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POST ESOPHAGODUODENOSCOPY PNEUMOPERITONEUM: SHOULD YOU BE WORRIED?

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ABSTRACT
Upper Gastrointestinal Bleeding (UGIB) is a medical emergency with the preferred method for the diagnostic and therapeutic purpose being endoscopy. Argon plasma electrocoagulation is a highly effective endoscopic method of cauterizing bleeding vessels, and this functions by delivering high-frequency current through argon gas. This case features an elderly female who presented to the emergency department with a three-day symptom of hematemesis. She was managed using epinephrine injection and argon beam electrocautery which resulted in pneumoperitoneum as a complication of the procedure. Argon plasma electrocautery is more effective than other endoscopic interventions. However, pneumoperitoneum is a known serious complication of this intervention. In order to decrease the incidence of this type of complication, analyzing the risk factors for poor compliance and increased intra-abdominal pressure prior to the use of argon gas in the endoscopic procedure is important.

KEYWORDS: Argon plasma electrocautery is more effective than other endoscopic interventions.

INTRODUCTION
Argon beam electrocautery is an effective method of hemostasis in upper gastrointestinal bleeding (UGIB).[1] After initial resuscitation in a hemodynamically unstable patient, endoscopic therapy is an effective way to achieve homeostasis in acute large upper gastrointestinal bleeding. Endoscopic therapy of a bleeding ulcer comprises either Adrenaline (epinephrine) and endoscopic clips or Adrenaline and electrocoagulation. Argon is an inert gas that is widely used in endoscopic electrocoagulation.

Acute gastrointestinal bleeding is a medical emergency with an annual incidence of 61 cases in 100,000 people and a mortality rate of up to 10%.[2] UGIB could either be of variceal or non-variceal with peptic ulcer disease as the commonest cause. UGIB presents as hematemesis or melena. In hemodynamically unstable patients, immediate resuscitation with intravenous fluid and blood transfusion and stopping the bleed can help to reduce mortality and morbidity that is associated with UGIB. There are several approaches to stopping the bleed, such as endoscopy, which localizes and stops the source; CT angiography can also be done in combination with interventional radiology if the bleeding persists and or if endoscopy is unable to identify the source.[3] Our case report focuses on the endoscopic approach with the use of argon beam electrocautery.

CASE REPORT
A 64-year-old Caucasian female presented to the emergency department with three days of copious bright red emesis and a one-time episode of an unwitnessed syncope with loss of consciousness. She also reported some palpitation that was associated with tightness across her chest and cold intolerance. She denied any abdominal or back pain. No melena, or hematochezia. On physical examination, she is frail but alert and fully oriented. The rest of her physical examination was normal except for sinus tachycardia with rate of 102bpm. Her past medical conditions are significant for chronic obstructive pulmonary disease, diverticulosis, recurrent kidney stones, hyperthyroidism, right ankle surgery, and rheumatoid arthritis. She is a current smoker with a thirty-pack-year smoking history. She does not drink alcohol or use illicit drugs. Family history was non-contributory. Her home medications are folic acid, AZO bladder supplementation, prednisone, Aleve, and methotrexate. Pertinent laboratory study showed white blood cells count of 11.7 K/uL, Hemoglobin 10.7 g/dl, hematocrit 32.7%, blood urea nitrogen 67 mg/dL with serum creatinine 1.3 mg/dL. The rest of her blood

counts, chemistry, and coagulation studies were within normal limits.

Esophagogastroduodenoscopy (EGD) performed on hospital day one revealed active bleeding in the lesser curvature of the stomach, which was treated with epinephrine injection and argon beam electrocautery. She remained intubated post-procedure with a repeat EGD planned the following day. Overnight, she continued to have active hematemesis that required coiling of the celiac artery branch that supplies the lesser curvature of the stomach. On hospital day three, her hemoglobin level stabilized. She was still intubated and requiring norepinephrine and vasopressin for blood pressure support. She was noted to have an increased abdominal gait that was tympanic to percussion. Urgent abdominal imaging revealed large free air in the abdomen that was highly suspicious for perforated viscera. Considering that this patient is critically ill with hemorrhagic shock from acute upper gastrointestinal bleed, elevated lactic acid level, and the above imaging findings, a decision was made with her family's consent to take her to the operating room for diagnostic laparotomy. Intraoperatively, there was no succus, blood or contamination that was noted inside her abdominal cavity. Careful run of the entire stomach and intestine showed no area of perforation, ischemia, or contamination. The abdomen was closed, and the surgery was completed.

She was returned to the intensive care unit for ongoing care. Post-operative day one, she was successfully extubated, and the rest of her hospital stay was uneventful. On hospital day eight, she was discharged to an inpatient rehabilitation facility.

Informed consent was obtained from the patient for this case report

DISCUSSION

Although bleeding stops spontaneously in about 80% of patients with non-variceal UGIB, endoscopic intervention is still the recommended and preferable procedure in acute UGIB.[4] Argon plasma electrocoagulation is an endoscopic method of delivering high-frequency current through argon gas. Argon is an inert gas with density that is 38% higher than air.[5] Its solubility in water and plasma is 24-fold lower than that of carbon dioxide.[6] Argon gas is also one of the gases used for abdominal insufflation during laparoscopic surgery. Its insolubility in water and plasma can lead to pneumoperitoneum when used repeatedly and at high pressures. The abdominal cavity pressure is between 5- and 7-mm Hg (in the supine position) in steady state.[1] Body position (head elevation, lateral decubitus, and prone position) and mechanical ventilation (positive end-expiratory pressure) affect intra-abdominal pressure. There is no exact method of measuring abdominal compliance in a patient; therefore, knowing the risk factors for poor compliance, and increased intra-abdominal pressure prior to the use of argon gas in the endoscopic procedure is essential.[7] Several studies show that argon beam coagulation is the most effective and safe method of endoscopic therapy, but the complications from its use, such as gaseous distention, pneumatosis intestinalis, pneumoperitoneum, pneumomediastinum are important factors to consider when using it.[7] Hence, the argon beam coagulation endoscopic method's frequency of use is operator-dependent. It has also been shown that there were no significant changes in outcome when argon beam coagulation is used when compared with Heater probe coagulation and soft coagulation using the hemostatic forceps.[8]

CONCLUSION

Argon plasma electrocautery is more effective than other endoscopic interventions because of its ease in application and reduced depth of penetration, thus minimizing tissue damage and has better rates of initial hemostasis. However, it is known to cause iatrogenic pneumoperitoneum, as seen in our patient. If pneumoperitoneum arises post argon plasma electrocautery, it is important to evaluate the patient carefully for visceral perforation. If there is no obvious perforation, close clinical monitoring may be all that is needed. More studies are required to understand the incidence and complications that are associated with argon plasma electrocautery.

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