Clinical Study

Glossopharyngeal Nerve Block versus Lidocaine Spray to Improve Tolerance in Upper Gastrointestinal Endoscopy

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Aim of the Study. To compare the effect of glossopharyngeal nerve block with topical anesthesia on the tolerance of patients to upper gastrointestinal endoscopy. Methods. We performed a clinical trial in one hundred patients undergoing upper gastrointestinal endoscopy. Subjects were randomly assigned to one of the following two groups: (1) treatment with bilateral glossopharyngeal nerve block (GFNB) and intravenous midazolam or (2) treatment with topical anesthetic (TASS) and intravenous midazolam. We evaluated sedation, tolerance to the procedure, hemodynamic stability, and adverse symptoms. Results. We studied 46 men and 54 women, from 17 to 78 years of age. The procedure was reported without discomfort in 48 patients (88%) in the GFNB group and 32 (64%) in the TASS group; 6 patients (12%) in GFNB group and 18 (36%) in TASS group reported the procedure as little discomfort ($\chi^2 = 3.95, P = 0.04$). There was no difference in frequency of nausea (4% in both groups) and retching, 4% versus 8% for GFNB and TASS group, respectively ($P = 0.55$). Conclusions. The use of glossopharyngeal nerve block provides greater comfort and tolerance to the patient undergoing upper gastrointestinal endoscopy. It also reduces the need for sedation.

1. Introduction

Gastrointestinal endoscopy is usually a minimally invasive procedure and is performed more frequently outside the surgical area [1]. Although the upper gastrointestinal endoscopy or esophagogastroduodenoscopy (EGD) is fairly safe, there is a risk of complications including bleeding, perforation, infection, and adverse drug reactions [2–5].

The anesthetic management most frequently used in patients undergoing upper gastrointestinal endoscopy is the combination of topical anesthetics and sedation with benzodiazepines. However, the sedation has been associated with pulmonary and cardiovascular complications. Patients with advanced age and those with cardiopulmonary disease may carry an increased risk for the procedure especially when high doses of intravenous sedatives are used [2, 6–8]. This has led to search for modes of anesthesia that carry less complication rates and, at the same time, provides satisfaction for both patient and endoscopist [9–16]. Few studies have used different forms of topical anesthesia, including spray, lollipop, and inhaler with mixed results. Some of these topical agents still carried a risk of retching, vomiting, and apnea [17–21].
The glossopharyngeal nerve block could be an effective anesthetic alternative. Because the glossopharyngeal nerve is quite superficial, it achieved an adequate block of the posterior third of the tongue and the vallecula. The complications of this technique are rare and less severe. Because of the low doses of local anesthetic used, it is unlikely to have systemic manifestations secondary to intravascular deposition [22, 23].

2. Materials and Methods

2.1. Patients. We included patients undergoing diagnostic EGD for various indications at the American Society for Gastrointestinal Endoscopy (ASGE). The study was approved by the local ethical committee at the PEMEX Hospital and by the Center of Bioethics of University of Guanajuato.

The sample size was determined with the formula of proportions with a confidence of 95%, 90% of power and considering a reduction of at least 20% in the frequency of pain in the study group.

2.2. Study Design. We performed a double-blind clinical trial in patients between 17 and 78 years old undergoing diagnostic EGD at the Endoscopy Department of PEMEX Regional Hospital, in Salamanca, Mexico. In all cases they showed ASA I or II.

Patients were randomly assigned to one of two study groups: treatment with bilateral glossopharyngeal nerve block (GFNB) or treatment with topical anesthetic (TASS). We evaluated sedation, tolerance to the procedure, hemodynamic stability, duration of the procedure, and adverse symptoms. The decision to administer intravenous sedation during the procedure (in all cases midazolam) was taken by the anesthesiologist depending on the patient’s tolerance and the presence of signs of discomfort, like excessive gag, retching, or restlessness.

GFNB group was treated with midazolam 0.02 mg/kg intravenously and between 2 and 3 minutes later the glossopharyngeal nerve block was performed with 60 mg of lidocaine 2%. Block of the lingual branch of the glossopharyngeal nerve was performed using 60 mg of lidocaine 2% in a syringe with a needle 22 × 32 mm. The tongue was retracted medially, and the needle was inserted under the mucosa at the base of the pillar, 0.5 cm lateral to the base of the tongue 30 mg lidocaine were injected in each side. Blockade was verified by gag reflex provocation after 3 minutes of latency, and then the endoscopic procedure began.

TASS group was treated with 30 mg of lidocaine spray, it was administered using the same technique in 3 consecutive 30 s intervals, each consisting of 10 sprays (10 mg/dose) of Xylocaine Pump Spray 10% (AstraZeneca) and 2-3 minutes later, midazolam 0.1 mg/kg intravenously was administered to a maximum dose of 0.2 mg/kg. All the patients had intravenous lines inserted and their vital signs (blood pressure, heart rate, respiratory rate) and pulse oximetry were continuously monitored during the procedure.

The endoscopist and the researcher who evaluated endpoints were blinded to the randomization. The endoscope used in the procedures was the EVIS EXERA-CV160 (Olympus Optical, Tokyo, Japan). Data were collected from the patient’s clinical record, including demographic variables such as age and gender in addition to the following clinical parameters: past medical and surgical history, medications, allergies, and history of previous endoscopy. The anxiety level of patients was evaluated according to a scale of 0 to 5 (1 = no anxiety to 5 = extreme anxiety).

2.3. Endoscopist’s Assessments. After the administration of the local anesthetics, the endoscopist rated the gag reflex based on a scale from 1 to 5 (1 = absent to 5 = strong). After the procedure, the endoscopist determined the ease of the procedure based on a scale from 1 to 5 (1 = easy to 5 = difficult). Finally, the amount of intravenous sedation given was recorded.

2.4. Patients’ Assessments. After the procedure was concluded, patients were monitored in the recovery room. A questionnaire was filled in by the participants to determine tolerance to the procedure based on a scale from 1 to 5 (1 = no discomfort to 5 = intolerable). Also, symptoms, such as retching, nausea, vomiting, abdominal pain, dyspnea, and cough, during and until 1 hour after (sore throat, nausea, vomiting, abdominal pain, dyspnea, cough) the procedure were recorded.

2.5. Statistical Analysis. Results are expressed as mean ± SD or as median (95% CI) according to variables’ distribution. The nonparametric Mann-Whitney U test was used to compare ordinal variables. The χ² test was utilized to compare categorical variables between the 2 groups. Continuous variables were assessed with an independent sample t-test. A P value < 0.05 was considered to be significant.

3. Results

We studied 100 subjects, fifty subjects per group (46 males and 54 females) with a mean age of 45.3 ± 17.3 years. No difference was found at baseline in gender, BMI, smoking, or previous EGD between groups; however, diastolic blood pressure was higher in the group of GFNB (Table 1). Before the endoscopic procedure, there was no significant difference in anxiety level between the two groups; the median anxiety scores were 2 (95% CI: 2-3) for subjects in GFNB and TASS. The TASS group had significantly stronger gag reflex than the GFNB (P = 0.0002) with respective median scores of 4 (95% CI: 3-4) and 2 (95% CI: 1-2).

3.1. Intravenous Sedation Use. Intravenous sedation was administered more frequently in the TASS than in the GFNB (92% versus 24%, χ² = 24.3, P = 0.0001). The amount of midazolam administered was lower in the GFNB compared to the TASS, 1.34 ± 0.17 mg versus 14.5 ± 2.2 mg (P = 0.0001). After the procedure, heart rate, oxygen saturation, and blood pressure were higher in the group GFNB, while the time required to Ramsay II and waking was lower (Table 2).

3.2. Procedure’s Tolerance. Patients in the GFNB showed a higher tolerance to the procedure with a median tolerability
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working relationship with pharmaceutical companies and declare no conflict of interests.

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