



Left thoracotomy utilizing splenectomy in blunt thoracic injury: An alternative surgical approach



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ABSTRACT

INTRODUCTION: Posterolateral thoracotomy could be an alternative surgical approach in selected cases coexistence of abdominal injuries with ipsilateral thoracic injury.

PRESENTATION OF CASE: A 65-year-old male with left sided chest injury was initially admitted to a regional health center after a crawler overthrow accident. He underwent chest tube drainage of left hemithorax and he was transferred immediately to our hospital. A CT scan showed a large spleen which was injured by a wedged splint of the 10th rib into its parenchyma. Lung parenchyma was also lacerated by chest tube misplacement with associated hemothorax. He underwent a lower left lateral thoracotomy. Splenectomy was performed via a phrenotomy and subsequently the injured lung was repaired. His postoperative course was uneventful.

DISCUSSION: Incisions in the diaphragm are commonly made to provide adequate exposure during a variety of thoracic and abdominal operations. Thoracic approach could potentially be advantageous for thoracic and abdominal injuries.

CONCLUSION: Thoracic approach is a safe alternative, providing excellent exposure of upper abdominal organs, and should be considered in selected cases of abdominal trauma, especially when an ipsilateral thoracic injury coexists.

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1. Introduction

The spleen, after the liver, is the second most frequently injured organ following abdominal trauma, occurring in 32% of abdominal injuries.¹ Splenic injuries are observed on blunt abdominal trauma. Presently, nonoperative management (NOM) of splenic and liver injury is the most common management strategy especially in hemodynamically stable patients.² However, it has been rarely implemented in instable patients too.³ In order to make the best treatment choice, we should keep in mind not only the predictors of NOM, but also the potential drawbacks of NOM.⁴ Thus, the surgeon should choose the right treatment modality for the patient for safe resumption of normal life. An alternative surgical approach on selected cases of blunt abdominal injuries is the posterolateral thoracotomy, especially when this is in coexistence with ipsilateral thoracic injury.

2. Case report

A 65-year-old male was initially admitted to a regional health center after a crawler overthrow accident. He had a left sided chest injury and chest radiography revealed left hemothorax with multiple rib fractures. He underwent chest tube drainage of left hemithorax and he was transferred immediately to our hospital.

Upon arrival at our department the patient was conscious with dyspnea, tachycardia (128 beats/min) and blood pressure of 100/65 mmHg. Blood analysis revealed hemoglobin 8.9 g/dl, hematocrit 27% (known past hematocrit 41%) and glucose 270 mg/dl. The rest of his laboratory examinations were normal and his past medical history included arterial hypertension, diabetes mellitus and a mid laparotomy for liver injury 15 years ago. A CT scan showed a large spleen which was injured by a wedged splint of the 10th rib into its parenchyma. Furthermore, lung parenchyma was lacerated by chest tube misplacement with associated hemothorax (Fig. 1a and b).

Considering the findings and the previous history of abdominal surgery, the patient underwent a lower left lateral thoracotomy. The pleural cavity had blood and clots while the lung was injured in the lower lobe by the existing tube through its parenchyma. A medial circumferential incision at the periphery of the diaphragm was performed and ipsilateral hemidiaphragm was raised as a trapdoor and retracted and suspended medially at the margins of

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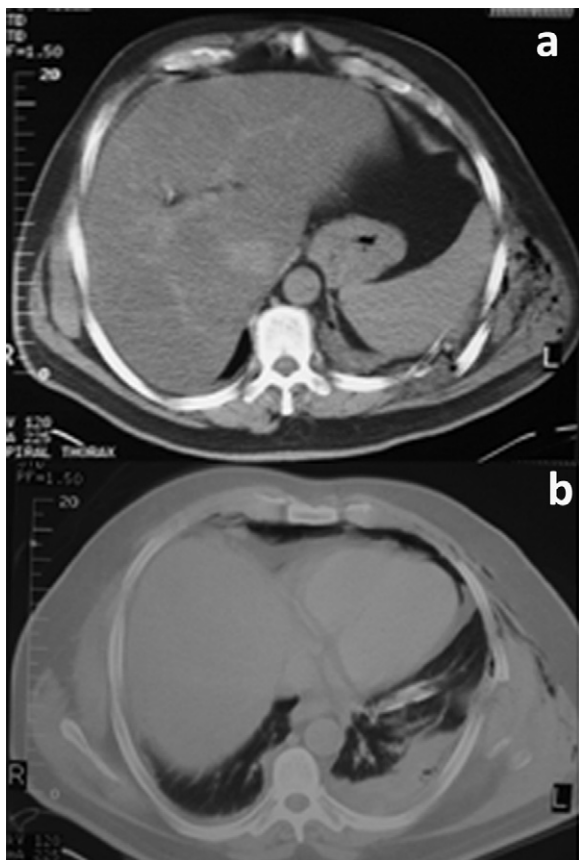


Fig. 1. Computed tomography scan showing the splenic (a) and the lung injury (b).

thoracotomy incision providing excellent exposure of the injured spleen (Fig. 2). The spleen was ruptured by the rib splint in a depth of 3 cm approximately. Splenectomy was performed and subsequently closure of the diaphragm incision was performed by approximating the cut edges with multiple interrupted mattress sutures of 0–0 and 2–0 nonabsorbable suture. Then, injured lung parenchyma was repaired and two large chest tubes drainage were placed after meticulous inspection of the thoracic cavity. The patient was extubated in the operating room and was transferred to the ward. Chemoprophylaxis with penicillin and recommended postsplenectomy vaccination were also administered. His postoperative course was uneventful and was discharged 6 days later. Pathology examination of the spleen revealed lymphoma and subsequently the patient was referred to hematologist.



Fig. 2. Intraoperative photo showing the excellent surgical exposure. Tip of forceps show the point of fractured rib. Arrow shows the point of injured splenic parenchyma.

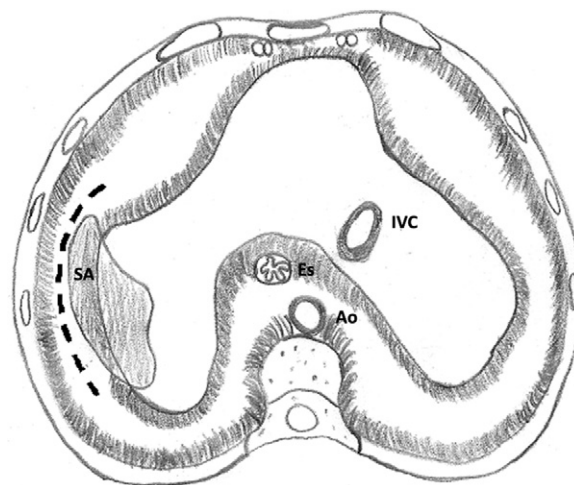


Fig. 3. Schematic representation of the diaphragm as seen from the opened thoracic cavity. Dotted line shows the safe incision for spleen approach (Ao: Aorta, Es: Esophagus, IVC: Inferior Vena Cava, SA: area of the diaphragm above the spleen).

3. Discussion

The presence of a large spleen which was injured by an inserted rib to its parenchyma and the coexistence of the injured lung in the pattern of a patient with blood loss and hemodynamic instability, made the decision for surgery imperative. In addition, because of previous abdominal surgery thoracic approach was considered more favorable for our patient.

Incisions in the diaphragm are commonly made to provide adequate exposure during a variety of thoracic and abdominal operations. The key point is the knowledge of phrenic nerve distribution in order to preserve diaphragm functional status. The best incision is made circumferentially approximately 2 cm from the muscle's lateral origin, thus the peril of injury to phrenic artery or nerve is eliminated.^{5,6} The incision was a lateral circumferential of 8 cm length, which offered an excellent exposure of the spleen (Figs. 2 and 3). Splenic hilum, short gastric arteries and ligaments as well as the point of rupture by the rib splint were accessible from the created surgical field. In addition, the tail of the pancreas was easily recognized in order to avoid its avulsion.

Posterior circumferential approach also offers excellent exposure to retroperitoneal abdominal organs. Posterior circumferential incision is ideal for large renal and adrenal gland tumors. From our experience incision should always be started from the vertebral bodies in a staged fashion in order to avoid accidental entrance to peritoneal cavity in these cases. Posterior and anterior circumferential incisions could be joined in cases of both peritoneal and retroperitoneal injuries.

Thoracic approach is also advantageous for thoracic injuries and for injuries that could not be easily recognized in some cases of trauma such as mild to moderate injuries of the diaphragm. Furthermore, in the setting of coexistence of thoracic and ipsilateral upper abdominal trauma, a single incision instead of two offers better postoperative outcome for the patient. Especially, left thoracotomy aggravates less than right thoracotomy the postoperative respiratory performance. However, thoracic approach and phrenotomy could not offer an adequate surgical field in cases of injuries of the lower abdomen or of the contralateral upper abdominal organs. The procedure does not require one-lung ventilation.

Klimanskii describes the advantages of the thoracic approach in splenectomy from his experience of 226 splenectomy operations in various hematological disorders and shows that the number of postoperative surgical complications may be reduced as compared to that in an abdominal approach.⁷

In our case, phrenotomy has also offered an excellent, quick and safe approach to the injured spleen. Thoracic approach is a safe alternative, providing excellent exposure of upper abdominal organs, and should be considered in selected cases of abdominal trauma, especially when an ipsilateral thoracic injury coexists.

Conflict of interest

The authors report no conflict of interest.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

M.K. participated in the design of the study, performed the literature review and drafted the manuscript.

P.M. performed the literature and helped to draft the manuscript and participated in the acquisition of data.

K.A. helped to draft the manuscript.

I.K. participated in the coordination and acquisition of data.

A.L. identified the case report, conceived of the study, participated in its design and coordination and he is the guarantor of the work.

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