



# Management Algorithm for Acute and Chronic Diaphragmatic Injuries

# 160

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## Algorithmic Approach

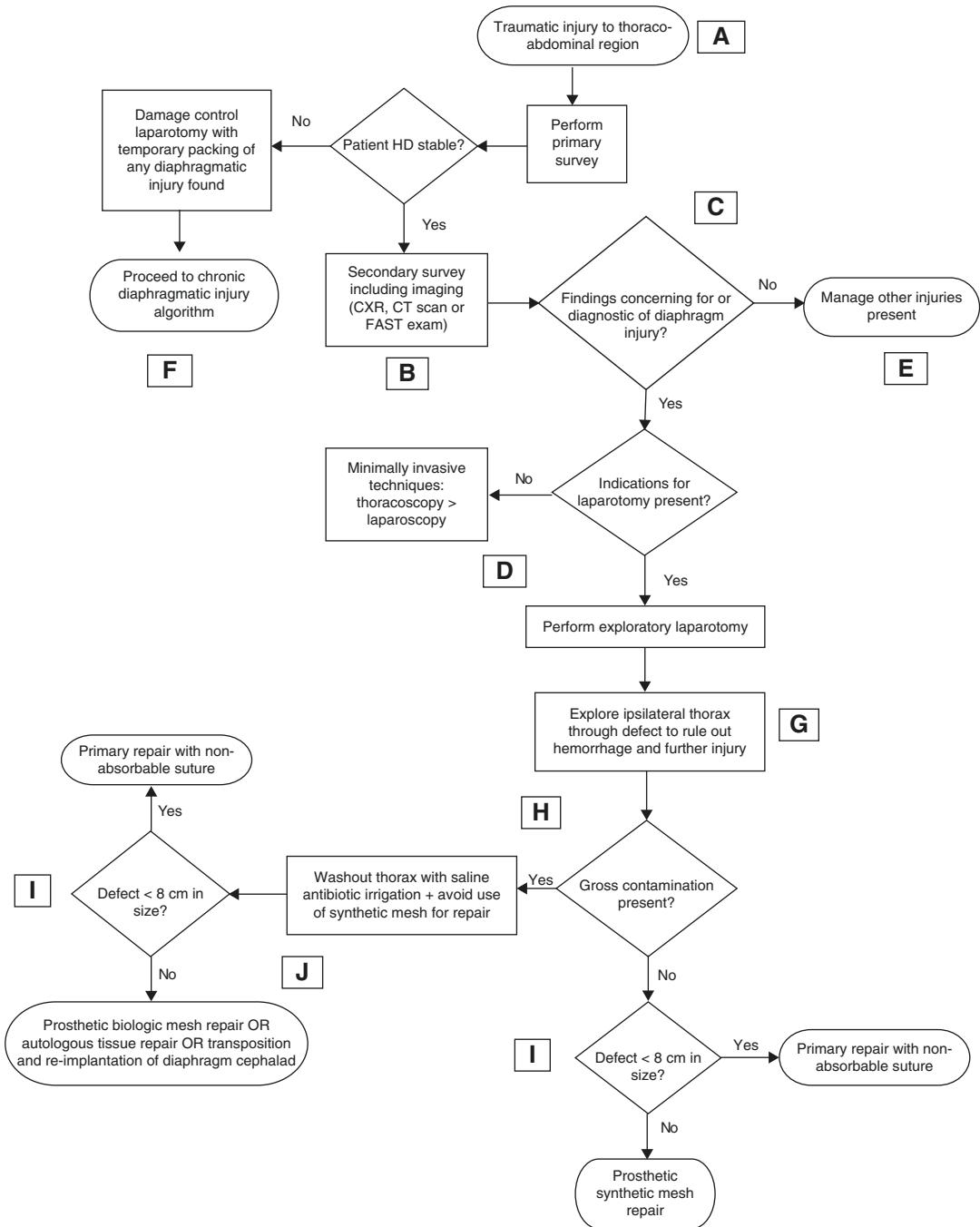
- A. Diagnosis of diaphragmatic injury in the acute setting presents a unique challenge to many clinicians as these injuries are often asymptomatic or masked by other concomitant injuries. As such, the most important tool in the initial assessment of the patient with diaphragmatic injury is a high index of suspicion [1]. Primary and secondary surveys should be completed as outlined by advanced trauma life support (ATLS) protocol [2]. After establishing that the patient is hemodynamically stable, additional history should include questions regarding the mechanism of injury, severity of impact, and trajectory of any missile-related injuries [3].
- B. Once hemodynamic stability has been established, adjuncts to history and physical may include the focused abdominal sonography for trauma (FAST) exam (may detect large ruptures associated with blunt force), plain chest radiographs (intra-abdominal contents may be seen in the left hemithorax), or helical computed tomography (CT) scan of the chest, abdomen, and pelvis with 3D reconstructions [3]. It is important to note that these imaging studies are intended more to rule in a diaphragmatic injury rather than to rule one out.
- C. If clinical suspicion of a diaphragmatic injury persists after imaging studies, operative intervention to establish a diagnosis is mandated [4]. Operative approach for management of diaphragmatic injury is stratified based upon chronicity of injury, the presence of concomitant injuries, and the hemodynamic stability of the patient [3].
- D. For acute injuries in which there is no other indication for laparotomy, a minimally invasive technique may be employed with preference given to thoracoscopy over laparoscopy due to an increased risk of precipitating ipsilateral tension pneumothorax during establishment of pneumoperitoneum [3]. For acute diaphragmatic injuries associated with concomitant injury, operative approach is via laparotomy with trans-diaphragmatic exploration of the ipsilateral thoracic cavity to rule out further hemorrhage or injury [1].
- E. In the event that a damage control laparotomy in a hemodynamically unstable patient reveals a diaphragmatic injury, it is considered acceptable to temporarily pack any defect found with laparotomy pads and return for definitive repair once the patient is stabilized [3].
- F. For chronic injuries, many favor thoracotomy due to tendency of dense pleural

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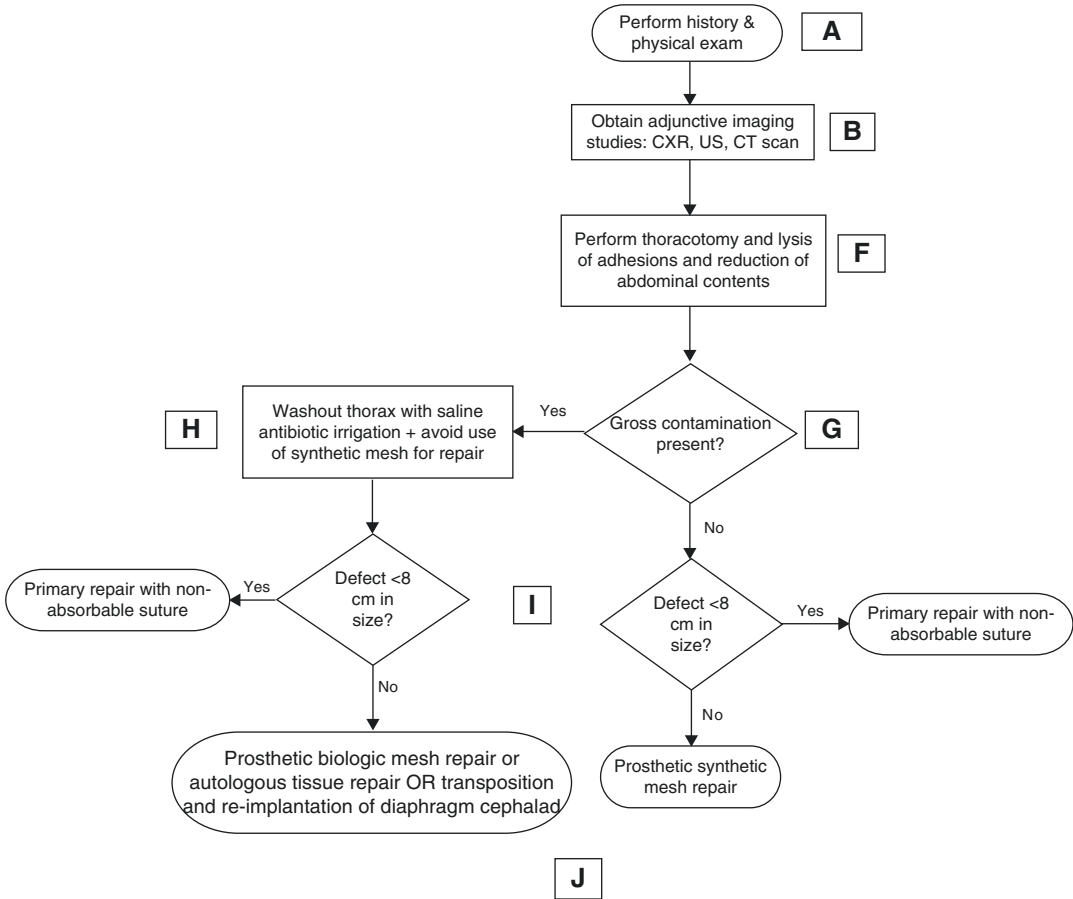
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adhesions to form in this setting requiring extensive lysis.

- G. Intraoperative technique in all settings is dependent upon size of defect and degree of contamination from associated injury or perforation of a strangulated viscus [5].
- H. Because of the natural progression of diaphragmatic defects toward herniation, strangulation, and obstruction or perforation of intra-abdominal viscera, all defects should be repaired regardless of size [3]. All non-viable tissue should be debrided. Primary repairs should be conducted using non-absorbable suture due to an increased risk of recurrence when absorbable sutures are utilized [1].
- I. Defects less than 8 cm in size can be repaired primarily. Defects larger than this size favor prosthetic synthetic mesh repair or transposition and re-implantation of the diaphragm cephalad by 1–2 interspaces [1].
- J. In the event of gross spillage of intestinal contents, a washout of the thoracic cavity should be done using saline irrigation containing antibiotics [3]. The use of synthetic mesh should be avoided in these cases in favor of autologous tissue (latissimus dorsi, rectus abdominis, or external oblique muscle flaps) or biologic mesh (that is replaced with synthetic mesh at a later date) [1].
- K. Postoperatively, the clinician should be mindful of complications such as breakdown of repair, iatrogenic injuries to the phrenic nerve leading to hemiparesis of the diaphragm, atelectasis, empyema, pneumonia, and morbidity related to concomitant injuries [3].



Algorithm 160.1



**Algorithm 160.2**

**References**

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