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Case Report

Spontaneous Otorrhagia after Laparoscopic Pelvic Surgery: A Report of Two Cases

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Spontaneous otorrhagia following laparoscopic pelvic surgery is a complication that is rarely reported and incompletely understood. Few case reports have described this phenomenon, though its true incidence is unknown. It has been hypothesized that a combination of extreme patient positioning and abdominal insufflation is the contributing factor. There does not appear to be any untoward consequences and patients can be managed conservatively. We present two cases of spontaneous otorrhagia associated with laparoscopic pelvic surgery, which occurred over a 1-week period at our institution.

KEYWORDS: Hemorrhage, ear canal, otorrhagia, laparoscopic pelvic surgery

INTRODUCTION

Spontaneous otorrhagia as a consequence of laparoscopic pelvic surgery has not been previously described in the otolaryngology literature. A few case reports have described this phenomenon, although its true incidence is unknown. We believe that otorrhagia results from the formation and rupture of a hematoma within the external auditory canal, which forms secondary to extreme patient positioning and abdominal insufflation. No significant sequelae have been reported and it appears to resolve with time. Herein, we present two cases of spontaneous otorrhagia associated with laparoscopic pelvic surgery, which occurred over a 1-week period at our institution.

CASE PRESENTATIONS

Case 1

A 73-year-old female with a history of carcinoid tumor underwent bilateral salpingo-oopherectomy for an ovarian mass and was found to have otorrhagia in the postoperative period. She had no history of bleeding disorders and did not take any anticoagulant or antiplatelet medication. Her history was significant for a left-sided acoustic neuroma excised using a retrosigmoid approach in the distant past leaving her with ipsilateral deafness. Written informed consent was obtained for participation in this study.

Her surgery was uncomplicated. Anesthetic medications included midazolam, fentanyl, propofol, and rocuronium. Octreotide was given due to a history of carcinoid. Desflurane was used for anesthetic gas. No nitrous gas was utilized. The airway was managed with endotracheal intubation and blood pressure was monitored with an arterial line. The patient had an episode of hypotension several minutes after induction requiring phenylephrine and vasopressin; however, blood pressure for the reminder of the procedure period remained between 120-140 mmHg systolic and 60-70 mmHg diastolic, except for a 5-minute period prior to extubation when the pressure was 160/70 mmHg. The patient was in a steep Trendelenburg position with abdominal insufflation at 15 mmHg for the case. The peak inspiratory pressure ranged as 14-24 cm H_2O. The peak inspiratory pressures did rise to 26 cm H_2O 1 hour into the case for approximately 10 minutes. The anesthetic duration lasted for 2 hours and 30 minutes.

Immediately, postoperatively, she was noted to have left-sided spontaneous otorrhagia. She was evaluated by the otolaryngology service and found to have a sloughed squamous layer of the inferior portion of the left external auditory canal (Figure 1). Her tympanic membrane was intact and mobile on insufflation and without apparent effusion or hemotympanum. She was noted to have

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a hematoma along the inferior portion of her right external auditory canal extending from the bony cartilaginous junction to the annulus (Figure 2). A Weber tuning fork exam lateralized to the contralateral side (consistent with prior history of acoustic neuroma). A computed tomography (CT) of the temporal bone did not show any abnormalities. She was prescribed an ototopical antibiotic-steroid combination for 10 days. One month after the initial insult, both sides had healed completed and her otologic exam was back to baseline.

Case 2

A 73-year-old female underwent laparoscopic bilateral salpingo-oopherectomy for an ovarian cyst and was noted to have otorrhagia at the completion of her case. She had no personal or family history of bleeding disorders and did not take any anticoagulant or antiplatelet medications. She had no significant otologic history. Written informed consent was obtained for participation in this study.

Her surgery was uncomplicated. Anesthetic medications included midazolam, fentanyl, rocuronium, and propofol. Desflurane was used for anesthetic gas. No nitrous gas was utilized. Her airway was managed with endotracheal intubation and her blood pressure was monitored with an arterial line. Her blood pressure remained between 120-150 mmHg systolic and 60-80 mmHg diastolic. The patient was in a steep Trendelenburg position with abdominal insufflation at 15 mmHg. The peak inspiratory pressures were in the range 20-41 cm H_2O and remained in a range of 39-41 cm H_2O for 1 hour total during the procedure. The anesthetic duration was 3 hours and 30 minutes.

Immediately, postoperatively, the patient was noted to have left-sided otorrhagia. Her external auditory canal was lavaged with warm normal saline and gently suctioned to reveal a sloughed layer of skin within the bony external auditory canal as well as an intratympanic hematoma (Figure 3). There was no effusion or hemotympanum noted. The membrane was intact and mobile on insufflation. The right ear canal and tympanic membrane were unremarkable. A CT of the temporal bone confirmed findings of an intratympanic hematoma without middle ear effusions or obvious trauma. She had no evidence of any other otologic abnormalities and her tuning fork exam was normal. She was placed on topical antibiotic-steroid ototopical solution for 10 days. She recovered completely 1 month later and had a normal otoscopic exam. Her Weber tuning fork exam remained midline. No formal audiogram was obtained.

DISCUSSION

Otorrhagia encountered during the intraoperative and immediate postoperative period is a concerning finding for patients and physicians. In the absence of known or suspected trauma to the ear canal, bloody otorrhagia is an uncommon phenomenon. In such cases where there is no clear cause, determining an inciting event can be difficult. In the two patients presented herein, neither experienced direct trauma nor had other exam findings to suggest an etiology of the otorrhagia. There are rare reports of postoperative otorrhagia following laparoscopic pelvic procedures, but none reported in the otolaryngology literature [1-4].

While the pathophysiology underlying the exam findings is not well understood, a review of relevant anatomy and physiology and the dynamics underlying laparoscopic surgery with Trendelenburg positioning warrant a comment. The external auditory canal receives its blood supply from the postauricular and superficial temporal arteries laterally and from the deep auricular artery medially. Its venous

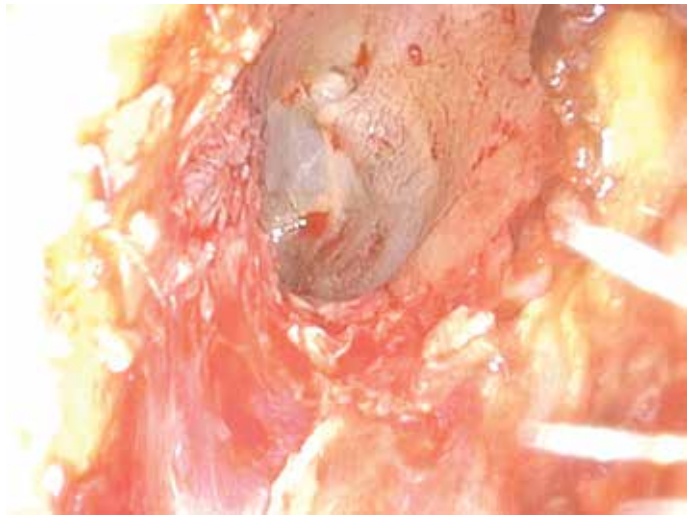

Figure 1. Ruptured hematoma of left external auditory canal

Figure 2. Hematoma of right external auditory canal

Figure 3. Intra tympanic hematoma of left tympanic membrane

drainage is via the posterior auricular vein and the superficial temporal vein. Of note, the posterior auricular vein also receives drainage from the sigmoid sinus via the mastoid emissary vein and this does pose a potential route for back flow if the pressure increases.

The Trendelenburg position can increase jugular venous pressure as much as four times and create a visible increase in jugular venous distention [5]. This increased pressure is well known to affect acute glaucoma due to increased venous pressure within the eye and is further increased by carbon dioxide retention from pneumoperitoneum during laparoscopic surgery [5, 6]. Additionally, carbon dioxide insufflation and resultant pneumoperitoneum also increase intracranial pressure potentially leading to increased blood flow through the veins directly contiguous with the sinus drainage pathway of the cranium [7, 8]. Furthermore, increases in middle ear pressure have been demonstrated while in the Trendelenburg position [9]. It is important to note that laparoscopic pelvic surgery requires a particularly steep Trendelenburg position compared to other abdominal surgeries. Baseline venous pressures are restored following resolution of pneumoperitoneum and reversal of positioning. The use of nitrous gas and bag mask ventilation can likewise contribute to an increase in the middle ear pressure that may result in tympanic membrane perforation [10]. With the increasing popularity of minimally invasive procedures, including those that use various robotic systems, the rare phenomenon described herein may become more common. This is highlighted by our institution's experience where two cases occurred within 1 week. It is entirely possible that this phenomenon is significantly under-reported as many episodes may be subclinical or incorrectly diagnosed as a traumatic injury.

Prolonged Trendelenburg positioning combined with an increase in systemic carbon dioxide absorption due to insufflation of the abdomen during laparoscopic surgery leads to substantial increases in venous pressure. We hypothesize that the ensuing dilation of the venous networks draining the bony external auditory canal and tympanic membrane resulted in their spontaneous rupture in the two cases we have reported. Fortunately, conservative treatment in both cases was all that was required and they experienced no permanent sequela. As these procedures are more common, some patients may experience more severe episodes than what has currently been reported.

CONCLUSION

It is important for otolaryngologists to be aware of the risk of certain surgical procedures leading to otorrhagia. Although the physical exam findings may seem to be consistent with direct trauma, this is not necessarily always the case. An astute otolaryngologist should suspect other etiologies when there is no direct evidence of trauma or suspected trauma. In our experience, there does not appear to be any significant sequela resulting from this injury, and it can be managed conservatively. It will be important for the otolaryngologist to work closely with anesthesiologist and pelvic surgeons ensuring that measures are taken to minimize the risk of this complication in the future.

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