

Oesophageal perforation in anterior cervical spine plating: A Case report

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A case report of a 48-year-old man who had a pharyngo-esophageal perforation with instrumentation failure 10 weeks after anterior cervical spine plating is presented and the literature on this issue is reviewed. Diagnosis of the perforation was made late as he had been lost to follow up and he eventually died of severe infection. This case stresses the necessity of using proper anterior cervical instrumentation systems and careful long-term follow-up in patients with anterior cervical spine plating for early detection of possible perforation.

Introduction

Anterior plate and screw fixation has been advocated to ensure immediate stabilization, improve the union rate, decrease the need for external immobilization, prevent graft migration, and in certain instances avoid the need for posterior procedures. An esophageal perforation after anterior cervical surgery is an uncommon but well recognized complication.^{1,2} We present a case of a delayed fatal proximal oesophageal perforation associated with inappropriate instrumentation.

Case report

A 48 year old male who underwent anterior decompression and interbody fusion with anterior cervical spine plating. He was a known diabetic whose initial surgery had been performed three months previously by physicians at another institution but, was referred to our institution for management of complications. The indication of the surgery was C₆/C₇ intervertebral disc herniation with bilateral nerve root compression. Post-operatively, he did not register any significant relief so he opted for reflexology however he just kept on deteriorating culminating in his eventual referral to our institution. He presented with generalized neck pain which he described as aching in nature, constant and radiating to both upperlimbs. The pain was aggravated by changes in posture and neck movements but relieved by rest and strong analgesics. He reported difficulty in swallowing of both solids and fluids, and reported occasional regurgitation. He also had excessive salivation with blood stained sputum. He had a history of a mild cough which was occasionally productive giving blood stained sputum however, there was no chest pain and no features of tuberculosis. He had lost appetite and progressively lost weight. He had no weakness of his arms or legs, no difficulty in walking and no difficulty in maintaining body balance or posture.



Figure 2: The post-operative radiograph

On physical examination, he was anaemic (Hb 6.7g/dl), emaciated and was wearing a cervical collar. The neck was extremely tender anteriorly with tender restricted movements. No provocative tests were done. The neurological status in the upperlimbs was normal, Blood investigations; ESR 20 mm/hr, WBC total 9.5×10^3 eosinophilia 62%, lymphopenia 16%, neutropenia 16%. Random blood sugar 10.1 mmol/l. Cervical spine radiographs were taken and they revealed poorly constructed anterior cervical spine plating with the strut graft between C₆ and C₇ not well placed, the plate was unnecessarily long, the instrumentation used was inappropriate for anterior cervical fixation and none of the screws was well secured into the vertebral bodies hence all were loose. He progressively weakened and developed a fever which was managed as malaria because he also had a positive blood slide however the fever did not subside. He received a blood transfusion and was put on broad spectrum antibiotics however, he just deteriorated. He eventually went into coma GCS 5/15 and died a few days later. Apart from plain radiography no other imaging investigation was done. Autopsy revealed an upper oesophageal perforation with severe mediastinitis.

Discussion

Since it was introduced in the 1950's by Robinson³, the anterior approach to the cervical spine has been widely used for the operative treatment of disc herniation, spondylosis, and injuries. Although this technique had become more and more sophisticated, the complication rate continued at a certain level because of the diversity of the surgeons' experience, indications choice and the understanding of internal fixators. Anterior plate and screw fixation has been advocated to ensure immediate stabilization, improve the union rate, decrease the need for external immobilization, prevent graft migration, and in certain instances avoid the need for posterior procedures.

An esophageal perforation after anterior cervical surgery is an uncommon but well recognized complication^{1,2}. The incidence of esophageal perforation after anterior cervical spine surgery is estimated to be between 0.02 and 1.49%²⁻⁵. Complications after esophageal perforation may range from minor problems to mediastinitis and death. The mortality rate for cervical esophageal perforations is 6%.⁶ Esophageal perforation may occur intraoperatively, perioperatively, or in a delayed fashion. There are numerous causes of esophageal perforations, including the blunt or penetrating trauma involved with the cervical spine injury⁷⁻⁹. However, most esophageal injuries are caused by iatrogenic injury during the approach, by inappropriate placement or dislodgement of retractors, over-vigorous retraction, or chronic erosion secondary to hardware migration^{1,2,8}. Delayed injuries are due to chronic compression/contact with successive necrosis, formation of abscess and perforation by graft dislodgement or screw migration with or without plate failure¹¹⁻¹³. Another cause of delayed injuries includes repetitive friction between the retropharyngo-esophageal wall and the plating system normally positioned with adhesion and traction-type pseudodiverticulum and perforation^{14,15}. The clinical presentation of patients with this condition is extremely variable; patients may have painful cervical swelling, fevers, dysphagia, odynophagia, dysphonia or subcutaneous emphysema or be completely asymptomatic. In addition to the obvious clinical signs, a high index of suspicion should include:

- (a) Cervical spinal column or cord injury with previous anterior cervical spine surgery (especially with instrumentation);
- (b) Systemic signs of a fever, leukocytosis, or an unexplained persistent tachycardia; and
- (c) Imaging evidence of air or fluid in the cervical fascial spaces or mediastinum.

Diagnosis of esophageal perforation traditionally has been by esophagogram, esophagography augmented by CT, and esophagoscopy. However, esophagography can yield a false-negative result, so clinical suspicion is most important in making a correct and timely diagnosis.^{16,17} If the treatment is instituted within 24 h the mortality rate is 20%, on the contrary it may be as high as 50% if instituted later.¹⁶

Evaluation of plate and screw position is most easily accomplished with cervical radiographs and plain or CT. A high index of suspicion is required in patients with poor screw fixation, osteopenia, neurological deficits, and fixation to the first thoracic vertebrae¹⁸. A plate with proper length should be selected. Broken hardware means a failure of internal fixation and the broken component should be removed early if combined with

symptoms. Because an unrecognized perforation is associated with high morbidity caused by uncontrollable sepsis and severe malnutrition, the esophagus must be assessed for iatrogenic injury before surgical closure¹⁸. If an esophageal perforation is detected intraoperatively, the laceration, if small, can be repaired primarily with a layered watertight closure using absorbable sutures¹⁹. A drain or a nasogastric tube should be placed for 7 days. Parenteral antibiotics against gram-positive, gram negative and anaerobic organisms should be given.

In conclusion, to avoid this potentially fatal complication, the surgeon must have a good choice of indication for operation, should make an adequate exposure, should be gentle while retracting, and should use appropriate anterior cervical plating systems and not try to improvise. Frequent follow-up and maintenance and a high index of suspicion of any postoperative dysphagia or throat soreness can lead to early diagnosis and successful management of this situation.

This case highlights some level of incompetence on the side of the surgeon and is a recipe for litigation. To avoid adverse medico-legal consequences surgeons should not compromise on quality. In situations where the surgeon does not possess the necessary skills or has no access to appropriate equipment and implants, it is advisable to either defer the surgery or refer to another institution/surgeon where they are available.

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