



Mediastinitis due to Cervical Osteophytes in a Patient after Hemithyroidectomy

Ainagul Zholdosheva Bayalieva¹ , Shamil Damirovich Gardanov¹ , Artem Anatolyevich Surikov² 

¹Department of Anesthesiology, Reanimation and Disaster Medicine, Kazan State Medical University, Kazan, Russian Federation

²Department of Neurosurgery, First Moscow State Medical University (Sechenov University), Tyumen, Russian Federation

Cite this article as: Bayalieva AZ, Gardanov SD, Surikov AA. Mediastinitis due to Cervical Osteophytes in a Patient after Hemithyroidectomy. *Turk J Anaesthesiol Reanim.* 2021;49(3):250-253.

Abstract

Descending necrotising mediastinitis is a terrible disease, usually a complication of an inflammatory process of the pharynx, pathology of the mandibular or submandibular space. The development of mediastinitis in a patient after haemithyroidectomy under general anaesthesia with tracheal intubation due to esophagus injury is a very rare condition. Our patient's early post-operative period was complicated by severe pain behind the sternum not associated with acute coronary syndrome. On the second post-operative day, our suspicions of mediastinitis were not definitively supported by diagnostic tests. On the fourth post-operative day, the patient experienced septic shock, necessitating emergent repeated oesophagogastroduodenoscopy, which located the injury of oesophagus. Emergent torachotomy for mediastinitis, gastrostomy and mediastinal drainage was conducted on the fourth post-operative day. Despite aggressive surgical and critical care management, the patient died 3 days after. Death was caused by mediastinitis complicated by severe sepsis and multiple organ failure. On autopsy, the damage to the posterior wall of the oesophagus occurred as a result of penetrating trauma to cervical and thoracic spine osteophytes during hemithyroidectomy. The pathology section revealed that acute angle osteophytes located at the cervical level injured the oesophagus when the pressure was applied in removing part of the thyroid gland with malignant neoplasia.

Keywords: Mediastinitis, osteophytes, esophagus injury

Introduction

The close proximity of anatomical structures in the neck can lead to iatrogenic injury of one organ during the manipulations of the others. Tracheal intubation as well as resection of thyroid gland may lead to trauma of the oesophagus. We are presenting a clinical case of non-intentional injury of cervical part of oesophagus during hemithyroidectomy by osteophytes, degenerative processes emanating from the cervical spine vertebrae.

Case Presentation

A 77-year-old female patient was admitted to the tertiary care hospital in Kazan, Russia, for a routine right hemithyroidectomy, resection of the isthmus, and removal of histologically confirmed malignant nodules in the left lobe of the thyroid gland. Her history included stable angina, compensated hypertension, and congestive heart failure with a preserved ejection fraction according to the New York Heart Association's functional classification. She underwent routine pre-operative assessment by an anaesthesiologist and usual preparation prior to surgery.

During the operation, the patient was exposed to general anaesthesia and intubated at the second attempt with endotracheal tube (size 7). Difficulties during intubation were caused by a "short neck" and enlarged thyroid gland. General anaesthesiological support during the hour-long operation was carried out in accordance with current European/Russian guidelines and protocols. Extubation, early post-extubation period, and early post-operative pain management were free of complications, and the patient was transferred to the specialised surgical ward according to the hospital policy. Four hours after the operation, the patient started complaining of pain behind the sternum, which was not relieved by nitrates or non-narcotic analgesics. Acute coronary syndrome was suspected;

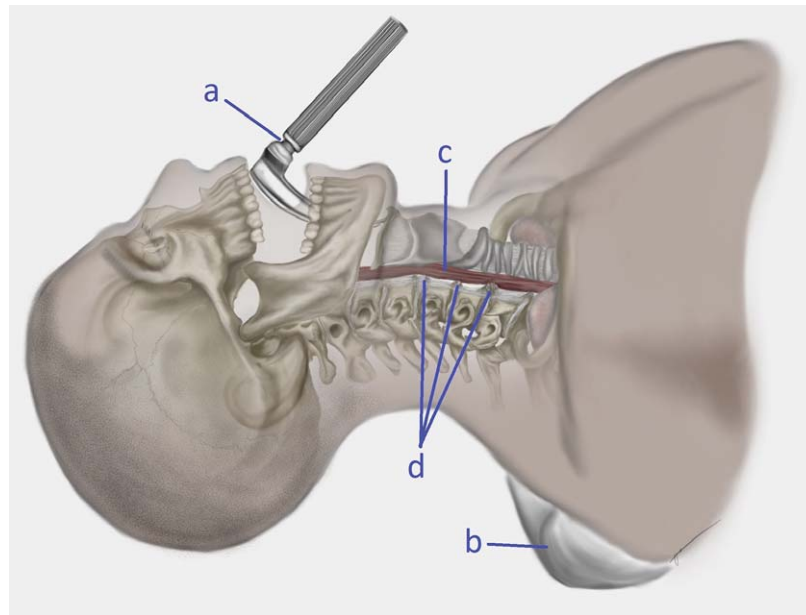


Figure 1. a-d. The position of the patient during surgery, hemithyroidectomy. (a) The position of the laryngoscope during intubation. (b) The location of the pillow during the operation. (c) Oesophagus (d) osteophytes on the bodies of the cervical vertebrae.

however, there were no changes on the series of ECG and no rise on repeated troponin tests. The pain was relieved only by narcotic analgesics.

On the second post-operative day, pain in the chest continued, new discomfort in the interscapular space appeared and fever and emphysema on the chest were observed. Due to new developments in the patient condition, the patient was rushed to the diagnostics department where chest x-ray and upper oesophagogastroduodenoscopy were performed. The x-ray was significant for mediastinum that was expanded in size; however, the upper GI endoscopy was not able to identify any oesophageal damage. On the fourth post-operative day after the hemithyroidectomy, the patient's condition was objectively worsened with raising leukocytosis, thrombocytopenia, compromised liver and kidney function tests, drop in arterial blood pressure and raised procalcitonin level. The Sequential Organ Failure Assessment score was 6.

The patient's intensive care was escalated according to the clinical protocol of suspected sepsis. The oesophagogastro-

duodenoscopy on an emergent basis was repeated, where a defect of 5-6 cm in size was identified along the upper posterior wall of the oesophagus covered with fibrin coating. Based on the confirmed lesion of the oesophagus involving mediastinum, the patient was taken for emergent thoracotomy with gastrostomy to drain necrotising mediastinitis. Despite successfully performed surgical procedure and critical care management in ICU, the patient condition steadily deteriorated with signs of severe sepsis and multiple organ failure leading to patient death on the seventh day after planned hemithyroidectomy.

Discussion

Non-intentional tissue injury caused during diagnostic manoeuvres or surgical treatment to the neck is rare but potential fatal. The medical literature describes few cases of injuries of anatomical structures of the neck during tracheal intubation such as trauma of pyriform sinuses, larynx and trachea. However, damage to the oesophagus is even more important due to its potential lethal complications. Most often the occurrence of oesophageal damage during tracheal intubation is associated with a conductor, a metal stylet with a small diameter inserted into the intubation tube before its introduction into the trachea for guiding the tube.

The cervical part of oesophagus is especially susceptible to iatrogenic injury due to manipulations on the neck and thyroid gland. Known cases occur because of technical

Main Points

- Degenerative changes in the spine in the cervical region can cause damage to the esophagus during thyroid surgery.
- With pain behind the sternum after surgery, it is necessary to exclude not only angina, but also possible mediastinitis.

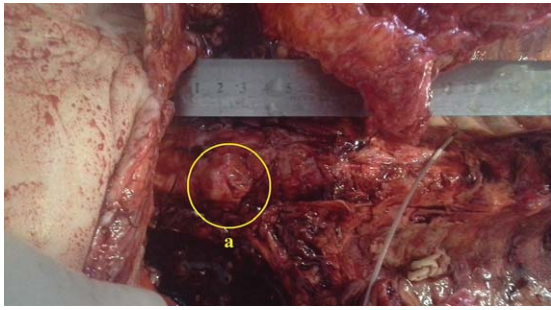


Figure 2. (a) Osteophyte of the cervical vertebral body.



Figure 3. Size of the prepared osteophyte of the seventh cervical vertebra.

difficulties associated with unusual location, large size of the nodule or thyroid cancer that spreads retroesophageally.¹

Cases of oesophagus injury during surgery on the thyroid gland due to pressure against cervical spine osteophytes are highly unusual. Osteophytes are a pathological marginal growth of bone tissue, which is subjected to deforming loads.² Common causes of osteophytes are osteoarthritis, ankylosing spondylitis, and diffuse idiopathic skeletal hyperostosis that can impinge important vessels, nerves and internal organs and also irritate muscles. Physicians may miss osteophytes in the cervical and thoracic spine during a routine examination of the patient.

As revealed by autopsy, the posterior wall of the esophagus injury in our patient is the result of penetrating trauma by cervical and thoracic spine osteophytes during hemithyroidectomy (Figure 1). The acute angle osteophytes at the cervical level (Figure 2) were exactly found at the same level of esophagus injury, where the fibrin overlaid on the epithelium in the area of oesophageal damage (Figure 3). This evidence confirms the cause of oesophageal injury leading to mediastinitis.

The combination of the following factors led to this unfortunate outcome: the presence of thyroid nodules that probably shifted the cervical level of the oesophagus from its physiological position and pushed closer to the vertebrae, atrophy and thinning of the oesophagus wall in older person, and the position of patient during surgery.

Considering this clinical case, we would like to add a few words about the diagnosis of oesophageal perforation, namely, about imaging methods. Imaging techniques that are useful for diagnosing oesophageal perforation include chest radiography, computed tomography (CT) of the chest and upper abdomen, and endoscopy. The diagnosis of oesophageal perforation should begin first with chest radiography using a contrast agent (if the patient can swallow).³ CT of the chest and upper abdomen with the introduction of a contrast agent can also show the presence of perforations. It should be said that the presence of air or fluid in the mediastinum, pleural effusion, pneumocardium, and pneumoperitoneum is important diagnostic criteria in these patients. The location of the perforation is much easier to judge by CT than by chest radiography.⁴ The endoscopic method provides direct visualisation of the oesophageal wall defect. However, the use of endoscopic imaging to diagnose oesophageal perforation remains controversial, as air insufflation can lead to pneumomediastinum and emphysema in the patient's neck, which can further worsen their condition.

Conclusion

Both anaesthesiologists and thoracic surgeons should use high index of suspicion to anticipate osteophytes' overgrowth as a potential source of complication in patients with degenerative conditions of the cervical spine, mainly in patients with a history of dysphagia, a feeling of lump in the throat, or a change in the character of the voice, and complaints of neck or back pain. In such situations, a CT of the neck and chest should be considered.⁵

Pain behind the sternum not associated with acute coronary syndrome should alert the physicians about potential mediastinitis and necessitate to urgently conducting further confirmatory tests, in particularly oesophagogastroduodenoscopy of cervical part of esophagus in order to prevent the development of descending necrotising mediastinitis. Surgical intervention aimed at suturing the perforated part of the oesophagus and draining the mediastinum is the current best treatment option. Despite adequate modern antibiotic therapy and surgical drainage of necrotising mediastinitis, the global mortality rate complicated by severe sepsis is still high, up to 19-47%.⁶⁻⁸

Informed Consent: A written informed consent was obtained from patient's relatives.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - A.Z.B.; Design - A.A.S.; Supervision, Resources and Materials - A.Z.B.; Data Collection and/or Processing - A.Z.B., S.D.G.; Analysis and/or Interpretation - S.D.G.; Literature Search - S.D.G.; Writing - S.D.G., A.Z.B.; Critical Review - A.Z.B.

Acknowledgements: The authors would like to acknowledge M. C. Browne, Internal Medicine Resident, PGY3. KSMU, for editing this article.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Kaur J, Virk JS. Dysphagia due to DISH-related anterior osteophytes: DISHphagia! *BMJ Case Rep.* 2017;2017:bcr-2017-222512. [\[CrossRef\]](#)
2. Klaassen Z, Tubbs RS, Apaydin N, Hage R, Jordan R, Loukas M. Vertebral spinal osteophytes. *Anat Sci Int.* 2011;86(1):1-9. [\[CrossRef\]](#)
3. Soreide JA, Viste A. Esophageal perforation: Diagnostic work-up and clinical decision-making in the first 24 hours. *Scand J Trauma Resusc Emerg Med.* 2011;19:66.
4. Romero RV, Goh K-L. Esophageal perforation: Continuing challenge to treatment. *Gastrointest Interv.* 2013;2(1):1-6. [\[CrossRef\]](#)
5. Alsalmi S, Bugdadi A, Alkhayri A, Fichten A, Peltier J. Urgent anterior cervical osteophyctomy for an asymptomatic cervical hyperostosis to overcome failed intubation. *Cureus.* 2018;10(3):e2400. [\[CrossRef\]](#)
6. Ridder GJ, Maier W, Kinzer S, Teszler CB, Boedeker CC, Pfeiffer J. Descending necrotising mediastinitis: Contemporary trends in aetiology, diagnosis, management, and outcome. *Ann Surg.* 2010;251(3):528-534.
7. Mureşan M, Mureşan S, Balmoş I, Sala D, Suci B, Torok A. Sepsis in acute mediastinitis—A severe complication after oesophageal perforations: A review of the literature. *J Crit Care Med (Targu Mures).* 2019;5(2):49-55. [\[CrossRef\]](#)
8. Prado-Calleros HM, Jiménez-Fuentes E, Jiménez-Escobar I. Descending necrotizing mediastinitis: Systematic review on its treatment in the last 6 years, 75 years after its description. *Head Neck.* 2016;38(Suppl. 1):E2275-E2283. [\[CrossRef\]](#)