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Tracheal inujry due to blunt chest trauma: a rare surgical emergency

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CASE REPORT

TRACHEAL INJURY DUE TO BLUNT CHEST TRAUMA: A RARE SURGICAL EMERGENCY

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ABSTRACT

Tracheal injury is a rare complication of blunt chest trauma. The patients usually present with signs of respiratory distress. Primary repair is the treatment of choice in case of large defects, while small tears can be managed conservatively. Immediate operation is recommended to improve deteriorating pulmonary function. The decrease in mortality and long-term morbidity depends on early diagnosis. We report a case of tracheal injury due to non-penetrating thoracic trauma which was successfully managed with surgery.

KEY WORDS: *Blunt trauma. Tracheal rupture. Pneumothorax.*

INTRODUCTION

Tracheal injury is a rare complication of blunt chest trauma. According to a National Safety Council report, thoracic trauma accounted for 25% of all deaths due to blunt trauma.[1] The apparent low incidence of tracheo-bronchial injuries despite the increase in road traffic accidents may be due to the fact that most of such patients die before reaching the hospital and are, therefore, not reported. The diagnosis of tracheal injury requires a high index of suspicion. In an earlier report, only 40% of the patients suffering from bronchial rupture were diagnosed in the first 48 hours.[2] Bronchial injuries are categorized into two clinical types.[3] In type I injury, the torn bronchus communicates with the pleural cavity and there is severe pneumothorax, usually refractory to drainage. Type I injuries carry high risk but are very obvious in presentation and hence, difficult to miss. In type II bronchial injury, there is very little communication between the ruptured bronchus and the pleural cavity. Pneumothorax, if present is usually easily managed by drainage, therefore, type II bronchial injuries are relatively low risk but are a diagnostic challenge as compared to type I injuries. Conservative management has a role in type II injuries, while surgery is the method of choice for type I injuries. We report a case of tracheal injury due to non-penetrating thoracic trauma which was successfully managed, surgically.

CASE REPORT

A 22 years old gentleman presented to the emergency room with history of road traffic accident. The patient was driving his car at 120 km/hr when his vehicle skidded on a wet patch of road and hit the pavement resulting in trauma to his face, chest and legs. At the time of presentation, he was drowsy and had moderate nasal bleeding. On examination, he had lacerations on his face, hands, anterior chest and legs. His breathing sounds and chest movements were paradoxical and decreased on left side. Radiological examination including chest X-rays and CAT scans of the chest and abdomen showed a fracture of medial 1/3rd of right clavicle, fracture of 3rd left rib and bilateral pneumothorax and pneumomediastinum. Bilateral chest tubes were inserted. Patient was shifted to intensive care unit, where he was intubated due to decreasing oxygen saturation and prepared for bronchoscopy to rule out airway injury. Flexible fiberoptic bronchoscopy was performed which revealed a tracheal tear involving more than 75% of the circumference about 4cm proximal to the carina. Patient was taken to the operating room, where right posterolateral thoracotomy was performed. Trachea was exposed and large near complete transaction of trachea was identified approximately 4cm from the carina. The tracheal edges were debrided and tracheal ends were approximated with interrupted PDS sutures. The tracheal repair was re-evaluated intra-operatively with flexible bronchoscopy and it showed excellent technical result. Patient was extubated in the operating room. His hospital course was unremarkable and he was discharged after two weeks and his repeat bronchoscopy, one week after the operation showed good healing and no signs of stenosis. The patient is still being seen by the operating surgeon for different reasons. His pulmonary functions have been within normal limits since his tracheal surgery.

DISCUSSION

Blunt chest trauma is a rare cause of tracheo-bronchial (TB) rupture. The incidence of TB rupture varies from 0.34% to 1.5%, in the centers where it has been reported.[4] It is 10 times more common in adults and is associated with road traffic impact injury. According to a recent literature review, 59% of all reviewed cases were due to motor vehicle accidents; whereas 27% resulted from crush injuries.[5]

As the patients of blunt chest trauma usually have multi-system injuries, the clinical presentation varies and tracheal injury can easily be missed on initial assessment. The patients with tracheal rupture often have dyspnea, cyanosis, subcutaneous and mediastinal emphysema, pneumothoraces

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and consequently respiratory distress. Even in case of complete transaction, a small airway is usually maintained by the pretracheal fascia[6], as was in our case. Respiratory distress occurs when airway gets occluded by blood, mucus or soft tissue. Initial management consists of maintenance of the airway, reversal of shock and relief of pneumothorax, which usually stabilizes the deteriorating symptoms. Although CT scan can show the small tears that cannot be seen with bronchoscopy, direct tracheo-bronchoscopy under general anesthesia, in the operating room, remains the gold standard of diagnosis.[7]

Primary repair is the treatment of choice in case of large defects in the tracheal wall or complete separation of the torn ends, while small tears can be managed conservatively. Patients with large tears, as was the case with our patient, may require immediate surgical treatment. The urgency of operative treatment depends on the patient's status, however, in case of significant rupture, immediate surgery is usually the only option. The indication for immediate surgery in the acute phase is to restore pulmonary function.[6] The optimal time for primary anastomosis is within 48 hours. Delayed primary anastomosis carries a higher risk of infection and stricture formation.[8] Before embarking on surgical treatment, all hemodynamically stable patients, with suspected tracheal injury, should undergo meticulous bronchoscopic and esophagoscopic examinations.[9] The surgical approach and method of peri-operative ventilation both depend on the type and location of injury. There is a general consensus in the literature about removal of the tissue immediately surrounding the injury. Although healthy edges are important for good healing but excessive debridement of normal surrounding soft tissue may cause excessive inflammation that can lead to obstruction of the airway, later on.

Penetrating wounds, like stab wounds or gunshot injuries, can cause damage to both soft tissue and the cartilage of the trachea, depending on the extent and severity of injury. On the other hand, blunt injuries usually cause rupture and damage of soft tissue between the tracheal rings and the cartilaginous rings themselves are usually left undamaged. Thus, in case of a major transaction, due to soft tissue rupture between the cartilaginous rings, the trachea can be mobilized for a primary end-to-end anastomosis and this was achieved in this case also. It is best to avoid the use of prosthesis for missing tracheal rings.[10] The repair can be done either in one layer with the help of synthetic absorbable suture, or in two layers, using absorbable suture for mucosa and unabsorbable suture for cartilage. Usually there is immediate improvement in the pulmonary functions but a follow-up bronchoscopy is recommended to check healing and overgrowth of granulation tissue.[6]

The decrease in mortality and long-term morbidity depends on early diagnosis of this medical emergency. Generally, increased use of bronchoscopy, early on, would help in early diagnosis of this rare injury and this in turn will improve the overall prognosis of the condition. Although the presence of associated injuries and the surgical technique used, affect the outcome, good long-term results can be obtained by immediate repair of major tracheal damage.

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