Store-and-forward telenurology results in a large Brazilian city

Telerregulação em neurologia e seus resultados em uma grande cidade brasileira

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Abstract

Background  Neurology is a high-demand specialty with long waiting lines. Some pathologies require rapid decision-making. Through technology, telemedicine can allow neurological patients to have faster access to specialized assessment. In store-and-forward telemedicine, the specialist physician evaluates data collected by a general practitioner and optimizes screening.

Objective  The aim of the present study is to evaluate the effectiveness of asynchronous telemedicine, used to refer patients from primary care to neurology, in the city of Curitiba, in southern Brazil.

Methods  A retrospective analysis of all patients referred from primary care to neurology between September 2019 and February 2020. After a request is made by a general medical doctor for a specialist’s opinion, 5 neurologists with complete access to patients’ records are tasked with the decision-making. The main variables analyzed were clinical reasons for telemedicine request, neurologist decision, final diagnosis, indication for diagnostic procedures, and subsequent follow-up.

Results  Between September 2019 and February 2020, 1,035 asynchronous telemedicine consultations were performed. Headache (30.43%), epilepsy (19.03%), and dementia (15.85%) accounted for almost two-thirds of the primary care requests; one-third of the cases (33.62%) required a complementary diagnostic procedure. More than 70% of the cases did not require face-to-face assessment by a neurologist.

Conclusions  In this study, store-and-forward telenurology successfully reduced the need for in-visit consultation in 70% of cases. Further studies should identify the best opportunities for telenurology in the city of Curitiba to facilitate better integrated care between primary care providers and neurologists.

Keywords
► Neurology
► Telemedicine
► Primary Health Care
► Telerregulation

DOI  https://doi.org/10.1055/s-0042-1755204.
ISSN 0004-282X.

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Thieme Revinter Publicações Ltda., Rua do Matoso 170, Rio de Janeiro, RJ, CEP 20270-135, Brazil.
INTRODUCTION

The world’s population is aging. The increase in the number of elderly people is accompanied by an increase in the number of patients affected by neurological diseases.¹,² In contrast, some countries have observed a reduction in the number of neurology specialists in recent years, producing a gap between the epidemiological impact and the specialty number of neurology specialists. This has led to a contrast, as some countries have observed a reduction in the number of patients affected by neurological diseases.

The aim of the current study is to evaluate the effectiveness of asynchronous TM for patient referral from primary care to a neurology specialist in Curitiba.

METHODS

The study is a retrospective analysis of all patients referred from primary care to neurology, between September 2019 and February 2020, in a tertiary hospital. The study was approved by the Ethical Committee of the Hospital das Clínicas of the Federal University of Paraná, and the board waived the need for patient consent. Each teleneurology session comprised an asynchronous evaluation, by a trained neurologist, of patients’ records in primary care in the city of Curitiba in Southern Brazil.

The inclusion criteria were: 1) patients from Curitiba with a primary care evaluation in any primary healthcare center, 2) complete information available on the patient, and 3) the patient’s last consultation within the last 4 months. Meanwhile, the exclusion criteria were: 1) duplicate consultations with the same patient, 2) citizens outside of Curitiba, 3) clinical information not available or not enough to make a decision.

All patients were placed in the store-and-forward system by a general medical doctor from the primary healthcare system of the city of Curitiba; 5 neurologists with at least 5 years of specialty experience were educated and trained to communicate with other physicians and provide useful consultations. Each neurologist had complete access to the patients’ records for the decision-making process. Each patient record was evaluated by one of the five neurologists. When a patient’s complaint was related to a neurological condition, the neurologist indicated a need for further evaluation.

The following variables were considered: sex; age in years; specific clinical reason for enrollment into TM; general clinical reason for enrollment into TM; diagnosis, and clinical reason for consultation.
management); the TM decision (i.e., if more data are required); diagnosis from the TM appointment; subsequent follow-up (the decision to keep patients in primary care or if in-person evaluations are required); and indications for diagnostic procedures. For the patients that remained in primary care, neurologists guided the primary care providers regarding diagnosis and management, including therapeutic options, drug titration, and drug monitoring with laboratory tests.

After data collection, a descriptive analysis of the variables was conducted. Quantitative variables are presented as means and standard deviations (SD) or by median, minimum, and maximum values according to their adherence to normal distribution. Categorical variables are presented as frequencies and percentages.

RESULTS

Between September 2019 and February 2020, 1,035 consultations were performed. The mean age was 49.98 ± 19.63 years, and 584 (56.43%) of the total number of patients were women. In 11 (1.06%) patients, the sex was not communicated.

When considering the general clinical reasons for TM request, 322 (31.11%) were for diagnosis, 336 (32.46%) were for therapeutic reasons or for the management of current conditions, 236 (13.14%) were diagnostic procedure requests (i.e., electroneuromyography), 100 (9.66%) were intended for other specialties, 49 (4.73%) were for answers to a previous consultation, 16 (1.55%) were for judicial demand, and 271 (26.18%) were for other reasons. Furthermore, 195 (18.84%) patients had more than one general clinical reason for participating in TM.

When considering the specific clinical reason for the TM request, headache was the main complaint presented in 315 (30.43%) patients. This was followed by epilepsy in 197 (19.03%), dementia in 164 (15.85%), neuromuscular disorders in 107 (10.34%), cerebrovascular diseases in 110 (10.63%), vestibular/dizziness in 101 (9.76%), and movement disorders in 80 (7.73%) patients. Other complaints were observed in 176 patients (17.00%); 237 patients (22.90%) had more than one complaint based on the primary care evaluation.

Based on the primary care information, more data were needed in 427 (41.26%) requests before a full decision could be made. When considering the final decision, follow-up in primary care was recommended for 713 (68.89%) patients. This was followed by epilepsy in 197 (19.03%), dementia in 164 (15.85%), neuromuscular disorders in 107 (10.34%), cerebrovascular diseases in 110 (10.63%), vestibular/dizziness in 101 (9.76%), and movement disorders in 80 (7.73%) patients. Other complaints were observed in 176 patients (17.00%); 237 patients (22.90%) had more than one complaint based on the primary care evaluation.

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Headache, epilepsy, dementia, neuromuscular disorders, and cerebrovascular disease were the 5 main complaints of the current study. However, in other countries studies, imaging findings, tingling/numbness, multiple sclerosis, and paresthesia were in the top requests. A possible explanation for this is that primary headaches are not properly diagnosed and managed in Brazil due to the lack of public policies addressing this problem. A recent review suggested that teleconsultations should be encouraged in the care of these patients.

In 41% of the TM appointments, the neurologist had to request more information. We postulate that this can delay the specialist’s final decisions. When a request is incomplete, the neurologist will review it more than once, possibly delaying the decisions of other patients. If the case report was complete, with all the necessary information for referral and description of the neurological condition, the neurologist would spend less time analyzing each patient.

The rate of reduction in the need for in-person consultations reaffirms the need for improving the teleneurology system. More than 70% of the cases did not require face-to-face assessment by a neurologist. In the current study, almost 70% of patients remained in primary care and 298 patients (28.79%) were sent for presental neurological evaluation.

Improving the telehealth system has the potential to reduce waiting lines, as demonstrated by a study conducted in Rio Grande do Sul, in Southern Brazil. In this study, the implementation of protocols of telemedicine achieved a general reduction in the queue volume for specialized consultation by approximately 30%. Besides reducing waiting lines, neurological patients may have functional incapacity. Therefore, instead of bringing a sick patient to see a doctor, teleconsultation allows neurological care to reach this patient, thereby overcoming functional distance. In this scenario, teleneurology has emerged as a useful tool for better diagnosis and patient care.

Some limitations were present in the current study. First, this was a single-center retrospective analysis. Furthermore, in 41% of the cases, the neurologist requested more information, and this number was higher than expected. For better communication, our local system needs appropriate training for primary care providers, and sufficient monitoring of processes and outcomes. As an initial analysis, we still have no data regarding patient outcomes, such as reduction in hospitalization or mortality.

Nevertheless, this study provides important insights for our local healthcare system. In Brazil, the long wait to see a specialist is one of the main reasons for dissatisfaction referred by public Unified Health System users. According to the Curitiba municipal health secretary, the median waiting time for a specialist consultation is 10 months.

In conclusion, the current study demonstrated that store-and-forward teleneurology achieved a 70% reduction in the intended consultation for neurology specialists. Further studies are needed to evaluate the effects of teleneurology in the city of Curitiba. We see this as a window of opportunity for structural reforms and better integrated care, particularly for those with neurological conditions.

Authors’ Contributions
VCS: project administration, database organization, analysis, and interpretation of results, writing-original draft and responsible for submission; MZR, GA: project administration, database organization, data curation, and initial data analysis; VHFZ: supervision, writing review & editing; RDPD: study conceptualization, established methodological guidelines for the study, discussion of results, writing review & editing; MCL: creation of database, study conceptualization, established methodological guidelines for the study, discussion of results, writing review & editing.

Conflict of Interest
The authors have no conflict of interests to declare.

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