

Intraoperative Bleeding and Pneumoperitoneum During Endoscopic Submucosal Dissection – A Cautionary Tale

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Abstract

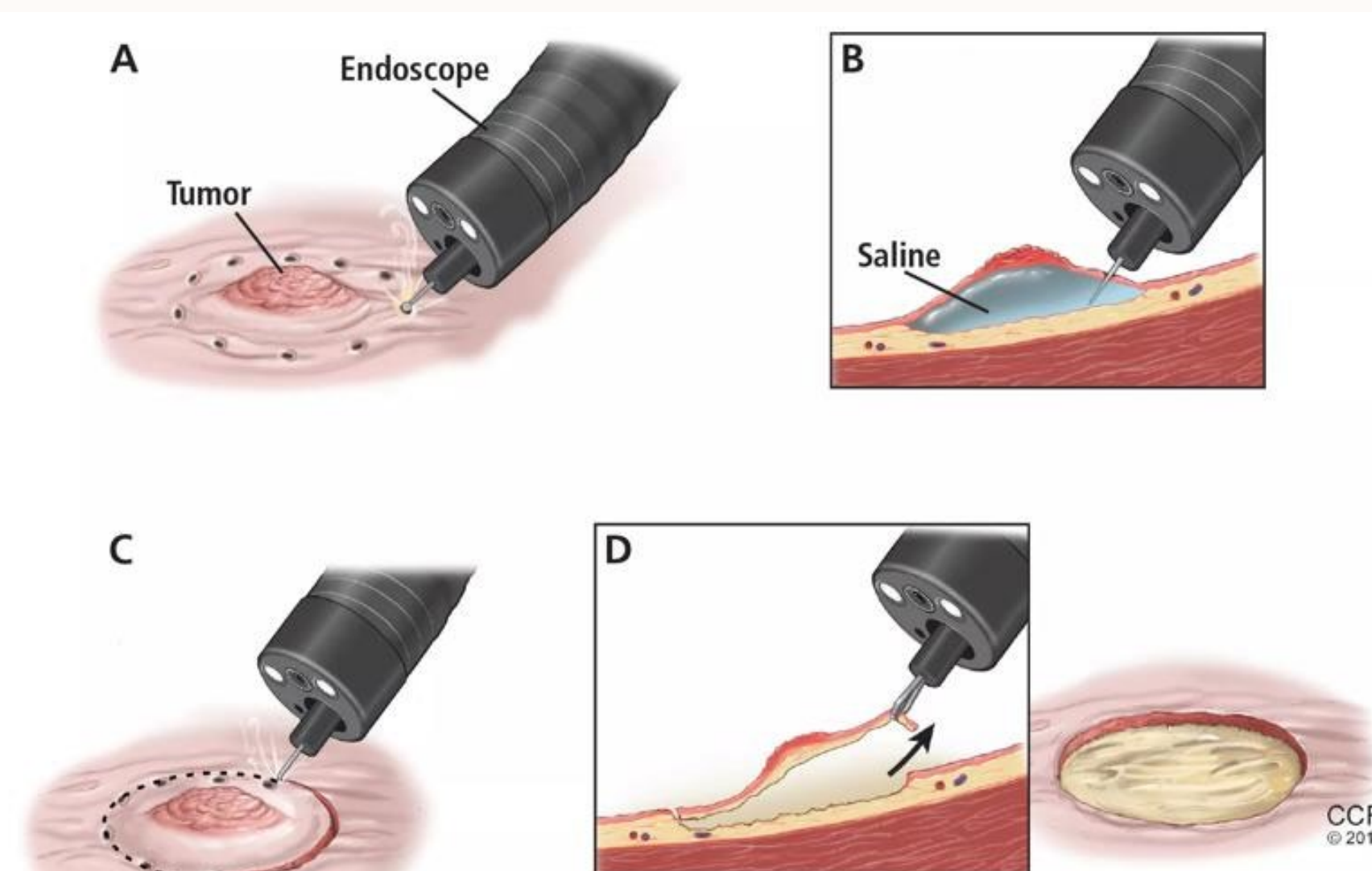
A 74 year old female, ASA 3 patient with a cancerous stomach lesion but otherwise unremarkable history presents to the GI endoscopy suite for lesion removal via ESD. After involvement of vasculature during the removal process, a bleed occurred, transitioning into a perforation and causing severe pneumoperitoneum. The unexpected adverse hemodynamic shifts prompted the need for major interventions via volume, pressors, and special monitors. This turned what was a simple case into something resembling a trauma procedure. For this reason, adequate expectations, precautions, and lines of communication with each team member should be maintained regardless of expectations surrounding case complexity.

Learning Objectives

- ❖ Outline the frequency of bleeds and perforations in GI procedures
- ❖ Assess the order of events which led to the complication
- ❖ Discuss methods by which these complications can be treated
- ❖ Relate new expectations to maintain during these cases

Background

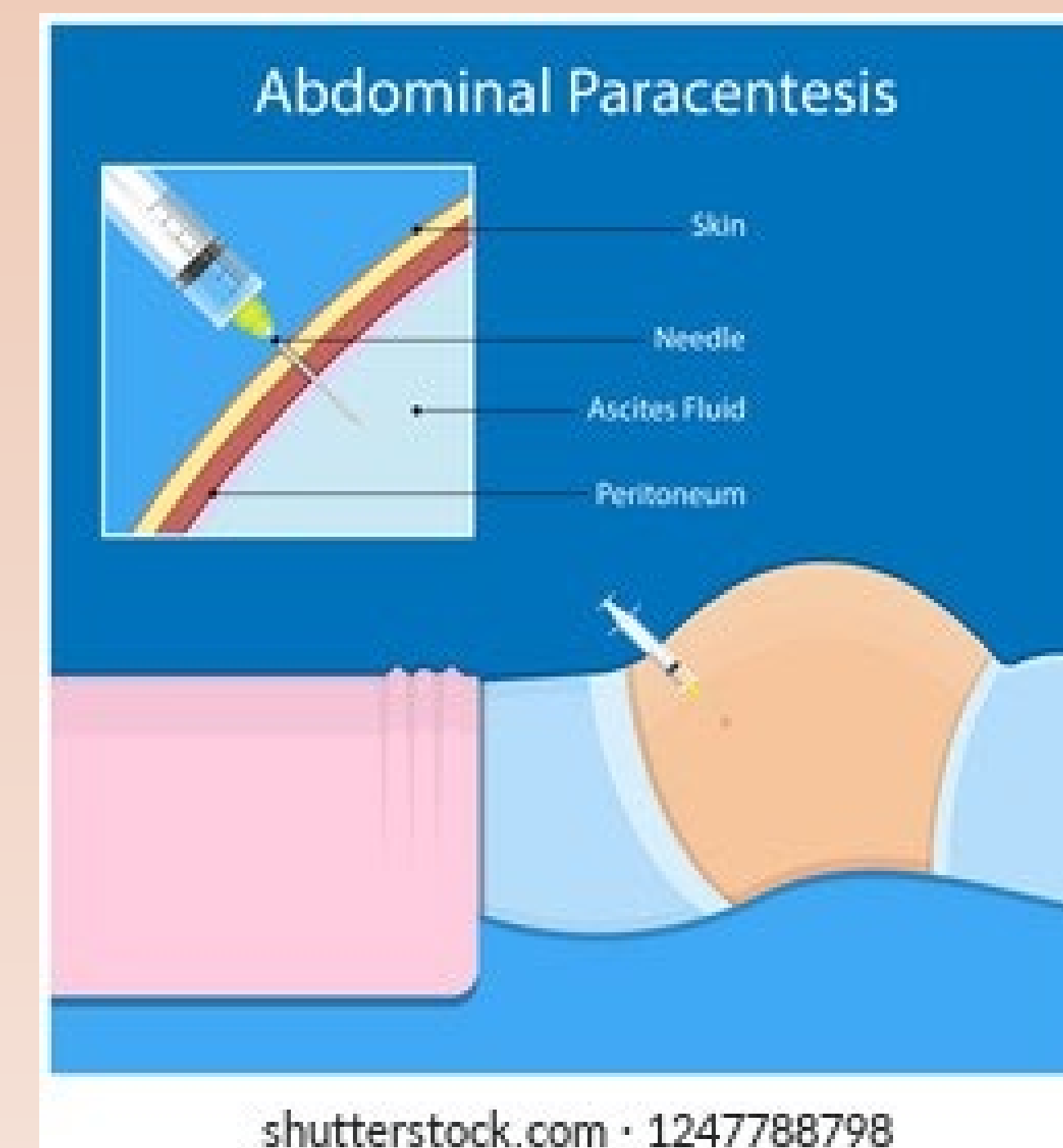
GI endoscopic submucosal dissection (ESD) procedures are a minimally invasive method of removing polyps and cancerous lesions from the GI tract. While the procedures have a low incidence of complications and can be done under MAC, problems can arise in the form of bleeds and pneumoperitoneum. Overall, the incidence of GI bleeding may vary case by case- reports of post-operative bleeds can be associated with 1-15% of ESD cases. Perforations occur ranging from 0.02-5% of all colorectal endoscopic procedures. While the figures still represent a minority of cases, mindfulness in preparation, identifying, and addressing these events will promote an overall improvement for patient quality of care.



<https://consultqd.clevelandclinic.org/a-minimally-invasive-treatment-for-early-gi-cancers>

Case Description and Management

Induction was standard with no complications- the case was expected to last more than two hours due to lesion size, so a general anesthetic with ETT was performed. At 3.5 hours, a bleed occurred at the stomach wall, obstructing the endoscope's view. Significant blood loss was notable by the filling of available suction canisters and eventual pooling at the mouth. Blood was immediately requested for the patient, but due to recent consent formatting changes, the blood consent form had not been presented to the patient. Preoperative oversight prompted an excess of time wasted in trying to get an emergency consent for the blood bank- in the meantime volume was replaced with albumin and crystalloids. The attending anesthesiologist was called to the room and secondary and tertiary IV lines were established. Communications began with on-site trauma team to assess if the bleed could practically still be fixed via endoscope. At the 5 hour mark, ETCO2 suddenly dropped to 2/3 the normal value, peak pressures surged, and blood pressure fell to 60/35. Pressure was treated with 2 units vasopressin and consultation with endoscopist revealed the stomach wall had been fully ruptured and caused severe pneumoperitoneum as higher insufflation pressures were being used to keep the stomach in operating view. Pneumoperitoneum had resulted in compressed major abdominal vasculature and difficulty ventilating. Paracentesis with a 10 cc syringe corrected the issue and pressures returned to better values over ten minutes. Following the incident, an A-line was placed to note any further hemodynamic shifts. Since the unresolved rupture made visualization through insufflation of the stomach very difficult- attending suggested the endoscopist stop their attempts at closing the wound and to instead focus completely on transfer to the trauma OR. 2 units PRBC were finally obtained right before transport and transfused accordingly to Hgb values obtained from ABGs. Acidosis was gradually addressed with hyperventilation and bicarbonate, until pH was within normal values. The patient was transferred to the trauma OR for an open gastrectomy procedure with a central line for more effective support. The delays in procuring blood and initiating transfer to a better equipped OR ultimately resulted in a severely detrimental experience for the patient of an elective minimally invasive procedure.



Discussion

- While GI unit procedures are often treated as simple anesthesia cases, significant adverse events can always occur regardless of the procedure type, which may transition a once stable case into a borderline trauma situation.
- Timely administration of blood could have been done if blood consent had been obtained from the very start, so one should always ensure patients have signed the blood consent regardless of having no adverse expectations.
- Despite initial confidence that the endoscopist could fix the bleeding, it would have been best practice to have placed an arterial line earlier- it would have helped in quickly noticing the large drop in blood pressure from the pneumoperitoneum.
- Transfer to an OR would have been ideal from the moment the surgeon expressed significant difficulty in closing the wound- better communication between the team and voicing concerns more adequately could have expedited the process.
- Recognition of pneumoperitoneum as a potential adverse occurrence in GI can aid in optimally identifying and treating these complications as soon as they occur.

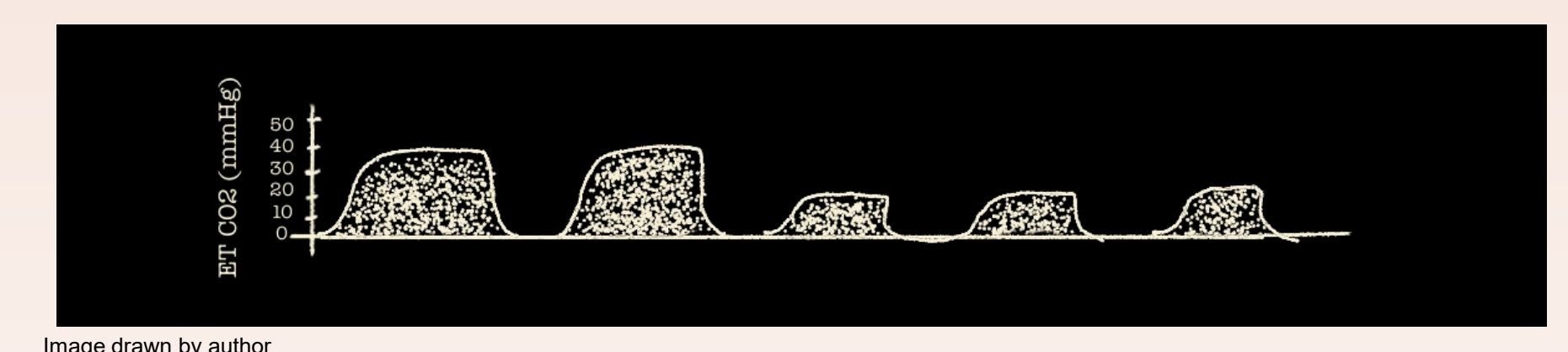


Image drawn by author

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