



African Federation for Emergency Medicine
African Journal of Emergency Medicine

www.afjem.com
www.sciencedirect.com



CASE REPORT

Conservative management of gunshot oesophageal injuries: A report of two consecutive exceptional cases



Prise en charge conservatrice des blessures par balle œsophagiennes : Étude de deux cas consécutifs exceptionnels

Francesco Virdis^{a,b,*}, Sharfuddin Chowdhury^{b,c}, Andrew John Nicol^{b,c}, Pradeep Harkison Navsaria^{b,c}

^a Department of Surgery, University of Cagliari, Italy

^b Trauma Centre, Groote Schuur Hospital, South Africa

^c University of Cape Town, South Africa

Received 16 December 2015; revised 9 April 2016; accepted 3 May 2016; available online 29 June 2016

Introduction: Oesophageal trauma carries high mortality and morbidity. For penetrating intrathoracic oesophageal injury, surgical repair has been the standard for decades to avoid its devastating consequences.

Case report: Both patients presented with a thoracoabdominal gunshot wound and retained intraabdominal missile. Although there were no visible signs of perforation on oesophagoscopy or contrast swallow, the presence of an intraluminal bullet highly suggested a thoracic oesophageal injury.

Discussion: Non-operative management of intrathoracic oesophageal perforation is controversial. Small perforations or contained leaks diagnosed within 24–48 h in a stable patient with no mediastinitis or empyema can be managed non-operatively with antibiotics and nasogastric feeds. These two case reports support the notion of selective non-operative management of asymptomatic patients with penetrating injury to the oesophagus.

Introduction: Les traumatismes œsophagiens sont associés à une mortalité et à une morbidité élevées. Pour les blessures œsophagiennes intrathoraciques pénétrantes, la réparation chirurgicale a été la norme pendant plusieurs dizaines d'années, l'objectif étant d'éviter ses conséquences dévastatrices.

Étude de cas: Chacun des patients s'est présenté avec une blessure par balle thoraco-abdominale et le projectile toujours présent dans l'abdomen. Bien qu'aucun signe de perforation n'était visible à l'oesophagoscopie ou radiocinématographie de la déglutition, la présence d'une balle en intraluminal suggère fortement une blessure œsophagienne au niveau du thorax.

Discussion: La prise en charge non opératoire de la perforation œsophagienne intrathoracique est controversée. Les petites perforations ou fuites contenues diagnostiquées dans les 24 à 48 heures chez un patient stable sans médiastinite ou empyème peuvent être prises en charge de manière non opératoire à l'aide d'antibiotiques et d'une sonde nasogastrique. Ces deux études de cas privilégient la notion de prise en charge non opératoire sélective pour les patients asymptomatiques souffrant de blessure pénétrante à l'œsophage.

African relevance

- Penetrating trauma is a significant burden in Southern Africa.
- Unnecessary exploration carries risk and morbidity.
- In a resource constrained, middle- or low-income setting, a non-operative approach should be considered when possible.

Introduction

Oesophageal perforation in civilian trauma continues to present a diagnostic and therapeutic challenge. The mortality

and morbidity associated with oesophageal injury remain high, especially when diagnosis and treatment are delayed for twelve or more hours, at which point mortality can reach as high as 40%.¹

Reported oesophageal injury is now more iatrogenic and related to endoscopic instrumentation for various gastroesophageal conditions.¹ Oesophageal injury due to transmediastinal gunshot wounds is uncommon—estimated at two to nine patients per year even in busy trauma centres²—and when it occurs, the refluxed gastric content rapidly contaminates the mediastinum and pleural cavities, with devastating consequences. Early diagnosis and rapid surgical repair have remained the standard of care for decades.²

We present two unusual cases of presumed oesophageal injury from gunshot injuries with identical evolution, treated conservatively successfully.

* Correspondence to Francesco Virdis. francesco.virdis@hotmail.com.it

Peer review under responsibility of African Federation for Emergency Medicine.

<http://dx.doi.org/10.1016/j.afjem.2016.05.007>

2211-419X © 2016 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Case report

Case one

A 30-year-old man was admitted to the Groote Schuur Hospital Trauma Centre (GSHTC) following a thoracic gunshot wound. The entrance wound was in the midline of the back at the level of the tenth thoracic vertebra (T10). There was no exit wound. The patient was fully alert and haemodynamically stable. He had complete neurological fallout at T5 level. A Lodox Statscan™, low-dose full-body digital X-ray, showed bullet fragments from T4 to T10 level and the presence of a large fragment (3/4th size of the original bullet) in the epigastric region. The migration of the bullet in the next radiograph suggested that it was intraluminal. A CT scan of the abdomen reported caudocranial and antero-oblique bullet tract with soft tissue haematoma and surgical emphysema of the back, comminuted fracture of the posterior elements of T10, bone and bullet fragments in the spinal canal at T9, and T10 with an extensive intraspinal haematoma and comminution of the vertebral bodies T4–T8 with bullet fragments along the tract. An extensive pneumomediastinum (Fig. 1) with in-situ bullet fragments and surgical emphysema extending up into the neck and right chest wall made high suspicion of both oesophageal and tracheal injury. No haemopneumothorax, no intraabdominal organ injury, or no intraperitoneal free fluid were demonstrated.

After CT scan, the patient had contrast swallow which was unremarkable. Due to the high spinal cord injury, the abdom-

inal physical findings were unreliable to exclude an intraperitoneal hollow visceral injury. The patient underwent an exploratory laparotomy, and no intraabdominal injury was found. The CT results and oesophageal proximity to the presumed trajectory prompted an intraoperative bronchoscopy and oesophagoscopy. The rigid bronchoscopy showed small mucosal haematoma at 9 cm and 12 cm on the right posterolateral aspect of the trachea. No hole or bleeding was seen. The flexible oesophagoscopy showed mucosal haematoma at 24 cm on the right posterolateral aspect of the oesophagus with no visible oesophageal perforation. The missile was identified and palpable in the small bowel lumen. It was left in-situ and monitored during the recovery with serial abdominal X-ray until spontaneously expelled. The patient was treated with broad-spectrum antibiotics and nasogastric enteral feeding. A follow-up water soluble contrast oesophagogram on day ten was also unremarkable. The patient started to eat orally and was discharged on day 14 post admission.

Case two

The second patient was a 29-year old man admitted to the GSHTC. He was a victim of a gunshot wound with entrance wound on the left side of the back at the level of the third thoracic vertebra (T3). There was no exit wound. On admission, the patient was haemodynamically stable with no significant symptoms. A Lodox Statscan™ showed left haemopneumothorax and the possible presence of a bullet in the stomach cavity. The features of an abdominal CT scan was suspicious for a



Figure 1 Above shows intraabdominal bullet and below shows extensive pneumomediastinum and surgical emphysema in Patient One.

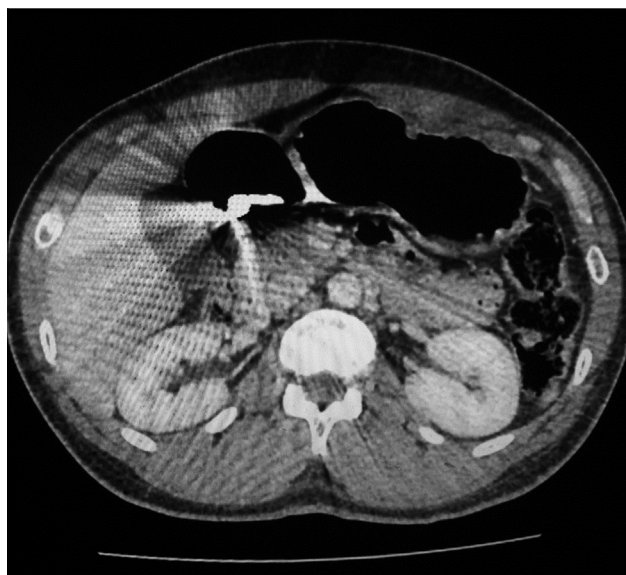


Figure 2 Gastrointestinal bullet in Patient Two.

posterior lesser curvature gastric injury with retained bullet within the pylorus (Fig. 2).

Considering the equivocal physical findings, the trajectory, CT findings, and high suspicion of hollow visceral injury led us to perform an exploratory laparotomy. However, we did not find any intraperitoneal injury, and the bullet was retrieved from the small bowel via an enterotomy. Intraoperative flexible and rigid oesophagoscopy were performed, and both studies were normal. A contrast swallow on the following day also did not show any leak. Subsequently, the patient developed left upper limb weakness and fall out of right facial nerve. To exclude cerebrovascular accident secondary to vascular injury, we performed CT angiogram of the neck and chest which did not show any vascular injuries. There were multiple fractures of the C7 and T1 right transverse processes, first to third ribs posteriorly along the bullet tract. Trachea and major airways were patent. Given the CT neck and chest findings, retrospectively, it was convincing that the entry of the bullet was in the proximal oesophagus which was missed at both oesophagoscopy and contrast swallow examination. The patient was treated for ten days with broad spectrum antibiotics and nasogastric enteral feeds. Repeat contrast swallow on day ten was also negative for the leak. The patient was discharged on day 13 after taking oral feed comfortably.

Discussion

The clinical manifestations of oesophageal injury vary according to the mechanism of injury, anatomical site (cervical, intrathoracic or intraabdominal) and the interval between perforation and diagnosis. The symptoms and signs can be early or delayed. Early symptoms include dysphagia, subcutaneous emphysema, dyspnoea, chest pain and epigastric or abdominal pain. When delayed, patients may present with fever, tachycardia, and tachypnea or even septic shock. During early stages, clinical symptoms of oesophageal injury may be subtle and makes the diagnosis challenging for the clinician.

Prevertebral fascia attachment prevents the spread of contamination in cervical oesophageal perforation and is usually less severe than intrathoracic or intraabdominal perforations. Thoracic perforation contaminates initially the mediastinum and subsequently the pleural cavities, mainly on the left side resulting in chemical mediastinitis followed by bacterial invasion and severe mediastinal necrosis. Systemic sepsis and septic shock develop within hours. Injury to intraabdominal oesophagus also gives rise to rapid peritonitis that can lead to severe sepsis and septic shock if not treated timely.¹

Most thoracic oesophageal perforations, especially spontaneous disruptions in ill or septic patients are treated surgically by primary repair, surgical drainage, or oesophageal resection.³ Earlier reviews documented the successful non-operative management in penetrating cervical oesophageal injuries,⁴ in patients with iatrogenic oesophageal perforations and also in those with Boerhaave syndrome or spontaneous perforation.³ The conservative treatment of a thoracic oesophageal gunshot wound lacks in the literature. Criteria proposed for the selection of patients suitable for conservative treatment include early diagnosis, contained leak, with an absence of symptoms and signs of sepsis. Injury to the intraabdominal part of the oesophagus, or proximal to an obstruction are excluded from conservative management.⁴⁻⁶

Nonoperative management includes nil per os, enteral feed, and broad-spectrum antibiotics for at least seven to 14 days.^{1,4,6} The appropriate moment to apply the conservative treatment is not easy to define, and a careful evaluation of the clinical condition is always important. In the early phase, it is hard to predict if the perforation effects are limited, or will progress to mediastinitis, pleural empyema or sepsis.⁷

There is wide variability in sensitivity and specificity of different diagnostic modalities in detecting oesophageal injury. Rigid oesophagoscopy and contrast oesophagogram have the sensitivity of 85% and 45–80% respectively. In the past flexible endoscopy was reported neither sensitive nor specific. Current studies are indicating its accuracy of 97%, which is similar to the combination of contrast oesophagogram and rigid oesophagoscopy.^{6,8}

Both of the patients reported in our study had a negative exploratory laparotomy. Although there were no visible signs of perforation on oesophagoscopy, the presence of an intraluminal bullet in both cases highly suggested a thoracic oesophageal injury.

Conclusion

Based on the existing literature for cervical oesophageal injury, selective nonoperative management is feasible and intraabdominal oesophageal injury needs definitive surgical repair. Thoracic oesophageal injury diagnosed early having contained leak, and without the symptoms and signs of sepsis are suitable for conservative management.

The conservative treatment was successful in both instances. These two case reports support the notion of selective non-operative management of asymptomatic patients with penetrating injury to the oesophagus. Different modalities even in combination are not 100% accurate in detecting penetrating oesophageal injury and considering the consequences of a missed injury we recommend in-hospital observation for

at least 24–48 h of an asymptomatic patient sustained with a suspicious trajectory.

Conflict of interest

The authors declare no conflict of interests.

Dissemination of results

Both our cases were discussed initially with the staff members of GSHTC at a weekly meeting through an informal presentation. Then it was presented formally at the academic meeting of the department of surgery, the University of Cape Town.

Author's contribution

FV designed this study and collected the data. FV and SC contributed to the literature review and wrote the manuscript. PHN and AJN edited and performed a critical revision of the manuscript.

References

1. Brinster CJ, Singhal S, Lee L, et al. Evolving options in the management of oesophageal perforation. *Ann Thorac Surg* 2004;**77**(4):1475–83.
2. Asensio JA, Chahwan S, Forno W, et al. Penetrating oesophageal injuries: multicenter study of the American Association for the Surgery of Trauma. *J Trauma* 2001;**50**:289–96.
3. Vogel SB, Rout WR, Martin TD, et al. Oesophageal perforation in adults: aggressive, conservative treatment, lowers morbidity and mortality. *Ann Surg* 2005;**241**(6):1016–21.
4. Madiba TE, Muckart DJJ. Penetrating injuries to the cervical oesophagus: is routine exploration mandatory? *Ann R Coll Surg Engl* 2003;**85**:162–6.
5. Altorjay A, Kiss J, Vörös A, et al. Nonoperative management of oesophageal perforations is it justified? *Ann Surg* 1997;**225**(4):415–21.
6. Ivatury RR, Moore FA, Biffi W, et al. Oesophageal injuries: position paper, WSES, 2013. *World J Emerg Surg* 2014;**9**:9.
7. Epstein MG, Costa SV, Carvalho FG, et al. Conservative treatment in isolated penetrating cervical oesophageal injury: case report. *Einstein (Sao Paulo)* 2012;**10**(4):505–7.
8. Peitzman AB, Rhodes M, Schwab CW, et al. *The trauma manual: trauma and acute care surgery*. 1st ed. Philadelphia: Lippincott Williams & Wilkins; 2008 Chapter 22.