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Case Report

Non-operative Management of a Penetrating Splenic Injury: A Case Report

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Abstract

Introduction: Penetrating abdominal injury is usually managed by operative treatment: Non-operative treatment is rarely practiced by surgeons. The focus of this paper is to report a case of penetrating abdominal (splenic) injury that was managed non-operatively.

Case summary: A 13-year old girl presented to the children emergency room with a history of a foreign body (a screw driver) stuck in the left hypochondrial region following an attempt to kick start a grinding machine. The patient was evaluated and found to be hemodynamically stable. An abdominal ultrasound showed a penetration of the screw driver 4 centimeters into the splenic parenchyma. The foreign body was removed in theatre under anesthesia. Recovery and post-operative period was uneventful.

Conclusion: Non-operative management of penetrating splenic injury is feasible in a selected group of patients.

Introduction

Regarding the management of solid organ injury, the paradigm is shifting from operative treatment to non-operative management. The spleen has immune functions and asplenia (absence of the spleen) is associated with increased risk of infections by encapsulated organisms [1]. This splenic immune function underlies the principle of splenic preservation that is well established in blunt splenic injuries [2]. Even when surgery is performed for splenic injury, spleen-saving procedures have been shown to be safe and effective in saving the immunologic function of the spleen [3]. However, it is difficult to apply this same management protocol to penetrating splenic injury where surgery is always required. There are doubts about the feasibility of non-operative management for penetrating splenic injuries [4]. Penetrating liver and kidney injuries have better outcomes than penetrating splenic injuries [4]. This may be because most studies on penetrating abdominal trauma focus on the injured liver and spleen [5]. In well-equipped and experience trauma centers that frequently deal with penetrating abdominal trauma, non-operative management of splenic injuries is currently being practiced [4]. However, when the patients are poorly selected there may be increased morbidity and mortality [4]. There is little or no data on the non-operative management of penetrating splenic injury in middle income country like Nigeria, hence, the need to report this case of penetrating splenic injury that was managed non-operatively.

Case Presentation

A 13-year old girl presented to the children emergency room with a history of a foreign body (a screw driver) stuck in the left hypochondrial region, just below the left 12th rib (Figure 1). The patient was trying to kick start a grinding machine using the screw driver, with the rope attached, for turning the engine of the grinding machine. On turning the engine, the screw driver got cut and its distal fragment was projected and penetrating into the patient's left hypochondrial region. There were no other injuries in other parts of patient's body. There was no loss of consciousness, no bleeding from the craniofacial orifices and no respiratory symptoms. She presented the emergency one hour following the occurrence of the incident. On examination, the airway was patent; breathing regular and the circulation was intact. She was fully conscious and alert, in moderate painful distress, afebrile, not pale, not in any respiratory distress and not cyanosed. The respiratory rate was 22 cycles per minute, pulse rate was 92 beats per minute, full volume and regular. Blood pressure was 110 mmHg/70 mmHg and temperature was 37.1°C. Abdomen was flat, moves with respiration and there was no guarding, no rigidity, no rebound tenderness. However, the area of entry of the screw driver was tender, inflamed and edematous with some blood clots at the site. There is no evidence of active frank bleeding. An assessment of penetrating abdominal injury secondary to impaled foreign body was made. Urgent hemoglobin estimation was 13 grams per deciliter. A chest radiograph showed no involvement of the left pleura/lung and an abdominal ultrasound showed the foreign body (screw driver) penetrating 4 centimeters into the parenchyma of the spleen. A Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) were not done due to non-availability. The patient was optimized and taken to theatre. Under anesthesia, the foreign body (screw driver) was removed (Figure 2). The entry site irrigated with diluted hydrogen peroxide and normal saline (Figure 3). From the theatre, the patient was taken back to the ward for close observation. Serial abdominal examination, serial hemoglobin estimation and serial abdominal ultrasound were done to assess for active bleeding from the spleen. No evidence of bleeding was observed throughout the period of observation and she was discharged on the 10th day post injury (Figure 4). The patient is currently being followed up in the clinic and has no complaints.

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Figure 1: Foreign body (Screw driver) stuck in the left hypochondrial region.

Figure 2: Removed foreign body (Screw driver).

Figure 3: State of the wound (Immediate post-op).

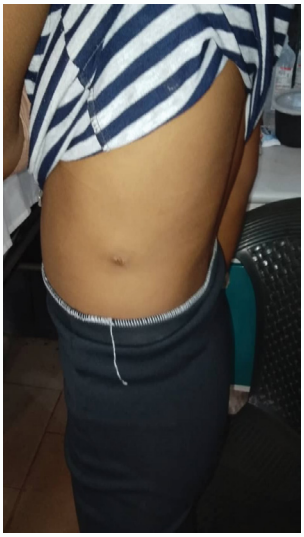

Figure 4: State of the wound at discharge.

Discussion

The spleen is the most commonly injured solid organ in abdominal trauma: In some series, splenic trauma account for up to 50% of all abdominal solid organ injuries [6]. Until some decades ago, operative management of splenic injury used to be the norm [6]. When splenic injury is not causing immediate threat to life, the interest is on splenic preservation especially in children due to immunologic importance of the spleen [7]. The spleen is divided into red pulp and white pulp. The red pulp filters red blood cells and traps bacteria while the white pulp is the site of production of opsonins and complement activation [8]. Penetrating injuries to the spleen are often managed operatively because of concern regarding associated intraperitoneal injuries [9]. In the present case report, the penetrating splenic injury occurred accidentally following an attempt to operate a grinding machine. In certain conditions, the mechanism of penetrating splenic injuries can be unintentional such as gunshots or intentional such as assault and suicide attempts [10]. The presence of splenic injury was confirmed at abdominal ultrasound. It would have been more appropriate to do a CT scan for proper grading of the solid organ injury. But cost, non-availability and exposure to irradiation especially in children restricted its use in the index patient. Serial ultrasound scan was used for the evaluation of the degree of splenic injury and possible associated intra-abdominal injury. There was no associated intra-abdominal injury. Serial abdominal examination and hemoglobin estimations were required for the monitoring of splenic injured patients. Madbak et al. [11] also reported the importance of serial evaluations in patients with solid organ injuries. The patient under discussion had no associated injuries and was hemodynamically stable. Hemodynamic instability and presence of other abdominal injuries such as bowel injuries are indications for operative treatment [4,6]. In the assessment of hemodynamic stability of splenic injured patients, serial blood pressure values and pulse values are more important than a single absolute value. There is need to define the exact criteria required for non-operative management of penetrating splenic injury: This is the future of prospective studies on penetrating splenic injury.

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