CASE SERIES

Glossopharyngeal nerve block for esophagogastroduodenoscopy in critically ill patients

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ABSTRACT

Deep sedation during esophagogastroduodenoscopy (EGD) may not be well tolerated by critically ill patients. Glossopharyngeal nerve (GPN) block provides reliable pharyngeal anesthesia and can significantly reduce sedation requirements for these procedures. We report our successful experience with GPN block as the sole or main source of anesthesia for EGD in a series of nine critically ill patients.

Key words: Glossopharyngeal nerve block; Esophagogastroduodenoscopy; Sedation; Propofol

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INTRODUCTION

Deep sedation is commonly used during esophagogastroduodenoscopy (EGD). Our standard sedation technique for these procedures includes propofol 2-3 mg/kg for induction, and propofol 200 -300 μg/kg/min for maintenance of anesthesia. This technique provides comfort to the patient and optimal conditions for the endoscopist. Despite these benefits, deep sedation may not be well tolerated by critically ill patients because of its potential to causing cardiovascular and respiratory depression. Pharyngeal anesthesia with minimal sedation can be a safer alternative for EGD in these patients.

Glossopharyngeal nerve (GPN) block provides reliable pharyngeal anesthesia. Specifically, it provides anesthesia of the posterior third of the tongue, the pharyngeal side of the epiglottis, and the vallecula; effectively abolishing the gag reflex.[1] This block has been used successfully as part of the anesthesia technique for awake fiberoptic intubation. Nonetheless, its use for EGD has not been described.

We report our experience with GPN block as the sole or main source of anesthesia for EGD in a series of 9 critically-ill patients (ASA III/IV) who were high risk for deep sedation.

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The anesthesia plan was thoroughly explained to each patient. They were told that their experience would be close to having a dental procedure using a nerve block and that the sedation would be minimal. The GPN block was performed as described by Benumof[1,2] using a 22-gauge spinal needle. The patients were asked to protrude the tongue which was grasped with gauze and displaced medially. The needle was inserted 0.5 cm deep just lateral to the base of the anterior tonsillar pillar and 2 mL of 2% lidocaine was injected (Figures 1&2).

Table 1: Demographics, medical history, and anesthetic management of nine critically ill patients undergoing EGD using glossopharyngeal nerve block

Age	Sex	Wt (kg)	Complicating Medical Conditions	ASA	Procedure	Procedure Duration	Indication	Sedation Supplement to GPN Block
62	M	97	Cirrhosis, varices, severe ascites, pulmonary hypertension	4	Esophagogastro-duodenoscopy (EGD)	8 min	GI Bleeding	None
66	M	71	Esophageal cancer, esophagectomy, anastomotic leak, sepsis, pneumonia	4E	Esophageal stent exchange	34 min	Migration of esophageal stent	Propofol 50 mg
64	M	122	Morbid obesity, cirrhosis, varices, severe ascites	4	Upper Endoscopic Ultrasound (EUS)	7 min	Abdominal lymphoma	Propofol 230 mg
57	M	67	Cardiomyopathy (ejection fraction [EF] 19%), atrial fibrillation with rapid ventricular response, cerebrovascular accident (CVA), carotid stenosis, renal insufficiency	4	EUS	13 min	Abdominal fluid collection following pancreatectomy	Propofol 220 mg
54	M	130	Cirrhosis, severe ascites, thrombocytopenia, renal insufficiency, Diabetes Mellitus (DM), hypertension (HTN), peripheral vascular disease	4	EUS	6 min	Abdominal Pain, nausea, vomiting	Propofol 60 mg
84	M	88	Coronary Artery Disease (CAD), atrial fibrillation, DM, vocal cord paralysis	3	EGD	5 min	Gastric lymphoma	Propofol 140 mg
84	M	82	CAD, Congestive Heart Failure (EF 25%), pleural effusion, pericardial effusion, HTN, DM	4	EGD/ Colonoscopy	20 min	Abdominal pain/ weight loss	Propofol 10 mg (EGD) Propofol 50 mg (colonoscopy)
63	M	68	Cirrhosis, varices, gastric ulcer, DM	4E	EGD	14 min	GI bleeding	Propofol 20 mg
82	F	45	Cachectic, atrial fibrillation, HTN	4	EUS	13 min	Pancreatic Cancer	Dexmedetomidine 20 mcg, Propofol 20 mg

The procedure was then repeated on the opposite side. All patients were monitored using non-invasive blood pressure measurement, electrocardiogram, pulse oximetry, and capnography. Oxygen was delivered using a nasal cannula throughout the case. Propofol sedation, if needed, was kept at a minimal level with the limited goal of making the procedure tolerable. In patient number 9, dexmedetomidine was used for sedation in addition to propofol. In order to decrease patient discomfort, the gastroenterologists attempted to keep gastric insufflation during the procedure to a minimum. The planned procedures were successfully completed in all patients. At the conclusion of the procedure the patients were transferred to PACU were they were monitored until discharge criteria were met. They were not allowed to drink until pharyngeal anesthesia subsided.

Table 1 summarizes the demographics, medical history, and anesthetic management of the nine patients in this case series.

Patient 1 was a 62-yr old male with a history of cirrhosis, varices, severe ascites, pulmonary hypertension, and COPD. He was admitted to the hospital with altered mental status and respiratory distress. While hospitalized, he developed GI bleeding and was brought to the endoscopy suite to undergo an EGD to evaluate its origin. Due to his comorbidities, the patient was classified as ASA 4. The patient tolerated the GPN block well. During the procedure he did not receive propofol

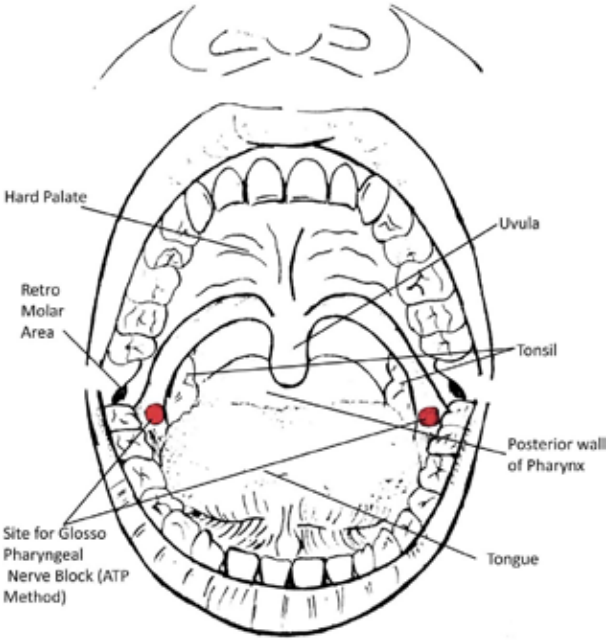

Figure 1: Diagrammatic presentation of site for glossopharyngeal nerve block by anterior tonsillar method. ATP, anterior tonsillar pillar.[8]

Figure 2: Needle at anterior tonsillar pillar for achieving glossopharyngeal nerve block.[8]

or any other sedative. Grade 1 varices in the lower esophagus and portal hypertensive gastropathy were identified as the likely source of bleeding. His vital signs were stable throughout the 8 min procedure. The patient remained hospitalized for 8 days undergoing treatment for his cirrhosis and its complications (pancytopenia, acute kidney injury, and GI bleeding). He was then discharged home in stable condition.

Patient 2 was a 66-year-old male with advanced esophageal cancer requiring neoadjuvant chemotherapy and radiation followed by esophagectomy who was admitted with hematemesis. The patient's post-operative course was complicated by recurrent episodes of pneumonia which were found to be the result of a bronco-esophageal fistula. The patient underwent multiple surgeries and an esophageal stents placement in an attempt to treat the fistula. He presented for an upper endoscopy for stent replacement due to migration of the original stent. The patient was in respiratory distress due to the pneumonia. Due to his comorbidities and the emergent nature of the procedure, the patient was classified as ASA 4E. The patient was counseled that deep sedation would require endotracheal intubation in his case and that successful extubation would be difficult because of his pulmonary status. He agreed to a trial of GPN block and minimal sedation. During the procedure he received 50 mg of propofol. The stent exchange was performed successfully. His vital signs were stable throughout the 34-minute procedure. He remained hospitalized for 40 more days to treat recurrent aspiration pneumonia and sepsis.

Patient 3 was a 64-year-old morbidly obese (BMI 39 kg/m^2) male with NASH cirrhosis, diabetes mellitus, coronary artery disease, and chronic kidney disease. The patient had refractory ascites and a history of esophageal varices, which were endoscopically banded in the past. He presented for upper endoscopic ultrasound (EUS) to evaluate a para-pancreatic mass, which was incidentally discovered on an MRI. Due to his comorbidities, the patient was classified as ASA 4. The patient found the GPN block to be acceptable. In addition to the block 230 mg of propofol were given for sedation. The mass was found to be a lymph node. Fine needle aspiration was performed for diagnosis. The patient's vital signs were stable and he was easy to communicate with throughout the seven-minute procedure. He was discharged home two hours after the procedure was complete.

Patient 4 was a 57-year-old male with a past medical history significant for atrial fibrillation treated with Warfarin, chronic kidney disease status-post renal transplant, cerebrovascular accident, hypertension, and non-ischemic cardiomyopathy with an ejection fraction of 20%. His past surgical history was significant for intra-abdominal schwanoma resection. The patient presented with 3 days of abdominal pain. A CT scan of his abdomen revealed a peri-pancreatic cyst. Due to his comorbidities, the patient was classified as ASA 4. He was scheduled for an EUS-guided fine needle aspiration of the abdominal fluid collection. After discussion of the

different anesthetic techniques' risks and benefits, the patient underwent GPN block. The block was well tolerated and the patient found the amount of discomfort associated with it to be acceptable. During the 13-minutes procedure, the patient received 220 mg of propofol. The fluid collected was cultured and grew vancomycin-resistant enterococcus. The patient remained hospitalized for 14 days to treat the infection. He was then discharged in stable condition.

Patient 5 was a 54-year-old male with hepatitis B cirrhosis, end-stage renal disease on dialysis, hypertension, thrombocytopenia, and peripheral vascular disease, status post right below the knee amputation. He was admitted with abdominal distension and shortness of breath in the setting of missing two weeks of hemodialysis. The patient's hospital course was complicated by spontaneous bacterial peritonitis requiring intravenous antibiotics. Due to a drop in his hemoglobin he was scheduled for an EGD to look for a possible gastrointestinal source of bleeding. Due to his multiple comorbidities, he was classified as ASA 4. In addition to the GPN block he received 60 mg of propofol for sedation during the 6-minutes procedure. The examination revealed erosive esophagitis which was treated with acid suppression medication. He remained hospitalized for 31 days to treat his ascites, cirrhosis, as well as decubitus ulcers that formed during his stay. He was then discharged in stable condition.

Patient 6 was an 84-year-old male with a history of Mantle Cell Lymphoma status post chemotherapy and radiation therapy. The patient's other medical problems included diabetes mellitus, coronary artery disease status post coronary artery bypass, hypertension, atrial fibrillation, and vocal cords palsy. He was scheduled for an EGD due to CT findings of proximal duodenal wall thickening. He was classified as ASA 3. The patient tolerated the GPN block well. During the 5-minute procedure, 140 mg of propofol was given for sedation. The EGD showed a duodenal bulb mass, which was biopsied and found to be positive for Mantle Cell Lymphoma. He recovered without complications and was discharged home an hour after the procedure was complete.

Patient 7 was an 84-yr old male with extensive cardiac history (coronary artery disease, previous myocardial infarction, and congestive heart failure with an ejection fraction of 25%), diabetes mellitus, chronic kidney disease, hepatitis C, and hypertension. He was scheduled to undergo outpatient upper endoscopy and colonoscopy for evaluation of abdominal pain, anemia, and weight loss. Due to his comorbidities, the patient was classified as ASA 4. Before the upper endoscopy, the patient underwent GPN block which was well tolerated. During the upper endoscopy, the patient received 10 mg of propofol. Since the findings of the upper endoscopy were normal, a colonoscopy was performed. During the colonoscopy, the patient required an additional 50 mg of propofol. The procedure lasted 20 min at the end of which he was awake and responsive. He was discharged home 30 min after the procedure was complete.

Patient 8 was a 63-yr old male with a history of chronic hepatitis, esophageal varies, gastric ulcer, diabetes mellitus, and liver transplant. He was initially admitted to the hospital for evaluation of signs of rejection. Thirty days into his hospital stay, he was brought to the endoscopy suite to undergo an EGD to evaluate melenic bleeding that he developed while hospitalized. Due to his comorbidities and the necessity of the procedure, he was classified as ASA 4E. Before the EGD was performed, the patient underwent bilateral GPN block which he found to be painful. During the 14 min procedure, he received 20 mg of propofol. The patient vomited during the case. His mouth was immediately suctioned. There was no evidence of aspiration during or after the case. Esophagitis was identified as the source of his bleeding. The patient remained hospitalized to treat the complications from the rejection. He died 32 days after the procedure from complications of sepsis.

Patient 9 was an 82-year-old female with atrial fibrillation, hypertension and bronchiectasis who presented to the emergency rooms with abdominal pain and nausea. The patient reported epigastric abdominal pain radiating to the back for 5 months that had progressively worsened. She also noted a 15-pound weight loss over the same time period. She had a CT scan of the abdomen and pelvis which revealed a pancreatic body mass. She was classified as ASA 4. The patient was scheduled for an EUS with fine needle aspiration, which was sent for cytology and was found to be adenocarcinoma. Before the endoscopy, bilateral GPN block was performed and was well tolerated. During the 13-minute procedure, the patient received 20 mcg of dexmedetomidine and 100 mg of propofol. The patient remained hospitalized for three days after the procedure due to small bowel obstruction and pain management secondary to her metastatic pancreatic cancer. The patient's pain was controlled

with the assistance of the palliative care team. She was started on chemotherapy as an outpatient.

DISCUSSION

Most of the patients presented in this report were ASA IV. They all had critical medical conditions, such as cirrhosis, congestive heart failure, and coronary artery disease. These comorbidities increased their risk of hemodynamic instability, aspiration, and difficulty of weaning from mechanical ventilation had they received deep sedation. The dose of sedation medications requirements for EGD can be significantly reduced by effective pharyngeal anesthesia. Topical anesthesia has long been the predominant technique used for pharyngeal anesthesia.[3] Topical local anesthetic agents used include 4%, 10% and 15% lidocaine spray, 2% viscous lidocaine gargle, 2% tetracaine, and 20% benzocaine spray. The benefits of topical anesthesia, however, have been questioned.[4,5] Even careful topical pharyngeal anesthesia may not be adequate for EGD because the pressure receptors at the root of the tongue that cause the gag reflex are submucosal and are not blocked topically.[6] The use of topical anesthesia may also be associated with methemoglobinemia and other serious complications.[7]

None of these complications were observed during this case series. Effective pharyngeal anesthesia using GPN block allowed successful completion of the procedures with minimal or no sedation. In addition, most of the patients reported that the block itself was tolerable, and no adverse effects related to the block were observed. Thorough preparation of and communication with the patients was instrumental in such successful outcome.

GPN block leaves intact the laryngeal reflexes which protects against aspiration. That most likely helped protect the patient who vomited during the case.

For these reasons, we believe that GPN block can be an effective alternative form of anesthesia for ASA III/IV patients undergoing EGD.

CONCLUSION

GPN block with no or minimal sedation can be an effective and safe anesthesia technique for EGD in critically ill patients.

Conflict of interest: None declared by the authors

Authors' Contribution:

MH &NH: Conduction of the study work and manuscript writing

AE & SK: Data collection, manuscript writing.

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