



CASE REPORT

Cervical Spine Osteomyelitis after Direct Rigid Laryngoscopy and Balloon Dilation

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Abstract

Direct rigid laryngoscopy (DRL) is a diagnostic tool used to visualize the larynx, pharynx or upper esophagus. DRL is considered a relatively well tolerated and safe procedure in Otolaryngology practice, however soft tissue injury to the oral cavity or upper aerodigestive tract are possible complications of the procedure. Tongue injury is the most common type of soft tissue trauma (36.3%), followed by lower lip injury (22.3%), upper lip injury (7.1%), and oral mucosa injury (2.1%) (1). Here, we report on a patient who underwent DRL, had osteomyelitis of the cervical spine after the procedure, and subsequently required cervical spine surgery.

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1 | CASE REPORT

A 64 year old female presented to the Laryngology clinic with a three-year history of solid food dysphagia that had worsened recently. Her medical history was significant for hypertension, hyperlipidemia, and gastroesophageal reflux disease. She also had a history of polymyositis and was taking 2.5mg of Methotrexate daily. Flexible laryngoscopy revealed bilateral vocal cord atrophy with no significant pooling in the pyriform sinuses. Her modified barium swallow revealed a cricopharyngeal bar potentially interfering with bolus flow (Figure 1).The patient was scheduled for esophageal balloon dilation with

Botox injection into the upper esophageal sphincter after discussion of management options. After preoperative counseling and informed consent was obtained, the patient was brought to the operating room and intubated by the Anesthesia team after two attempts, using video laryngoscopy with a curved Macintosh blade and a 7.0 endotracheal tube. Several attempts were made to visualize the upper esophageal sphincter using both Dedo and anterior commissure laryngoscopes. The exposure obtained with either laryngoscope was limited and not safe for intervention. Finally a video laryngoscope with a curved Macintosh blade was used to visualize the esophageal inlet. Under this visualization, an esophageal balloon (18-20mm

CRE Balloon Dilator, Boston Scientific) was positioned with the midpoint of the balloon at the level of the upper esophageal sphincter and inflated to 20mm. Next, using a curved rigid needle, botulinum toxin was injected into the upper esophageal sphincter under direct visualization using the video laryngoscope. A total of 40 units were injected. No intraoperative antibiotics were administered. There were no immediate complications, she was extubated in the operating room, and sent home in stable condition. On post-operative day 7, the patient presented to the emergency room complaining of moderate pain located along both sides of her neck, and decreased oral intake. She denied fever or extremity weakness. Her pain did not improve with Tylenol, Valium, or Ibuprofen. The Otolaryngology team evaluated the patient, and after finding no evidence of infection or other acute pathology on physical exam or laboratory studies, the patient was discharged home on muscle relaxants. Furthermore, on a follow-up outpatient clinic visit, a cervical spine X-ray was performed and revealed nonspecific soft tissue swelling. On post-operative day 20, the patient presented to the emergency room complaining of persistent severe neck pain radiating to both shoulders, and exacerbated with arm motion. She denied fever or chills. Her physical examination was significant only for weakness with left shoulder extension. A CT of the neck with intravenous contrast (Figure 2) was performed and revealed C4-C5 discitis with osteomyelitis and loss of C5 anterior vertebral body height. The latter finding was noted to be new as compared to the prior cervical spine XR. An MRI of the cervical spine with contrast (Figure 3) was then performed and showed a phlegmon centered at C4-C5, extending anteriorly to involve the prevertebral space, superiorly to the level of C2, inferiorly to the level of T1. There was also noted to be involvement of the spinal canal resulting in mild to moderate canal stenosis at C4-C5 and possible invasion at the C5-C6 neural foramina on the left. A XR esophagram (Figure 4) was performed and showed no evidence of perforation. The patient was admitted for intravenous broad-spectrum antibiotics and Neurosurgery team was consulted. On admission day 0, the patient was noted to have worsening left upper extremity weakness and the patient was taken to the operation room with the Neurosurgery team

for neck and cervical spine exploration, evacuation of prevertebral and epidural phlegmon, C4-C5 corpectomies and discectomies, anterior plating from C3-C6. During the neck exploration there was no evidence of esophageal or pharyngeal perforation. During the immediate postoperative period, the patient was kept on intravenous broad-spectrum antibiotics and a cervical collar. Her dysphagia and neck pain slowly improved and the patient was discharged to a rehabilitation center. The patient was readmitted to the hospital for persistent dysphagia and underwent laparoscopic gastrostomy tube placement. One month later, the patient underwent C3-C6 lateral mass instrumentation and posterior lateral arthrodesis by the Neurosurgery team. The patient ultimately completed 8 weeks of IV antibiotics, based on operating room culture and sensitivity reports. On discharge following the posterior cervical spine surgery, the patient's neurological examination showed intact sensation over extremities and full strength in the upper and lower extremities. Two months after discharge from the hospital, the patient denied neck pain, and was advanced to oral feeds with additional tube feeds as needed. Her follow-up MRI of the cervical spine with contrast (Figure 5) revealed expected postoperative change without fluid collection, osteomyelitis, or spinal canal / neuroforaminal stenosis.

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Figure 1: Modified Barium Swallow

Modified barium swallow shows evidence of cricopharyngeal bar at the level of C5-C6 vertebrate.

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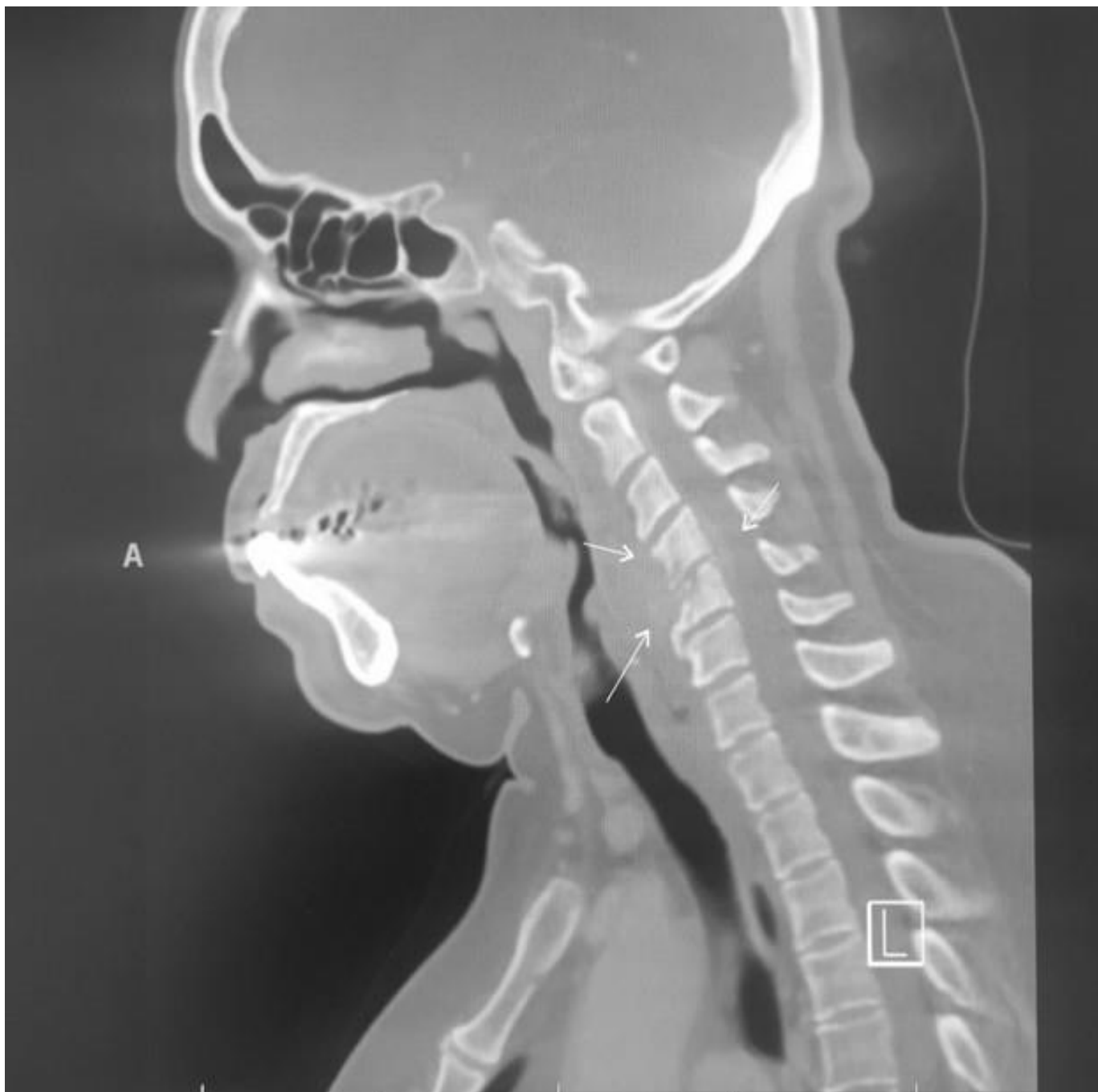


Figure 2: Post-Operative CT Neck with Contrast
CT Neck with contrast performed post-operative day 20. There is evidence of C4-C5 discitis and osteomyelitis



Figure 3: Post-Operative MRI Neck with Contrast

MRI of the neck with contrast taken post-operative day 20. There is evidence of prevertebral, epidural phlegmon and spinal canal stenosis.

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Figure 4: Post-Operative XR Esophagram

XR esophagram performed post-operative day 21. No evidence of perforation in the pharynx or esophagram



Figure 5: Post-Vertebral Fusion MRI with contrast
Following vertebral fusion, evidence of post-surgical changes and resolution of phlegmon

2 | DISCUSSION

Postoperative infection is a known, but rare, complication after direct rigid laryngoscopy (DRL). There are multiple mechanisms for infection after DRL, such as lack of surgical instrument sterility and mucosal injury which can facilitate the translocation of oral flora into the deep neck spaces or bloodstream. Vayisoglu et al. found a post-DRL bacteremia incidence of 0%, though nosocomial colonization was found in 25.5% of subjects at 24 hours post-operative, of which 57.1% of subjects had concurrent malignant pathology [1]. Balloon dilation is a useful adjunctive tool for the Otolaryngologist in management of upper aerodigestive strictures during DRL. However, balloon dilation is considered a higher risk procedure for bacteremia as compared to standard gastrointestinal endoscopy (34-54% versus 4%).[2] The British Society of Gastroenterology (BSG) does not advocate antibacterial prophylaxis for routine endoscopy, but does recommend prophylaxis for neutropenic and severely immunocompromised patients undergoing higher risk endoscopic procedures, such as balloon dilation [3]. In 2015 the American Society for Gastrointestinal Endoscopy (ASGE) released consensus statements on antibiotic prophylaxis during endoscopy as well, recommending against prophylaxis for patients with prosthetic heart valves, congenital heart disease, orthopedic prostheses, unless there is active infection at the intervention site [4].Osteomyelitis of bony structures in the head and neck after DRL is very rare. Tucke et al. reported two cases of mandibular osteomyelitis after laceration of overlying oral mucosa during DRL; both were treated by mandibular debridement and a prolonged course of antibiotics [5].

Osteomyelitis of the cervical spine is rare, representing only 3% to 6% of all cases of vertebral osteomyelitis. Risk factors for vertebral osteomyelitis include diabetes mellitus, immunocompromised status, IV drug use, end-stage renal disease and hematogenous spread. Neck pain is the most presenting symptom, but patients may also present with chills, fever, night sweats, fatigue, loss of appetite, neck stiffness and limited

range-of-motion. Cervical osteomyelitis can rapidly progress with significant sequelae if immediate intervention is not done. Although well discussed in the Gastrointestinal literature there is rare discussion of antibiotic prophylaxis during DRL in the Otolaryngology literature, and there are no consensus statements to guide management. Therefore, it is important for the Otolaryngologist to consider antibiotic prophylaxis during DRL with additive intervention with high risk for bacteremia. Furthermore, we present this case of cervical osteomyelitis after DRL with balloon dilation and Botox injection given its rarity and the seriousness of this complication. It is therefore important for the Otolaryngologist to consider neck pain and upper extremity weakness as a presenting symptom following DRL, and the important of rapid intervention to prevent further deterioration.

3 | CONCLUSION

Direct rigid laryngoscopy is well known as a safe diagnostic procedure. Although it uncommonly causes bacteremia, additive intervention such as balloon dilation may increase the risk of bacteremia. Consideration of antibiotic prophylaxis during this procedure should consider patient risk factors. Additionally, cervical osteomyelitis after DRL rarely occurs and the Otolaryngologist must be aware of cervical osteomyelitis pathophysiology, risk factors and postoperative presentation, as early diagnosis and intervention of this rare complication can prevent serious sequelae.

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