10, 25, 50, 100 mg) | SANDIMMUN NEORAL (NOVARTIS) | Capsules     | No       | Alternative: Cyclosporine oral solution                                                | [8,9]|

Table 3. Cont.
**Table 3. Cont.**

| ATC     | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|---------|----------------|---------------------------|-------------|----------|------------------------|------|
| Tacrolimus (1 mg) | **TACROLIMUS ACC** (ACCORD HEALTHCARE) | Tacrolimus monohydrate (0, 5, 1, 3, 5 mg) | **PROGRAF** (ASTELLAS) | No | Alternatives: Porgraf capsules or Tacni capsules | |
| Tacrolimus monohydrate (0, 5, 1, 5 mg) | **TACROLIMUS MYL** (MYLAN) | No | Alternative: Porgraf capsules | |
| Tacrolimus monohydrate (0.5 mg) | **TACROLIMUS ACC** (ACCORD HEALTHCARE) | Tacrolimus monohydrate (1 mg) | **ADOPORT** (SANDOZ) | No | Alternative: Porgraf capsules | |
| Tacrolimus monohydrate (1 mg) | No | Alternative: Porgraf capsules | |
| Azathioprine (50 mg) | **AZATIOPRINA** (ASPEN PHARMA) | Coated tablets | Yes | Disperse the tablet in 10 mL water in the body of a syringe (closed system) | [10] |
| Thalidomide (50 mg) | **THALIDOMIDE CELGENE (CELGENE)** | Capsules | No | Cytotoxic drug | Use personal protective equipment | |
| Lenalidomide (5, 10, 15, 25 mg) | **REVLIMID** (CELGENE) | Capsules | No | The capsules must not be opened | |
| Pirfenidone (267 mg) | **ESBRIET** (ROCHE) | Capsules | No | Teratogen drug | |
| Pomalidomide (4 mg) | **IMINOVID** (ROCHE) | Capsules | No | The capsules must not be opened | |
| Piroxicam (20 mg) | **INDOXEN** (SIGMATAU) | Capsules | No | Teratogen drug | |
| Diclofenac sodium (50, 150 mg) | **FLOGOFENAC** (A.MENARINI) | Modified release capsules | No | Alternatives: disperseable tablets, solution for injection, cutaneous formulations | [8,9] |
| Diclofenac sodium (50, 150 mg) | **DICLOREUM** (ALFA WASSERMANN) | Gastro-resistant tablets | No | Alternatives: disperseable tablets, solution for injection, cutaneous formulations | [8,9] |
| Ketorolac tromethamine (10 mg) | **TORADOL** (RECORDATI) | Coated tablets | No | Alternatives: drops, solution for injection | [8,9] |
| Piroxicam (20 mg) | **FELDENE SOL** (PFIZER) | Soluble tablets | Yes | | [8,9] |
| ATC   | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form       | Via Tube | Operative Information                                                                 | Ref. |
|-------|--------------------------------|---------------------------|-------------------|----------|--------------------------------------------------------------------------------------|------|
| M01AE01 | Ibuprofen (600 mg)            | BRUFEN (BGP PRODUCTS)     | Coated tablets    | No       | Alternatives: effervescent granules, oral suspension to be diluted with the same water amount |      |
|       | Ibuprofen (600 mg)            | BRUFEN (BGP PRODUCTS)     | Effervescent granules | Yes      | Dissolve the granules in plenty of water                                              |      |
|       | Ibuprofen (200 mg)            | NUROFEN (RECKITT BENCKISER) | Coated tablets    | No       | Alternative: oral suspension                                                            | [8,9]|
|       | Ibuprofen arginine salt (400 mg) | SPIDIDOL (ZAMBON)     | Coated tablets    | No       | Alternative: oral suspension                                                            |      |
|       | Ketoprofen lysine salt (80 mg) | OKI (DOMPE' FARMACEUTICI) | Granules for oral solution | Yes      |                                                                                        |      |
| M01AE03 | Ketoprofen (200 mg)           | KETOPROFENE EG (EG)       | Capsules          | No       | Alternatives: solution for injection, suppositories, cutaneous gel                    | [8,9]|
|       | Ketoprofen lysine salt (80 mg) | KETOPROFENE MYL (MYLAN)   | Powder for oral solution | Yes      |                                                                                        |      |
|       | Ketoprofen (200 mg)           | ORUDIS RETARD (SANOFI)    | Capsules          | No       |                                                                                        |      |
| M01AH01 | Celecoxib (200 mg)            | CELEBREX (PFIZER)         | Capsules          | Yes      | Open the capsule and disperse the content in 10 mL water                              | [10] |
|       | Etoricoxib (60, 90 mg)        | TAUXIB (ADENDA)           |                  |          |                                                                                        |      |
|       | Etoricoxib (60 mg)            | ARCOXIA (MSD)             |                  |          |                                                                                        |      |
|       | Etoricoxib (60, 90 mg)        | ALGIX (NEOPHARMED GENTILI) | Coated tablets    | Yes      | The tablet immersed in 10 mL water, swells and then releases fine granules that must be administered in an 8 Fr caliber tube | [10] |
| M01AX17 | Nimesulide (100 mg)           | AULIN (HELSINN BIREX PHARMAC.) | Granules for oral solution | Yes      | Disperse the tablet in 30 mL water and then administer immediately with EN to reduce gastrointestinal side effects |      |
| M03BX01 | Baclofen (10, 25 mg)          | LJORESAL (NOVARTIS)       | Tablets           | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately   | [10] |
| M03BX03 | Pridinol mesilate (4 mg)      | LYSEEN (GLAXOSMITHKLINE)  | Tablets           | Yes      | Alternative: solution for injection                                                   |      |
| M03BX05 | Thiocolchicoside (4 mg)       | MUSCORIL (SANOFI)         | Capsules          | No       | Alternative: solution for injection                                                   | [8,9]|

Table 3. Cont.
## Table 3. Cont.

| ATC     | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref.        |
|---------|---------------------------------|---------------------------|-------------|----------|---------------------------------------------------------------------------------------|------------|
| M04AA01 | Allopurinol (100, 300 mg)       | ALLOPURINOLO TEV (TEVA)   | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately   | [10]       |
| M04AA03 | Febuxostat (80 mg)              | ADENURIC (A.MENARINI)     | Coated tablets | No      | Alternative: Allopurinol tablets                                                      |            |
| M04AC01 | Colchicine (1 mg)               | COLCHICINA LIRCA (PHARMAFAR) | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately   | [10]       |
| M05BA04 | Alendronate sodium (10 mg)      | ALENDROS (ABIGEN PHARMA)  | Tablets     | No       | Interaction with EN                                                                   |            |
|         | Alendronate sodium trihydrate (70 mg) | ADRONAT (NEOPHARMED GENTILI) | Tablets     | No       | Irritant for mucosal membranes                                                        |            |
|         | Alendronate sodium monohydrate (70 mg) | ALENDRONATO TEV (TEVA)  | Tablets     | No       | If necessary grind the tablet and dissolve the powder in 50 mL water, then administer 30 min before the first daily administration of EN keeping the patient in a semi-sitting position Rinse the tube with 100 mL water after administration |            |
| M05BA06 | Ibandronate sodium monohydrate (150 mg) | BONVIVA (ROCHE)          | Coated tablets | No      |                                                                                       |            |
| M05BB03 | Alendronate sodium trihydrate Cholecalciferol (70 mg + 5600 IU) | AC.IBANDR.TEV (TEVA)    | Tablets     | No       |                                                                                       |            |
| M05BX03 | Strontium ranelate (2 g)         | PROTELOS (SERVIER)       | Granules for oral suspension | Yes     |                                                                                       |            |
| N02AA01 | Morphine sulfate (10, 30 mg)    | MS CONTIN (MUNDIPHARMA)   | Modified release tablets | No      | Alternative: drops to be diluted with 50 mL water and administered immediately         | [8,9]      |
| N02AA03 | Hydromorphone hydrochloride (4, 8, 16 mg) | JURNISTA (JANSSEN CILAG) | Modified release tablets | No      |                                                                                       | [8,9]      |
| N02AA05 | Oxycodone hydrochloride (5, 10, 20 mg) | OXYCONTIN (MUNDIPHARMA)  | Modified release tablets | No      |                                                                                       | [8,9]      |
|         | Oxycodone hydrochloride (40 mg)  | OXICODONE SAN (SANDOZ)    | Modified release tablets | No      |                                                                                       | [8,9]      |
| ATC     | API (Strength)           | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                      | Ref.   |
|---------|--------------------------|----------------------------|-------------|----------|-------------------------------------------------------------|--------|
| N02AA55 | Oxycodone hydrochloride  | DEPALGOS                   | Coated tablets | No       |                                                             | [8,9]  |
|         | Paracetamol (10 + 325/20 + 325 mg) | (MOLteni & C. Flli ALITTI) |             |          |                                                             |        |
| N02AA55 | Oxycodone hydrochloride  | TARGIN                     | Modified release tablets | No       | Alternative: switch to another analgesic opioid transdermal formulation | [8,9]  |
|         | Naloxone hydrochloride dihydrate (10 + 325/20 + 325 mg) | (MUNDIPHARMA)              |             |          |                                                             |        |
| N02AA59 | Paracetamol Codeine phosphate (500 + 30 mg) | ANGELINI                   | Effervescent granules Coated tablets | Yes      | Administer only after the end of the effervescence The tablet can be triturated and dispersed in water |        |
| N02AB03 | Fentanyl citrate (100, 200, 300, 400, 600 µg) | ABSTRAL                    | Sublingual tablets Orosoluble tablets Modified release tablets | No       | Yes Alternatives: suppositories, orosoluble tablets, suppositories, drops to be diluted with 50 mL water | [8,9]  |
| N02AX02 | Tramadol hydrochloride (100 mg) | CONTRAMAL              | Modified release tablets | No       | Alternatives: effervescent tablets to be dissolved in water and administered after the end of the effervescence | [8,9]  |
| N02AX06 | Tapentadol hydrochloride (50, 100 mg) | PALEXIA                  | Modified release tablets | No       |                                                             | [8,9]  |
| N02AX52 | Tramadol hydrochloride Paracetamol (37.5 + 325 mg) | PATROL                    | Coated tablets | No       |                                                             |        |
| N02BA01 | Acetylsalicylic acid (100 mg) | ASPIRINETTA              | Tablets | Yes | Immerse directly the tablet in water Administer together with EN to reduce gastrointestinal side effects | SmPC   |
| N02BE01 | Paracetamol (500 mg) | TACHIPIRINA              | Tablets | Yes | Alternatives: orosoluble tablets, granules, suppositories, syrup or solution for injection Dissolve the tablet in 30 mL water and administer only at the end of the effervescence |        |
|         | Paracetamol (1000 mg) | TACHIPIRINA              | Effervescent tablets | Yes | Alternatives: orosoluble tablets, granules, suppositories or solution for injection |        |
| N02BE01 | Paracetamol (250, 500 mg) | TACHIPIRINA              | Orodispersible tablets | Yes |                                                             | [8,9]  |
Table 3. Cont.

| ATC     | API (Strength)                  | Brand Name (Manufacturer)                  | Dosage Form         | Via Tube | Operative Information                                                                 | Ref. |
|---------|---------------------------------|--------------------------------------------|---------------------|---------|---------------------------------------------------------------------------------------|------|
| N02CC01 | Paracetamol (250, 1000 mg)      | TACHIPIRINA OROS (ANGELINI)                | Orosoluble granules | Yes     | Alternatives: solution for injection or nasal spray                                    | [8,9]|
|         | Sumatriptan succinate (50 mg)   | SUMATRIPTAN DOC (DOC GENERICI)             | Coated tablets      |         | Grind the tablet and disperse the powder in 10 mL water, then administer immediately  |      |
|         |                                 |                                            |                     |         | Administer together with EN to reduce gastrointestinal side effects                   |      |
| N03AA02 | Phenobarbital (100 mg)          | LUMINALE BRACCO (BRACCO)                   | Tablets             | Yes     | Do not administer solution for injection via tube due to the presence of glycol        | SmPC |
| N03AA02 | Phenobarbital (100 mg)          | GARDENALE (SANOFI)                         | Tablets             | Yes     | Administer together with EN to reduce gastrointestinal side effects                   |      |
|         |                                 |                                            |                     |         | Do not administer solution for injection via tube due to the presence of glycol        |      |
| N03AA03 | Primidone (250 mg)              | MYSOLINE (SIT LABORATORIO FARMACEUTICO)    | Tablets             | Yes     | Grind the tablet and disperse the powder in 10 mL water, then administer immediately  |      |
| N03AB02 | Phenytoin sodium (100 mg)       | DINTOINA (RECORDATI)                       | Coated tablets      | Yes     | Stop EN 2 h before and 2 h after drug administration                                 | [10] |
|         |                                 |                                            |                     |         | Wash the tube with 50 mL water                                                       |      |
|         |                                 |                                            |                     |         | Alternative: solution for injection                                                  |      |
| N03AB52 | Phenytoin Methylphenobarbital (100 + 40 mg) | DINTOINALE (RECORDATI)                  | Tablets             | Yes     | Alternative: Clonazepam drops to be diluted with 50 mL water and administered immediately |      |
| N03AE01 | Clonazepam (2 mg)               | RIVOTRIL (ROCHE)                           | Tablets             | Yes     | Grind the tablet and disperse the powder in 10 mL sterile water, then administer immediately |      |
|         |                                 |                                            |                     |         | Stop EN 1 h before and 2 h after drug administration                                 | [10] |
|         |                                 |                                            |                     |         | Requires close monitoring, it interacts with the EN Can adhere to the walls of the tube and have a reduced absorption Better to use syrup |      |
| N03AF01 | Carbamazepine (200, 400 mg)     | CARBAMAZEPINA (EG)                         | Tablets             | Yes     |                                                           |      |
| N03AF01 | Carbamazepine (400 mg)          | TEGRETOL (NOVARTIS)                        | Modified release tablets | No     | Alternatives: syrup or tablets                                                       | [8,9]|

Note: EN refers to enteral nutrition.
Table 3. Cont.

| ATC    | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|--------|----------------|---------------------------|-------------|----------|------------------------|------|
| N03AF01 | Carbamazepine (400 mg) | TEGRETOL (NOVARTIS) | Tablets | Yes | Grind the tablet and disperse the powder in 10 mL sterile water, then administer immediately Stop EN at least 1 h before and 2 h after the dose Requires close monitoring, it interacts with the EN Can adhere to the walls of the tube and have a reduced absorption Better to use syrup | [10] |
| N03AF02 | Oxcarbazepine (300, 600 mg) | TOLEP (NOVARTIS) | Tablets | Yes | Grind the tablet and disperse the powder in 10 mL water, then administer immediately | |
| N03AG01 | Valproic acid Valproate sodium (300, 500 mg) | AC VAL/S. VALPRAT (RATIOPHARM) | Modified release tablets | | | |
| N03AG01 | Valproate sodium (500 mg) | AC VALPROICO/SOD VALPR SAN (SANDOZ) | Modified release tablets | | | |
| N03AG01 | Valproate sodium (200, 500 mg) | DEPAKIN (SANOFI) | Gastro-resistant tablets | | | |
| N03AG01 | Valproate sodium (100, 250, 500, 750, 1000 mg) | DEPAKIN SAN (SANOFI) | Modified release granules | | | |
| N03AG02 | Valproamide magnesium (500 mg) | DEPAMAG (SIGMATAU) | Gastro-resistant tablets | No | | |
| N03AG02 | Valpromide (300 mg) | DEPAMIDE SANOFI | Gastro-resistant tablets | No | | |
| N03AG04 | Vugabatrin (500 mg) | SABRIL (SANOFI) | Coated tablets | No | Alternative: granules | [8,9] |
| N03AX09 | Lamotrigine (25, 200 mg) | LAMOTRIGINA EG (EG) | Dispersible tablets | Yes | Dissolve the tablet in 10 mL water and administer the solution immediately | |
| N03AX09 | Lamotrigine (25, 50, 100, 200 mg) | LAMICTAL (GLAXOSMITHKLINE) | Dispersible tablets | Yes | | SmPC |
| N03AX11 | Topiramate (25 mg) | TOPIRAMATO DOC (DOC GENERICI) | Coated tablets | Yes | The tablet is not easily dispersed in water, due to the coating, but requires gentle stirring for 5 min A fine suspension is obtained which should be administered immediately Better to use capsules | [10] |
Table 3. Cont.

| ATC     | API (Strength)     | Brand Name (Manufacturer)         | Dosage Form | Via Tube | Operative Information                                                                 | Ref.     |
|---------|--------------------|-----------------------------------|-------------|----------|---------------------------------------------------------------------------------------|---------|
| N03AX11 | Topiramate (25 mg) | TOPAMAX (JANSSEN CILAG)           | Capsules    | Yes      | Open the capsule, disperse the content in 20 mL water, then administer immediately     | SmPC    |
| N03AX12 | Gabapentin (400 mg) | DOC GENERICI GABAPENTIN TEV (TEVA) | Capsules    | Yes      | Open the capsule, disperse the content in 20 mL water, then administer immediately     | [10]    |
| N03AX14 | Levetiracetam (500 mg) | LEVETIRACETAM DOC (DOC GENERICI) LEVETIRACETAM SAN (SANDOZ) | Coated tablets | Yes      | Grind the tablet and disperse the powder in 20 mL water, then administer immediately Better to use oral solution | [10]    |
| N03AX15 | Zonisamide (50, 100 mg) Pregabalin (25, 75, 150 mg) | ZONEGRAN (EISAI) LYRICA (PFIZER) | Capsules    | Yes      | Open the capsules and dissolve the content in water Drug water soluble                  |         |
| N03AX16 | Lacosamide (50, 100 mg) | VIMPAT (UCB PHARMA)              | Coated tablets | Yes      | Alternative: solution for injection                                                  |         |
| N04AA02 | Biperiden hydrochloride (4 mg) | AKINETON (SIT LABORATORIO FARMACEUTICO) | Modified release tablets | No      | Alternative: Biperiden hydrochloride 2 mg                                              | [8,9]   |
| N04AA02 | Biperiden hydrochloride (2 mg) | AKINETON (SIT LABORATORIO FARMACEUTICO) | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Stop EN 2 h before and 2 h after drug administration Photosensitive drug |         |
| N04AA11 | Bornaprine hydrochloride (4 mg) | SORMODREN (TEOFARMA)             | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Wash the tube with 50 mL water |         |
| N04BA02 | Levodopa Carbidopa (100 + 25/200 + 50 mg) | SINEMET (MSD)                     | Modified release tablets | No      | Alternative: dispersible tablets                                                      | [8,9]   |
| N04BA02 | Levodopa Carbidopa (100 + 25/250 + 25 mg) | SINEMET (MSD)                     | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Stop EN 2 h before and 2 h after drug administration Photosensitive drug | [10]    |
|         | Levodopa Benserazide hydrochloride (100 + 25 mg) | MADOPAR (ROCHE)                 | Modified release capsules |          |                                                                                       |         |
| ATC     | API (Strength)                        | Brand Name (Manufacturer) | Dosage Form       | Via Tube | Operative Information                                                                                   | Ref.          |
|---------|--------------------------------------|---------------------------|-------------------|----------|--------------------------------------------------------------------------------------------------------|---------------|
| N04BA02 | Levodopa Benserazide hydrochloride (100 + 25 mg) | MADOPAR (ROCHE)            | Capsules          | No       | Alternative: dispersible tablets                                                                      | [8,9]         |
|         | Levodopa Benserazide hydrochloride (100 + 25 mg) | MADOPAR (ROCHE)            | Tablets           |          | SmPC                                                                                                   |               |
|         | Levodopa Benserazide hydrochloride (100 + 25 mg) | MADOPAR (ROCHE)            | Dispersible tablets | Yes      | Disperse the tablet in 25–50 mL water until a fine opalescent suspension is obtained Stop EN 1 h before drug administration | [8,9]         |
|         | Levodopa Carbidopa (200 + 50 mg)       | LEVOD/CARB HEXAL (SANDOZ)   | Modified release tablets | No       | Alternative: dispersible tablets                                                                      | [8,9]         |
|         | Levodopa Benserazide hydrochloride (200 + 50 mg) | LEVODOPA/BENSERAZIDE TEV (TEVA) | Tablets           | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Stop EN 2 h before and 2 h after drug administration Do not administer together with high-protein diets Splittable tablet | [10]          |
|         | Levodopa Carbidopa Entecapone (all dosages) | STALEVO (NOVARTIS)         | Coated tablets    | No       |                                                                                                        | [8,9]         |
| N04BA05 | Melevodopa hydrochloride Carbidopa hydrate (12.5 + 125/25 + 100 mg) | SIRIO (CHIESI FARMACEUTICI) | Effervescent tablets | Yes      | Dissolve in 150 mL water and wait until the end of the effervescence                                  |               |
| N04BB01 | Amantadine hydrochloride (100 mg)     | MANTADAN (BOEHRINGER INGELHEIM) | Tablets           | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately                  | [10]          |
| N04BC04 | Ropirinole hydrochloride (4, 8 mg)    | REQUIP (GLAXOSMITHKLINE)   | Modified release tablets | No       | Alternative: Requip tablets                                                                         | [8,9]         |
| N04BC04 | Ropirinole hydrochloride (0.25, 0.5, 1.2 mg) | REQUIP (GLAXOSMITHKLINE)   | Coated tablets    | Yes      | Dissolve quickly the tablet in 10 mL water to obtain a fine dispersion to be administered immediately | [10]          |
| N04BC04 | Ropirinole hydrochloride (4 mg)       | ROPINIROLO SAN (SANDOZ)    | Modified release tablets | No       | Alternative: Requip tablets                                                                         | [8,9]         |
| N04BC05 | Pramipexole dihydrochloride monohydrate (0.26, 0.52, 1.05, 2.1, 3.15 mg) | MIRAPEXIN (BOEHRINGER INGELHEIM) | Modified release tablets | No       | Alternative: Pramipexol tablets                                                                    | [8,9]         |
| ATC      | API (Strength)                                      | Brand Name (Manufacturer)           | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|----------|-----------------------------------------------------|-------------------------------------|-------------|----------|---------------------------------------------------------------------------------------|------|
| N04BC05  | Pramipexole dihydrochloride monohydrate (0.7 mg)    | PRAMIPEXOLO EG (EG)                 | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately    |      |
|          | Pramipexole dihydrochloride monohydrate (0.18, 0.7 mg) | PRAMIPEXOLO (TEVA)                  |             |          | Photosensitive drug                                                                    |      |
| N04BC06  | Cabergoline (2 mg)                                  | CABASER (PFIZER)                    | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately    | [10] |
| N04BD01  | Selegiline hydrochloride (5, 10 mg)                  | JUMEX (CHIESI FARMACEUTICI)         | Tablets     | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately    |      |
|          | Rasagiline mesylate (1 mg)                          | AZILECT (TEVA)                      | Tablets     | Yes      | Administer in the morning before starting EN                                          |      |
| N04BX01  | Tolcapone (100 mg)                                  | TASMAR (MEDA PHARMA)                | Coated tablets | Yes    |                                                                                       |      |
| N04BX02  | Entacapone (200 mg)                                 | COMTAN (NOVARTIS)                   | Coated tablets | Yes    | Grind the tablet and dissolve the powder in 20 mL water, then administer immediately    | [10] |
| N05AA01  | Chlorpromazine hydrochloride (100 mg)               | PROZIN (IST.LUSOFARMACO)            | Coated tablets | No     | Alternatives: drops or oral solution                                                  | [8,9]|
| N05AA02  | Levomepromazine maleate (25, 100 mg)                | NOZINAN (SANOFI)                    | Coated tablets | No     |                                                                                       |      |
| N05AB03  | Perphenazine (2, 4, 8 mg)                           | TRILAFON (NEOPHARMED GENTILI)       | Coated tablets | Yes    |                                                                                        |      |
| N05AB06  | Trifluoperazine dihydrochloride (1 mg)              | MODALINA (IST LABORATORIO FARMACEUTICO) | Coated tablets | No     |                                                                                        |      |
| N05AD01  | Haloperidol (1, 5 mg)                               | HALDOL (JANSSEN CILAG)              | Tablets     | Yes      | Better to use drops diluted in 50 mL water and administered 1 h before or 2 h after EN|      |
| N05AF05  | Zuclopenthixol dihydrochloride (10 mg)              | CLOPIXOL (LUNDBECK)                 | Coated tablets | Yes    | Immerse the tablet in water, after 10 min a fine suspension is obtained, then administer immediately |      |
| ATC     | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information | Ref. |
|---------|----------------|---------------------------|-------------|----------|----------------------|------|
| N05AH02 | Clozapine (25 mg) | CLOZAPINA CHS (CHIESI FARMACEUTICI) | Coated tablets | Yes | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately |      |
|         | Clozapine (25, 100 mg) | LEPONEX (NOVARTIS) | Tablets |       |                      |      |
|         | Clozapine (100 mg) | CLOZAPINA (ORION) | Tablets |       |                      |      |
| N05AH03 | Olanzapine (5, 10 mg) | ZYPREXA VELOTAB (ELI LILLY) | Orodispersive tablets | Yes | Dissolve in 30 mL water, apple juice, orange juice, or milk Irritant drug Use personal protective equipment | SmPC |
|         | Olanzapine (2.5 mg) | ZYPREXA (ELI LILLY) | Coated tablets | Yes | Better to use orodispersible tablets Irritant to mucous membranes and eyes |      |
|         | Olanzapine (5, 10 mg) | OLANZAPINA SUN (SUN PHARMACEUTICALS) | Orodispersive tablets | Yes | Dissolve the tablet in water and administer immediately |      |
|         | Olanzapine (2.5, 5, 10 mg) | OLANZAPINA TEV (TEVA) | Coated tablets | No | Better to use orodispersible tablets |      |
| N05AH03 | Olanzapine (5, 10 mg) | OLANZAPINA TEV (TEVA) | Orodispersive tablets | Yes | Dissolve the tablet in water and administer immediately | SmPC |
| N05AH04 | Quetiapine fumarate (50, 150, 200, 300, 400 mg) | SEROQUEL (ASTRAZENECA) | Modified release tablets | No | Alternative: Seroquel coated tablets | [8,9] |
|         | Quetiapine fumarate (100, 200, 300 mg) | SEROQUEL (ASTRAZENECA) | Coated tablets | Yes | Grind the tablet and dissolve the powder in 25 mL water, then administer immediately |      |
|         | Quetiapine fumarate (50, 200, 300, 400 mg) | QUETIAPINA TEV (TEVA) | Modified release tablets | No | |      |
| N05AH04 | Asenapine maleate (5, 10 mg) | QUETIAPINA TEV (TEVA) | Sublingual tablets | No | | [8,9] |
| N05AH05 | Clotiapine (40 mg) | ENTUMIN (LAB.JUVIS' PHARMACEUTICALS) | Tablets | Yes | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Alternative: Entumin drops to be diluted with 50 mL water | [8,9] |
| N05AL03 | Tiapride hydrochloride (100 mg) | SEREPRILE (SANOFI) | Tablets | Yes | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately Administer at a fixed time |      |
### Table 3. Cont.

| ATC       | API (Strength) | Brand Name (Manufacturer) | Dosage Form          | Via Tube | Operative Information                                                                 | Ref. |
|-----------|----------------|---------------------------|----------------------|----------|----------------------------------------------------------------------------------------|------|
| N05AL05   | Amilsupride (50 mg) | AMISULPRIDE EG (EG)       | Tablets              |          | Alternative: oral solution                                                              | [10] |
|           | Amilsupride (50, 200, 400 mg) | AMISULPRIDE MYL (MYLAN)   | Tablets              | Yes      |                                                                                         |      |
|           | Amilsupride (400 mg) | AMISULPRIDE SAN (SANDOZ)  | Coated tablets       |          | Alternative: oral solution                                                              |      |
|           | Amilsupride (400 mg) | SOLAN (SANOFI)            | Coated tablets       |          |                                                                                         |      |
|           | Levosulpride (50, 100 mg) | LEVOPRAID (TEOFARMA)      | Tablets              | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately    | [10] |
| N05AN01   | Lithium carbonate (300 mg) | LITIO CARBONATO (NOVA ARGENTIA) CARBOLITHIUM (TEVA) | Tablets |          | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately     |      |
|           |                |              | Capsules              | Yes      | Attention drug with a narrow therapeutic index                                         |      |
| N05AX08   | Risperidone (1, 2 mg) | RISPERIDONE SAN (SANDOZ)  | Coated tablets       | No       | Alternative: liquid formulation                                                         | [8,9]|
|           | Risperidone (2, 3, 4 mg) | RISPERIDONE TEV (TEVA)    | Tablets              |          | Alternatives: orodispersible tablets or oral solution                                  | [8,9]|
|           | Aripiprazole (5, 10, 15 mg) | ABILIFY (OTSUKA)         | Orodispersible tablets | Yes      |                                                                                         | [8,9]|
|           | Aripiprazole (10, 15 mg) | ABILIFY (OTSUKA)         | Modified release tablets |        |                                                                                         | [8,9]|
|           | Paliperidone (3, 6, 9 mg) | INVEGA (JANSSEN CILAG)    | No                   | Alternative: Xeplion modified release suspension for injection | [8,9]|
|           | Delorazepam (0.5, 1, 2 mg) | DELORAZEPAM (AUROBINDO)   |                         |          |                                                                                         |      |
|           | Delorazepam (0.5, 1, 2 mg) | DELORAZEPAM RAT (RATIOPHARM) |                  |          |                                                                                         |      |
|           | Delorazepam (2 mg) | DELORAZEPAM WPI (ZENTIVA) |                         |          |                                                                                         |      |
|           | Delorazepam (0.5, 1 mg) |                         |                         |          |                                                                                         |      |
| N05BA01   | Diazepam (2 mg) | VALIUM (ROCHE)            | Capsules              | Yes      | Open the capsule, disperse the content in 10 mL water, then administer immediately      | [10] |
|           | Diazepam (5 mg) | VATRAN (VALEAS)           | Tablets               |          | Disperse the tablet in 10 mL water, then administer immediately                         |      |
| ATC     | API (Strength)          | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref.   |
|---------|-------------------------|----------------------------|-------------|----------|--------------------------------------------------------------------------------------|--------|
| N05BA04 | Oxazepam (15 mg)        | SERPAX (MEDA PHARMA)       | Tablets     | Yes      | Grind the tablet and disperse it in 10 mL water, then administer immediately          | [10]   |
|         |                         |                            |             |          | Divisible tablet                                                                     |        |
|         |                         |                            |             |          | Better to use Diazepam or Lorazepam                                                 |        |
|         |                         |                            |             |          | Disperse the tablet in 10 mL water, then administer immediately                      |        |
|         |                         |                            |             |          | Prefer liquid or the orosoluble formulation                                           |        |
| N05BA06 | Lorazepam (1, 2.5 mg)   | TAVOR (PFIZER)             | Tablets     | Yes      |                                                                                      |        |
| N05BA08 | Bromazepam (1.5 mg)     | COMPENDIUM (POLIFARMA)     | Capsules    | No       | Alternative: drops                                                                    | [8,9]  |
|         | Bromazepam (3 mg)       | BROMAZEPAM RAT (RATIOPHARM)|             |          |                                                                                      |        |
| N05BA09 | Clobazam (10 mg)        | FRISIUM (SANOFI)           | Capsules    | Yes      | Open the capsule, disperse the content in 10 mL water, then administer immediately   | [10]   |
| N05BA11 | Prazepam (10 mg)        | PRAZENE (PFIZER)           | Tablets     | No       | Alternative: drops that must be diluted                                               | [8,9]  |
| N05BA12 | Alprazolam (0.25, 0.5 mg)| XANAX (PFIZER)             | Tablets     | Yes      |                                                                                      | [10]   |
|         | Hydroxyzine hydrochloride(25 mg) | ATARAX (UCB PHARMA)   | Coated tablets | Yes  | Disperse the tablet in 10 mL water, then administer immediately          | [10]   |
|         | Flurazepam monohydrochloride (15, 30 mg) | VALDORM (VALEAS) | Capsules | Yes | Better to use the drops                                                             | [10]   |
|         |                         |                            |             |          | Prefer Atarax syrup                                                                  |        |
| N05CD01 | Nitrazepam (5 mg)       | MOGADON (MEDA PHARMA)      | Tablets     | Yes      | Open the capsule, disperse the content in 20 mL water, then administer immediately  | [10]   |
|         |                         |                            |             |          | Administer before the last EN                                                        |        |
| N05CD02 | Zolpidem tartrate (10 mg)| ZOLPIDEM RAT (RATIOPHARM)  | Coated tablets | Yes  |                                                                                      |        |
| N05CD05 | Triazolam (250 µg)      | HALCION (PFIZER)           | Tablets     | Yes      |                                                                                      |        |
|         |                        | LENDORMIN (BOEHRINGER INGELHEIM) |             |          | Divisible tablets                                                                     |        |
| N05CD09 | Brotizolam (0.25 mg)   |                            | Tablets     | Yes      |                                                                                      |        |
|         |                        |                            |             |          | Grind the tablet and disperse it in 10 mL water, then administer immediately          |        |
|         |                        |                            |             |          | Better to administer at bedtime to have a hypnotic effect                             |        |
|         |                        |                            |             |          | Divisible tablets                                                                    |        |
| N05CF02 | Zolpidem tartrate (10 mg) | ZOLPIDEM RAT (RATIOPHARM)  | Coated tablets | Yes  |                                                                                      |        |
| N06AA04 | Clomipramine hydrochloride (75 mg) | ANAFRANIL (SIGMATAU) | Modified release tablets | No |                                                                                      | [8,9]  |
| ATC       | API (Strength) | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref. |
|-----------|----------------|----------------------------|-------------|----------|----------------------------------------------------------------------------------------|------|
| N06AA04   | Clomipramine hydrochloride (10, 25 mg) | ANAFRANIL (SIGMATAU)       | Coated tablets | Yes      | Grind the tablet and disperse it in 10 mL water, then administer immediately             | [10] |
| N06AA09   | Amitriptyline hydrochloride (10, 25 mg) | LAROXYL (TEOFARMA)         | Coated tablets | No       | Alternative: drops that must be diluted with 50 mL water                                  | [8,9]|
| N06AA10   | Nortriptyline hydrochloride (10, 25 mg) | NORITREN (LUNDBECK)        | Coated tablets | Yes      |                                                                                         |      |
| N06AB03   | Fluoxetine hydrochloride (20 mg)       | FLUOXETINA EG (EG)         | Capsules    | Yes      | Open the capsule, disperse the content in 20 mL water, then administer immediately       | [10] |
|           |                             |                            |             |          | Prefer liquid formulation or orosoluble tablets                                          |      |
|           |                             |                            |             |          | The solution should not be administered in the fast due to the acidic pH                |      |
| N06AB03   | Fluoxetine hydrochloride (20 mg)       | FLUOXETINA FDI             | Capsules    | Yes      | Preferably use the liquid form or the dispersible tablets                               | [8,9]|
| N06AB03   | Fluoxetine hydrochloride (20 mg)       | FLUOXETINA RAT             | Soluble tablets | Yes      | Dissolve the tablet in 50 mL water and administer immediately                           | SmPC|
| N06AB03   | Fluoxetine hydrochloride (20 mg)       | XEREDIEN (VALEAS)          | Dispersible tablets | Yes      | Dissolve the tablet in water and administer immediately                                | [8,9]|
| N06AB04   | Citalopram hydrobromide (20 mg)        | CITALOPRAM RAT             | Coated tablets | Yes      | Grind the tablet and disperse it in 10 mL water, then administer immediately             | [10] |
|           |                             | CITALOPRAM HEX             |             |          | Preferably use drops                                                                   | [10] |
|           |                             | (SANDOZ)                   |             |          | Incompatible with PVC tubes                                                            |      |
| N06AB05   | Paroxetine hydrochloride (20 mg)       | SEREUPIN (GLAXOSMITHKLINE) | Coated tablets | Yes      | Grind the tablet and disperse the powder in 10 mL water, then administer immediately   | [10] |
|           |                             |                            |             |          | Alternatives: drops or oral suspension                                                  |      |
| N06AB06   | Sertraline hydrochloride (50 mg)       | SERTRALINA MYL             | Coated tablets | Yes      | Grind the tablet and disperse the powder in 10 mL water, then administer immediately   |      |
|           |                             | (Mylan)                    |             |          | Grinb the tablet and disperse the powder in 10 mL water, then administer immediately   |      |
|           |                             | ZOLOFT (PFIZER)            |             |          | Rinse the tube well after administration                                                |      |
|           |                             |                            |             |          | Preferably switch to another selective serotonin reuptake inhibitor                     |      |
| N06AB08   | Fluvoxamine maleate (50 mg)            | FEVARIN (BGP PRODUCTS)      | Coated tablets | No       | Preferably switch to another selective serotonin reuptake inhibitor in liquid formulation | [8,9]|
| ATC     | API (Strength)                   | Brand Name (Manufacturer)     | Dosage Form          | Via Tube | Operative Information                                                                 | Ref.         |
|---------|----------------------------------|--------------------------------|----------------------|----------|-----------------------------------------------------------------------------------------|--------------|
| N06AB10 | Escitalopram oxalate (10, 20 mg) | CIPRALEX (LUNDBECK)            | Coated tablets       | Yes      | Alternative: Cipralex drops                                                               | [10]         |
|         | Escitalopram oxalate (20 mg)     | ENTACT (LUNDBECK)              |                      |          | Divisible tablets                                                                        |              |
| N06AX03 | Mianserin hydrochloride (30 mg)  | LANTANON (MSD)                 | Coated tablets       | Yes      | Grind the tablet and disperse the powder in 10 mL water, then administer immediately     | [8,9]        |
| N06AX05 | Tradozone hydrochloride (75, 150 mg) | TRITTICO (ANGELINI)        | Modified release tablets | No      | Alternatives: coated tablets or drops                                                   | [8,9]        |
|         | Tradozone hydrochloride (75, 150 mg) | TRITTICO (ANGELINI)        | Coated tablets       | Yes      | Grind the tablet and disperse the powder in 10 mL water, then administer immediately     |              |
|         | Mirtazapine (30 mg)              | MIRTAZAPINA SAN (SANDOZ)       | Coated tablets       | Yes      |                                                                                         |              |
| N06AX12 | Bupropion hydrochloride (150 mg) | WELLBUTRIN (GLAXOSMITHKLING)   | Modified release tablets | No      |                                                                                         | [8,9]        |
|         | Venlafaxine hydrochloride (75, 150 mg) | ZARELIS (ITALFARMACO)      |                     |          |                                                                                         |              |
|         | Venlafaxine hydrochloride (37.5, 75, 150 mg) | EFEIXOR (PFIZER)                | Modified release capsules | No      | Alternative: oral solution                                                               | [8,9]        |
|         | Venlafaxine hydrochloride (37.5 mg) | VENLAFAX TEV (TEVA)            | Modified release capsules | No      | Risk of probe occlusion                                                                  | [8,9]        |
|         | Duloxetine hydrochloride (30, 60 mg) | CYMBALTA (ELI LILLY)         | Modified release capsules | No      | Do not grind the granules                                                                | [8,9]        |
|         | Duloxetine hydrochloride (60 mg)  | XERISTAR (QUINTILES)          | Gastro-resistant capsules |        |                                                                                         |              |
| N06BA04 | Methylphenidate hydrochloride (10 mg) | RITALIN (NOVARTIS)            | Tablets              | Yes      |                                                                                         |              |
| N06BA04 | Methylphenidate hydrochloride (10, 20 mg) | EQUASYM (SHIRE)               | Modified release capsules | No      |                                                                                         | [8,9]        |
| N06BA07 | Modafinil (100 mg)               | PROVIGIL (TEVA)                | Tablets              | Yes      | Grind the tablet and disperse the powder in water, then administer immediately            | [10]         |
| N06BA09 | Atomoxetine hydrochloride (40, 60 mg) | STRATTEIRA (ELI LILLY)       | Capsules             | No       |                                                                                         |              |
| ATC     | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form | Via Tube | Operative Information                                                                 | Ref.   |
|---------|---------------------------------|---------------------------|-------------|----------|--------------------------------------------------------------------------------------|--------|
| N06BX12 | Acetyl-L-carnitine (500 mg)     | NICETILE (SIGMATAU)       | Gastro-resistant tablets | No       |                                                                                      | [8,9]  |
| N06BX12 | Acetyl-L-carnitine (500 mg)     | NICETILE (SIGMATAU)       | Powder for oral solution | Yes      |                                                                                      |        |
| N06CA01 | Amitriptyline Perphenazine (10 + 4 mg) | MUTABON MITE (NEOPHARMED GENTILI) | Coated tablets | No       |                                                                                      | [8,9]  |
| N06DA02 | Donepezil hydrochloride (10 mg) | ARICEPT 10 (PFIZER)       | Coated tablets | Yes      | Grind the tablet and disperse the powder in 20 mL water, then administer within 15 min | [10]   |
|         | Donepezil hydrochloride         | DONEPEZIL ACV (ACTAVIS)   | Caplets      | No       | Alternatives: transdermal patches or oral solution                                    | [8,9]  |
| N06DA02 | Donepezil hydrochloride monohydrate (5 mg) | DONEPEZIL MYL (MYLAN)     | Orodispersible tablets | Yes      | Dissolve the tablet in 10 mL water and administer immediately                         | [8,9]  |
| N06DA02 | Donepezil hydrochloride (5, 10 mg) | DONEPEZIL TEV (TEVA)      | Capsules     | No       | Alternatives: transdermal patches or oral solution                                    | [8,9]  |
| N06DA03 | Rivastigmine hydrogen tartrate (1.5, 3, 4.5 mg) | EXELON (NOVARTIS)        | Capsules     | No       | Alternatives: transdermal patches or oral solution                                    | [8,9]  |
|         | Rivastigmine hydrogen tartrate (1.5, 3, 4.5, 6 mg) | RIVASTIGMINA SAN (SANDOZ) | Modified release capsules | No       | Alternative: oral solution                                                           | [8,9]  |
| N06DA04 | Galantamine hydrobromide (8, 16, 24 mg) | REMINYL (JANSSEN CILAG)   | Coated tablets | Yes      | Grind the tablet and disperse the powder in 10 mL water, then administer              | [10]   |
|         | Galantamine hydrobromide (8, 16, 24 mg) | REMINYL (JANSSEN CILAG)   | Coated tablets | Yes      | Preferably use Galantamine oral solution to be diluted before administration           | [10]   |
| N06DX01 | Memantine hydrochloride (10 mg)  | EBIAXA (LUNDBECK)         | Coated tablets | No       | Alternative: Ebixa oral solution                                                    | [8,9]  |
|         | Memantine hydrochloride (10, 20 mg) | MEMANTINA MYL (MYLAN)     | Coated tablets | No       | Alternative: Ebixa oral solution                                                    | [8,9]  |

**Table 3. Cont.**
Table 3. Cont.

| ATC     | API (Strength)                  | Brand Name (Manufacturer)                              | Dosage Form                  | Via Tube | Operative Information                                                                 | Ref.          |
|---------|--------------------------------|--------------------------------------------------------|-----------------------------|----------|----------------------------------------------------------------------------------------|--------------|
| N07AA02 | Pyridostigmine hydrobromide (180 mg) | MESTINON (MEDA PHARMA)                                  | Modified release tablets    | No       | Alternative: Mestinton 60 mg                                                            | [8,9]         |
| N07AA02 | Pyridostigmine hydrobromide (60 mg)  | MESTINON (MEDA PHARMA)                                  | Tablets                     | Yes      | Divisible tablets                                                                      |              |
| N07AX01 | Pilocarpine hydrochloride (5 mg)   | SALAGEN (MERUS LABS LUXCO II SARL)                     | Coated tablets              | No       |                                                                                         |              |
| N07BB01 | Disulfiram (400 mg)               | ANTABUSE DISPERGETTES (AUROBINDO)                      | Effervescent tablets        | Yes      | Dissolve the tablet in 10 mL water and administer at the end of the effervescence      |              |
| N07BB03 | Acamprosate calcium (333 mg)       | CAMPRAL (BRUNO FARMACEUTICI)                           | Coated tablets              | No       |                                                                                         |              |
| N07BC01 | Buprenorphine hydrochloride (2, 8 mg) | BUPRENORFINA MOL (MOLTENI & C. F. ALITTI)               | Sublingual tablets          | No       | Administer sublingually only if the patient is conscious                                | [8,9]         |
| N07CA01 | Betahistine dihydrochloride (8 mg) | MICROSER (GRUNENTHAL)                                  | Tablets                     | Yes      | Grind the tablet and disperse the powder in 20 mL water, then administer                | [10]         |
| N07CA02 | Cinnarizine (75 mg)               | STUGERON FTE (JANSSEN CILAG)                           | Capsules                    | No       | Alternative: drops                                                                      | [8,9]         |
| N07XX02 | Riluzole (50 mg)                  | RILUZOLO SAN (SANDOZ)                                  | Coated tablets              | Yes      | Grind the tablet and disperse the powder in water, then administer                     | [10]         |
| N07XX06 | Tetrabenazine (25 mg)             | XENAZINA (CHIESI FARMACEUTICI)                         | Tablets                     | Yes      | Divisible and crushable tablet                                                         |              |
| N07XX09 | Dimethyl fumarate (120, 240 mg)   | TECFIDERA (BIOGEN ITALIA)                              | Gastro-resistant capsules   | No       | Do not grind the granules                                                               | [8,9]         |
| P01AB01 | Metronidazole (250 mg)            | VAGILEN (ALFA WASSERMANN)                              | Capsules                    | Yes      | Open the capsule, disperse the content in 20 mL water, then administer immediately     |              |
|         |                                  |                                                        |                             |          | 1 h before EN Alternatives: solution for injection or vaginal ovules                   |              |
Table 3. Cont.

| ATC     | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form          | Via Tube | Operative Information                                                                 | Ref.   |
|---------|--------------------------------|---------------------------|----------------------|----------|---------------------------------------------------------------------------------------|--------|
| P01BA01 | Chloroquine diphosphate (250 mg) | FLAGYL (ZAMBON)           | Tablets              | No       | Alternatives: solution for injection or vaginal ovules                                |        |
| P01BA02 | Hydroxychloroquine sulfate (200 mg) | CLOROCHINA (BAYER)        | Coated tablets       | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately preferably after EN | [10]   |
| P01BF05 | Piperaquine tetraphosphate Dihydroartemisinin (320 + 40 mg) | EURARTESIM (SIGMATAU)     | Coated tablets       | Yes      |                                                                                       |        |
| P02CA03 | Albendazole (400 mg) Niclosamide (500 mg) | ZENTEL (GLAXOSMITHKLINE) | Tablets              | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer immediately preferably after EN | SmPC   |
| P02DA01 | Theophylline anhydrous (200, 300 mg) | THEO-DUR (RECORDATI)      | Modified release tablets | Yes      | Dissolve the tablet in water and administer                                           | SmPC   |
| R03DA04 | Montelukast sodium (5 mg) Montelukast sodium (10 mg) Montelukast sodium (5 mg) | MONTELUKAST SAN (SANDOZ) | Coated tablets       | Yes      | Disperse the tablet in 10 mL water under gentle stirring, then administer immediately |        |
| R03DA08 | Bamifylline hydrochloride (600 mg) | BAMIFIX (CHIESI FARMACEUTICI) | Coated tablets       | No       | Alternative: suppositories but only for pediatrics                                    | [8,9]  |
| R03DA11 | Doxofylline (400 mg) Montelukast sodium (5 mg) Montelukast sodium (10 mg) Montelukast sodium (5 mg) | ANSIMAR (ABC FARMACEUTICI) | Tablets              | Yes      | Alternatives: Ansimar syrup or solution for injection                                |        |
| R03DC03 | Montelukast sodium (5 mg) Montelukast sodium (5 mg) | MONTELUKAST TEV (TEVA)    | Chewable tablets     | Yes      | Grind the tablet and disperse the powder in water, then administer away from EN Preferably use oral granules Administer at the end of the effervescence |        |
|         |                                  | ACETILCISTEINA RAT (RATIOPHARM) | Coated tablets       | Yes      | Mix with water then administer                                                        |        |
| ATC   | API (Strength)                  | Brand Name (Manufacturer)                  | Dosage Form         | Via Tube | Operative Information                                           | Ref.          |
|-------|--------------------------------|---------------------------------------------|---------------------|----------|----------------------------------------------------------------|--------------|
| R05CB01 | Acetylcysteine (600 mg)        | FLUIMUCIL (ZAMBON)                         | Effervescent tablets | Yes      | Administer at the end of the effervescence                     |              |
| R06AE06 | Oxatomide (30 mg)             | TINSET (GRUNENTHAL)                        | Tablets             | No       | Alternative: drops                                             | [8,9]         |
| R06AE07 | Cetirizine hydrochloride (10 mg) | CERCHIO (MEDIOLANUM FARMACEUTICI) CETIRIZINA SAN (SANDOZ) | Tablets             | Yes      | Alternative: drops                                             |              |
| R06AX25 | Mizolastine (10 mg)           | ZOLISTAM (SANOFI)                          | Modified release tablets | No       |                                                                | [8,9]         |
| R06AX26 | Fexofenadine hydrochloride (180 mg) | TELFAST (SANOFI) AERIUS (MSD)  | Coated tablets      | No       | Alternatives: Cetirizine or Loratadine                        |              |
| R06AX27 | Desloratadine (2.5 mg)         | AERIUS (MSD) DIAMOX (TEOFARMA)             | Orodispersible tablets | Yes      |                                                                |              |
| S01EC01 | Acetazolamide (250 mg)        |                                             | Tablets             | Yes      |                                                                |              |
| V03AC03 | Deferasirox (125, 500 mg)     | EXJADE (NOVARTIS)                          | Dispersible tablets | Yes      | Disperse in 200 mL water until a suspension is obtained       | SmPC         |
| V03AE02 | Sevelamer hydrochloride (800 mg) | RENAGEL (GENZYME) RENVELA (GENZYME) | Coated tablets      | No       | Alternative: Renvela powder for oral suspension               | [8,9]         |
| V03AE02 | Sevelamer carbonate (2.4 g mg) | RENVELA (GENZYME)                          | Powder for oral suspension | Yes      | Disperse the powder in 60 mL water and administer immediately Rinse well the tube |
| V03AE03 | Lanthanum(III) carbonate hydrate (1 g) | FOZNOL (SHIRE) | Oral powder         | No       |                                                                |              |
| V03AE03 | Lanthanum(III) carbonate hydrate (1 g) | FOZNOL (SHIRE) | Chewable tablets    | Yes      |                                                                |              |
| V03AE04 | Calcium acetate Magnesium carbonate (435 + 235 mg) | OSVAREN (VIFOR FRESENIUS) | Coated tablets      | No       |                                                                |              |
| ATC   | API (Strength)                  | Brand Name (Manufacturer) | Dosage Form     | Via Tube | Operative Information                                                                 | Ref.   |
|-------|--------------------------------|----------------------------|-----------------|----------|---------------------------------------------------------------------------------------|--------|
| V03AF | Calcium mefolinate (15 mg)     | PREFOLIC (ZAMBON)          | Gastro-resistant tablets | No       |                                                                                       | [8,9]  |
| V03AF04 | Calcium levofolinate (7.5 mg) | LEDERFOLIN (PFIZER)       | Tablets         | Yes      | Grind the tablet and dissolve the powder in 10 mL water, then administer               | [10]   |
| V03AF04 | Calcium levofolinate (2.5 mg)  | LEDERFOLIN (PFIZER)       | Granules for oral solution | Yes      | Alternative: powder for reconstitution for injection                                   |        |
3.4. Magistral Liquid Preparations

The analysis of the prescriptions within the hospital shows that liquid pharmaceutical forms are administered only to a small extent, despite being the most suitable for this route of administration. This low percentage of liquid forms can be partly explained by the lack of a wide availability of liquid medicinal products in the hospital formulary. As for the pharmaceutical form in most cases, tablets were prescribed, followed by liquid formulations (solutions, suspensions, and drops), powders for oral solutions, and capsules. To increase the administrations of liquid forms and meanwhile reduce the use of off-label prescriptions, the pharmacists are used to compounding some magistral preparations (Table 4).

Table 4. List of magistral preparations routinely compounded in the hospital pharmacy.

| Magistral Preparation | Ingredients | Storage/Expiration | Method of Administration |
|-----------------------|-------------|--------------------|--------------------------|
| Captopril 1 mg/mL Syrup | Captopril powder Pharm. Eur. Simple syrup | 5 °C in a well-closed amber glass jar for 10 days | Shake, withdraw the required portion of the liquid and dilute with water * |
| Carbamazepine 40 mg/mL Suspension | Carbamazepine powder Pharm. Eur. Simple syrup | | |
| Isoniazid 50 mg/mL Solution | Isoniazid powder Pharm. Eur. Distilled water | | |
| Midazolam 2.5 mg/mL Syrup | Midazolam powder Pharm. Eur. Simple syrup | | |
| Omeprazole 2 mg/mL Solution | Omeprazole powder Pharm. Eur. Sodium bicarbonate 8.4% Sorbitol Purified water | | |
| Ranitidine 15 mg/mL Solution | Omeprazole powder Pharm. Eur. Sorbitol | | |
| Spironolactone 10 mg/mL Suspension | Spironolactone powder Pharm. Eur. Simple syrup | | |
| Verapamil 50 mg/mL Suspension | Verapamil powder Pharm. Eur. Distilled water Simple syrup Glycerol | | |

* 60 mL.

3.5. Instructions for the Nursing Staff Concerning Administration of Drugs via Tube

The administration of drug therapy should be a unitary act, performed by the same person. It is necessary to avoid, as far as possible, interruptions during the preparation and administration of drugs. The main steps of the procedure can be listed as follows:

1. if the patient is undergoing EN, temporarily stop the infusion;
2. before administration, wash the probe with 30 mL of water;
3. take, where necessary, a tablet crusher, wash it with water and dry it, then grind the tablet to a fine powder;
4. put the powder or other pharmaceutical forms directly in a plastic cup, add 30 mL of water at room temperature, shake and dissolve (possibly with the help of a disposable plastic spoon);
5. once a solution or a suspension is obtained, draw it with a 60 mL catheter cone syringe (dedicated syringe for EN). Make sure there are no drug residues left in the glass;
6. check the correct positioning of the tube; insert the syringe cone into the tube connector and flush the medication dose down the feeding tube. If the medical prescription provides for the administration of several drugs at the same time, do not simultaneously grind several drugs and do not mix them in the same syringe, but it is necessary
to rinse the tube between one drug and another with at least 5–10 mL of water to ensure that the tube is clean during the transition to the next drug;
7. rinse the tube with at least 40 mL of water after the administration;
8. restart the feed, unless a break is required.

A thorough description of the recommendations for each pharmaceutical form is summarized in Table 5.

Table 5. General recommendations for medications given by tube.

| Pharmaceutical Form | Method of Administration |
|----------------------|--------------------------|
| Liquid forms (drops, syrups, suspensions) | High osmolar or very viscous liquids must be suitably diluted before being administered. If the osmolality is not known, it is advisable to dilute the drug with at least 30 mL of water to make it compatible with gastric administration and to prevent diarrheal phenomena from osmotic effect. Shake and mix the solution or suspension well. Administer directly by tube. |
| Tablets | The tablets must be crushed in the crusher until they are reduced to a fine and homogeneous powder to promote better absorption and avoid obstruction of the tube. Transfer the powder to a plastic cup. |
| Chewable tablets | |
| Effervescent tablets | Put the tablet directly in a plastic cup. |
| Dispersible/soluble tablets | Put the tablet directly in a plastic cup. |
| Capsules | Open the capsule and insert the powder in a plastic cup, verifying the content first. |
| Soft capsules | |
| Modified-release tablets/capsules | They cannot be administered. |
| Gastroresistant tablets, enteric-coated tablets | |
| Sublingual tablets | |

4. Conclusions

The present paper has highlighted the need to oversee and investigate the problem of administering drugs by feeding tube in dysphagic patients. The management of therapeutic pathways, due to the complexity and high clinical risk that it entails, requires advanced, updated, and integrated skills. The alteration of oral pharmaceutical forms, if not properly managed, can lead to errors in therapy, side effects, occupational exposure by inhalation or contact with the drug, and cost increase. The advice of the clinical pharmacist, especially for the verification of alternative pharmaceutical forms, can prove effective in reducing therapeutic errors. This study provides health-care teams a practical guide for the correct administration of oral drugs in patients undergoing EN through PEG. The hope that has accompanied the drafting of this document is that it can be a tool that allows the prescriber to receive the correct information on the drug and consequently to adapt the pharmacological prescription for the new type of administration. Secondly, we want to provide nurses with practical suggestions regarding the correct methods of handling and adequate administration of drugs via tube, in order to ensure continuity of care and adherence to the therapeutic program.

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