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Editorial

Traumatic diaphragmatic hernia, the sequelae of missed diaphragmatic injury

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Tracheobronchial tree, esophagus, diaphragm and descending thoracic aorta are the most susceptible organs to missed injuries in the trauma setting.[1,2] The suspicion is the key for early diagnosis and prompt treatment of traumatic diaphragmatic ruptures in order to avoid the formation of diaphragmatic hernia and the associated catastrophic complication of gastrointestinal obstruction with or without strangulation of the contained viscera.

Diaphragmatic ruptures are in their majority found in the multi-trauma patient, usually in combination with rib, pelvis and extremities fractures, lacerations of the spleen or liver, pulmonary contusion and cerebral trauma. The domination of associated injuries during the acute phase of trauma is responsible for missing the diagnosis of diaphragmatic injury.[3,4] Chest radiography and chest CT scan provide mostly confusing images in the absence of herniated hollow viscera, such as arch-like curvilinear density simulating the appearance of elevated hemidiaphragm, obscuration of the hemidiaphragm, irrelevant or amorphous densities at the hemidiaphragm level, blunted costophrenic angle, areas of discoid atelectasis in the lung bases, loculated hemopneumothorax that is not resolved by properly inserted chest tubes.[1-4] These confusing radiographic images together with possible mediastinal shifting towards the opposite side and possible malfunction of the inserted chest tubes in the affected hemithorax strongly support the suspicion of diaphragmatic injury.[3,4] Unfortunately, many patients with traumatic diaphragmatic hernia have trauma radiographic images which, if retrospectively examined, could have shown diaphragmatic rupture. Early onset of mechanical ventilation with positive end expiratory pressure during transportation of the patient or just upon admission to the hospital may initially prevent the herniation of abdominal viscera even in large, left-sided ruptures.[3] The diagnosis of diaphragmatic rupture will become evident after discontinuation of mechanical ventilation and mobilization of the patient in the above mentioned cases.

Laparoscopy and thoracoscopy (VATS) are recently advocated as the tools to establish the diagnosis in stable patients with high index of suspicion for injury of the diaphragm.[3,5,6] VATS techniques require a patient able to withstand one-lung ventilation, however this is not the case in the majority of multi-trauma patients and consequently laparoscopy seems to be a more feasible diagnostic tool than VATS.[5]

Latent post-traumatic traumatic diaphragmatic hernias can be surgically approached through either laparotomy or thoracotomy.[2,4] It still remains controversial which approach is the best. Thoracotomy allows for better exposure of the multiple adhesions between the herniated viscera and the lung, pericardium or both.[1-4] In addition, thoracotomy provides good visualization of the phrenic nerve and consequently iatrogenic injury to the nerve is eliminated. Thoracotomy should almost always be the access of choice for right-sided, chronic, uncomplicated diaphragmatic hernias, because the liver does not allow for optimal visualization and manipulation of the whole right hemidiaphragm through a laparotomy incision.[2,4] On the other hand, when one is dealing with an incarcer-

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ated hernia, laparotomy is preferable because the choice of thoracotomy would necessitate additional laparotomy if there is a question regarding the condition of the strangulated viscera. In the absence of evidence, the choice of access for the repair of traumatic diaphragmatic hernias is highly dependent on the preference of the surgeon, as thoracic surgeons prefere to proceed with thoracotomy and general surgeons with laparotomy.

Chest tube should be inserted within the affected hemithorax after elective laparotomy for the repair of post-traumatic diaphragmatic hernia. Chest tube insertion will prevent complications such as pleural effusion or pneumothorax. Pneumothorax can be the result of small iatrogenic tears created accidentally on the visceral pleura of the lower lobe of the lung during adhesiolysis.[1,3,4]

Laparoscopic repair is recently reported to be an alternative to thoracotomy or laparotomy for the repair of post-traumatic diaphragmatic hernias.[7,8] Indeed, communication of the rupture with the hiatus or long, transverse ruptures extending close to the pericardium are contraindications for endoscopic repair.[8] Laparoscopic and thoracoscopic techniques are suitable for the repair of small or medium sized ruptures of the central tendon of the diaphragm.[8]

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