

Multidisciplinary Approach to the Management of Abdominal Blast Injury

Surendra B Patil and Shree Harsh*

Department of Plastic and Maxillofacial Surgery, Government Medical College and Hospital, Nagpur, India

*Corresponding author: Shree Harsh, Department of Plastic and Maxillofacial Surgery, Government Medical College and Hospital, Nagpur, India, Tel: 91-7028749832; E-mail: s007harsh@gmail.com

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Abstract

Management of abdominal wall defects can occur after blast injury. Reconstruction requires a multidisciplinary approach management for speedy and satisfactory recovery. We present a case of blast injury which resulted in abdominal wall defect along with skin and soft tissue defect over penis. Abdominal wall was reconstructed by mesh application to strengthen the abdominal wall followed by a transposition flap to cover the mesh.

Keywords: Multidisciplinary; Abdominal; Blast; Mesh; Transposition flap

Introduction

Blast wave caused by any blast injury can result in variety of injuries. Injury can be limited or involve many organ systems. They can range from burns, abdominal wall and intraabdominal injuries, chest injury, injury to genitalia, perineum and extremities. A thorough clinical examination and a multidisciplinary approach is required depending upon the organ systems involved.

Case Study

Twenty six year old male presented to casualty of Government Medical College and Hospital following history of accidental blast in a chemical factory of paints with complains of pain abdomen and wound over right side of anterior abdominal wall and penis. At the time of incidence, patient was about 20 feet from the place of blast. The amount and type of chemical used which led to blast was not known. Examination revealed tachycardia, abdominal rigidity and wound over the anterior abdominal wall and penis of size 16 by 13.5 cm in maximum horizontal and vertical dimensions. X-ray plain picture abdomen showed gas under the diaphragm (Figure 1) and absent bowel sound. A diagnosis of perforation peritonitis was made. As X-ray was suggestive of hollow viscera perforation patient was planned for surgery without going for a contrast enhanced computed tomography.

He underwent emergency laprotomy by midline incision below the umbilicus under care of general surgery where he underwent resection and anastomosis of 20 cm of ileum in two layers for multiple perforations. Debridement of the anterior abdominal wall wound was also done in the same sitting. There was an anterior abdominal wall defect of twenty by eighteen cm post debridement extending to the right hypogastric, right lumbar and right iliac fossa region and a circumferential raw area over the penis post debridement. Abdomen was closed in layers. Bowel was herniating through the defect in the anterior abdominal wall. Patient was thereafter referred to plastic surgery for reconstruction of the anterior abdominal wall and coverage of raw area over the penis.



Figure 1: Preoperative X-ray.

1 week after the first surgery, patient was posted for reconstruction of the anterior abdominal wall after anesthetic fitness. Prolene mesh was applied over the anterior abdominal wall defect by general surgery team followed by coverage of the defect with a laterally based transposition flap by plastic surgery team. Residual raw area over the anterior abdominal wall and raw area over the penis was covered with split thickness skin graft. In the post-operative period, patient developed infection of the graft which resulted in 5 percent graft loss over the root of penis (Figure 2). The infection was treated conservatively by regular moist dressings and intravenous antibiotics.

Raw area over the base of penis epithelized in the next 2 weeks (Figure 3) after which patient was discharged.

Patient was advised to use abdominal binder for 3 months. Early post-operative follow up showed no evidence of hernia. At six months post-operative follow up, patient was leading his normal life and had resumed his duties. A multidisciplinary effort of general surgery, plastic surgery and radiology led to proper treatment of the patient.



Figure 2: Early post-operative photograph.

Discussion

Blast injury affects many organ systems. Anterior abdominal wall, intrabdominal gas containing contents and skin are vulnerable to blast injury. It can present in a variety of ways ranging from burns to perforation of ear drum, to primary blast injury. Primary blast injury may affect intrathoracic and intraabdominal organs. Actual injury of abdominal blast injury is not known. These injuries affect multiple organs and may require a multidisciplinary approach to the management.

Treatment starts at the site of accident where patient is resuscitated. Radiation exposure should be ruled out. Patients should be thoroughly screened for intraabdominal and intrathoracic injury. Intraabdominal injuries may present later in the due course of admission and patients should be observed for some time if the intraabdominal injury is not present initially [1].

Injury severity can depend on many factors ranging from the distance from the blast to the direction and intensity of the blast wave. Abdominal radiographs are very useful for detecting bowel perforations [2]. Delayed mortality can be seen in Intestinal blast

injuries [3]. Full thickness abdominal wall defects require flap coverage without mesh. Primary closure with or without skin grafting can be done for small defects less than 5 cm [4]. Local flaps are good treatment option for larger complex full thickness defects. The options include local fasciocutaneous flaps, muscle and myocutaneous flaps with or without mesh. Free flaps also provide good alternative when local or locoregional flaps are not available [5].



Figure 3: Late post-operative photograph.

Abdominal binder should be used postoperatively. Patient should be advised to avoid strenuous activities for 3 to 6 months.

Conclusion

Abdominal wall reconstruction after a blast for a full thickness defect is a complex task. Though multiple options are available, a local transposition flap with mesh gives a good option for coverage. A multidisciplinary approach is very helpful for proper treatment of these defects.

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