CASE REPORT

Traumatic Abdominal Wall Hernia (TAWH): A Case Report and Literature Review

Luay Shihab Ahmed, Department of Surgery, Kirkuk University College of Medicine, Kirkuk, Iraq,
Email: luayahmed2@gmail.com
Mobile: +9647701237626,
ORCID: http://orcid.org/0000-0002-6604-137X
Received: 30/3/2020 Accepted: 29/4/2020 Published: 1st May, 2020

Abstract

Traumatic abdominal wall hernia (TAWH) can occur after blunt trauma and can be classified into low- or high-energy injuries. Low energy injuries occur after impact on a small blunt object. High-energy injuries are sustained during motor vehicle accidents or automobile versus pedestrian accidents. It is an uncommon injury in pediatric age group, we report a two years old boy who sustain a trauma to the right loin region , he presented with soft bulging at right loin region clinically diagnosed, ultrasound examination show no sign of intra abdominal bleeding, though we decide to explore the abdomen to prevent any possible complication or miss injury ,through local exploration there was no associate injury to the bowel or other organs the defect corrected by suturing and patient pass an uneventful period.
Keywords: Hernia, Trauma, Blunt trauma, TAWA.

Introduction

Traumatic abdominal wall hernia is an uncommon injury despite the high prevalence of blunt abdominal trauma. Traumatic abdominal hernia was first described by Selby in 1906 and to date, fewer than 60 cases have been reported [1]. Traumatic abdominal wall hernia (TAWH) can occur after blunt trauma and can be classified into low- or high-energy injuries. Low energy injuries occur after impact on a small blunt object. High-energy injuries are sustained during

motor vehicle accidents or automobile versus pedestrian accidents [2]. Abdominal wall hernias caused by direct trauma from handlebar-like objects, and therefore called 'handlebar hernias', are a rare occurrence Handlebar hernias are abdominal wall hernias resulting from direct trauma to the anterior abdominal wall. They usually result at weak anatomic locations of the abdominal wall [3]. traumatic abdominal wall hernia can be associated with significant intra abdominal injuries in up to 60% of cases [4]. CT scan is the only radiological investigation that can aid in the diagnosis of a traumatic hernia and should be used in any stable patient with signs of abdominal injury [5].

Case report

We report a two years old boy with history of trauma to the abdomen by falling over an exposed metal rod used in construction of steering, the boy presented with soft reducible swelling at right loin region with bruises over it (Fig. 1); otherwise the boy looks stable with normal vital signs soft abdomen except at the site of injury there was a tenderness overlying the swelling ,all investigation were normal, U.S examination show no signs of intra abdominal bleeding, operation were decided because there is a fear from any associated visceral injury or development of strangulation of the hernia and the awareness of the family, so local exploration through a transverse incision over the swelling was done, content was small bowel, all the layers of the abdominal wall were disrupted even the peritoneum for about 5cm (Fig. 2) ,abdominal viscera check was done and no associated intra abdominal organ injury were found, after reduction of the content repair of the defect in the abdominal wall by two layers with long acting absorbable suture (vicryl) was done without any tension and after passing smooth postoperative period the boy send home with good general condition.

Discussion:

TAWH is a rare condition in trauma cases arriving to the casualty units [3] age incidence may affect all age groups but in most recorded cases the pediatric age group is a rare event [6] 32 cases of handlebar-related TAWH in children have been reported to date [6-8]. Our study reports the youngest age had ever reported.

The cause for this type of injury is different according to the reports , cough, handle bar like object, steering wheel, gear handle, seat belt, fall from height, bull attack, rock attack [9]. All those

causative factors share in one concept that it is produced by a sudden application of blunt force that is insufficient to penetrate the skin but strong enough to disrupt the muscle and fascia [10]. However, the mechanism for this type of injury had different explanation: There is no conclusive classification system for TAWH. Nevertheless, categorization is generally based on either the defect size and location or the intensity and mechanism of injury force [4,11,12].

Wood et al. [11] classified TAWHs into three major types. The first is sustained from a high-energy injury such as a motor vehicle accident or a fall from a height. The fascial defect is generally large. Coexisting intra-abdominal visceral injury is common and depends upon the location of the herniation. The second type is caused by low-energy injuries such as bicycle handlebar impact. In this type of hernia, associated intra-abdominal injuries are relatively infrequent. The third type is an intra abdominal herniation of the bowel with deceleration injuries. [11]. The pathophysiology, as proposed by Gauchi, involves the application of a blunt force to the abdomen over an area large enough to prevent penetration of the skin; the tangential forces resulting in a pressure-induced disruption of the abdominal wall muscles and fascia, allowing subcutaneous herniation of abdominal viscera through the defect [4].

The present study which agrees with second type , the little boy felt over an exposed iron rod tip in such a way that the elasticity of skin prevents the further penetration of the iron inside the abdominal cavity and to injure vital organs and because of its low energy type. The most common locations are areas of relative anatomic weakness: the lumbar region and the lower abdomen [13,14]. Hernia location does not necessarily correspond to the site of impact, but rather to points of anatomical weakness ,there are several areas of relative weakness, notably the superior (Grynfeltt-Lesshaft) and inferior (Petit's) lumbar triangles [15].

Most affected site is the lateral abdominal muscles. The location of the defect is usually discovered at anatomically weak points in the lateral to rectus sheath, lower abdomen, and inguinal lesion [16]. Tiong reports 2 cases with site of hernia is opposite to the site of impact for which he claims that a sudden rise in intra abdominal pressure during impact caused a contra lateral or countre-coup injury of the abdomen .[17].

Diagnosis of the condition could be done easily by history and the evident bulging after trauma as in our study, which also is a common presenting feature in other studies [13,18,19]. Prompt diagnosis, however, must start with a high index of suspicion and be based on the nature, mechanism, and force of the injury. Clinical findings show subcutaneous fluctuant swelling that may or may not reduce. Abdominal bruising and ecchymosis are common. [19,20]. There was a statistically significant association between handlebar imprints and a positive CT scan result, defined as evidence of a solid or hollow viscous injury [6]. This presenting feature might be very difficult to be diagnosed by first evaluation because of the hematoma and the tenderness and it might be missed for a long time [21-24]. Further evaluation is needed by the aid of other investigation to prove hernial bulging, defect in abdominal wall or to exclude intra abdominal visceral injury; such as ultrasound [19], plain X-ray of abdomen [25], barium enema, laparoscopy [7], and CT scan which considered to be the cornerstone in the diagnosis of TAWH most of studies specially in suspicious cases [5,13]. Tany et al highlights the need for a high index of suspicion for traumatic herniation in patients who sustain low-velocity blunt abdominal wall trauma even when initial CT scans are negative.[14] direct impact with the bicycle handlebar can cause serious abdominal injuries [26].

Multi–detector row CT permits reliable diagnosis and assessment of traumatic hernias, including characterization of hernia contents, visualization of disrupted abdominal muscle layers, and identification of associated intra abdominal injuries. [27].

There are controversies regarding the timing of exploration: immediate versus delayed exploration. Delayed exploration, as well as delays in diagnosis, can lead to some problems such as bowel strangulation [28-30]. Some reports advocate that the presence of an acute traumatic hernia alone is an indication for laparotomy because of the high prevalence of associated injury to hollow viscera and mesentery [31,32]. While Nnamdi etal decided not to be urgent in the repair of the hernia after exclusion of intra abdominal injury [23]. Matsuo and colleagues have reported successful conservative management of abdominal hernia cause by handlebar injury, using a cloth corset. Their decision was again aided by a CT scan which did not reveal any intra-abdominal injury [26]. Treatment based on the merits of each case would again be the most prudent approach [18].

Surgical interference is either by explorative laparotomy when there is doubt or signs of intra abdominal visceral injury proved by investigation specially those associated with high energy type accident ,were the associated visceral injury is very common [2,3,5,17,25,33]; or by local exploration specially when trauma caused by low energy injury and there is no sign of intra abdominal bleeding [13,17,18,34]). Selection type of incision should be done on case by –case basis [13]. The purpose from the surgical incision is to explore abdominal cavity for any visceral injury and to correct the defect in the abdominal wall at the same time without need for separate incision for each, so we think local exploration in pediatric age group is optimum because of relatively small abdominal cavity which can be explored easily.

The use of laparoscopy to identify any visceral injury or to detect the exact site of hernia will assist a lot in the diagnosis and local repair of traumatic abdominal hernia [7,17]. We use absorbable suture (vicryl) in two layer repair with no later complications, Several previously reported cases showed no drawbacks in using absorbable suture for hernia repair.[7,16]. Repair of the traumatic hernia should be performed by careful primary approximation of the defect edges, using strong, non-absorbable sutures, as most case reports indicated [4, 35-37] that the mechanism of injury should be considered when deciding on operative intervention [32]. Both mesh repair as well as primary repair have been successfully performed for treatment of traumatic hernia [7,13,18]. One may conclude that low-velocity injuries lead to less tissue necrosis, and a mesh can be used. [18].

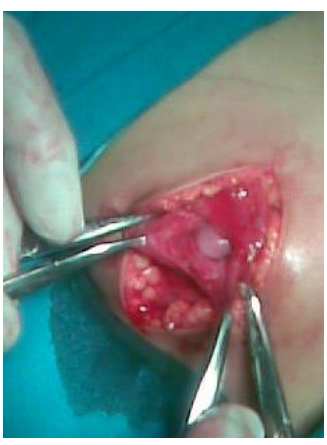
Regarding content of hernia, in our case it was small bowel as most of other studies Main content is small bowel although there is other studies with different content which depends on the site and the size of hernia [23,24].

Conclusion:

TAWH should be suspected in every traumatic injury to the abdomen though it is a rare entity to decrease the morbidity of miss diagnosis. Ct scan should be considered in every case of proved or suspected case to diagnose the hernia and to outline the associated intra abdominal injury. Immediate exploration through local or a midline incision is mandatory especially at pediatric age group .

Fig.1. Soft reducible bulging at right loin region with bruises print over it.

Operation forTAWH



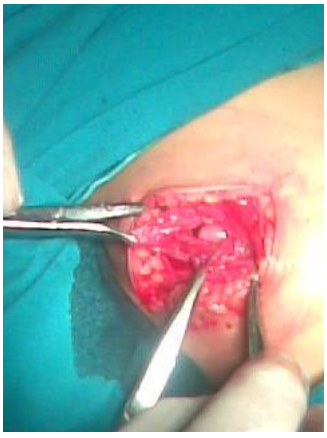


Fig.2. Operation for TAWH

References

1. Selby CD. Direct abdominal hernia of traumatic origin. JAMA 1906:47:1485.
2. Lane CT.Managment of traumatic abdominal wall hernia. Ann Surg. 2004;70(1):94-5.
3. Hassan KAF, Elsharawy MA, Moghazy K, AlQurain A. Handlebar hernia: A rare type of hernia Saudi J Gasdtroentrology 2008;14(1):33-35.
4. Gauchi GA, Orgill DP. Autopenetrating hernia: a novel form of trauma to abdominal wall hernia - case report and review of the literature. J Trauma 1996: 41(6):1064-1066.
5. Tiong H, So J, Cheah W. Traumatic Abdominal Wall Hernia: Open And Laparoscopic Approaches To Repair. The Internet Journal of Surgery. 2007;10(2).
6. Hickey N. Computed tomography of traumatic abdominal wall hernia and associated deceleration injuries. Can Assoc Radiol J 2002;53(3): 153–9.
7. Chen HY. Bicycle-handlebar Hernia: A Rare Traumatic Abdominal Wall Hernia. J Chin Med Assoc 2005;68(6):283-5.
8.Wood RJ, Ney AL, Bubrick MP. Traumatic abdominal hernia: a case report and review of the literature. Am Surg. 1988;54:648–651.
9. Otero C, Fallon WF., Jr Injury to the abdominal wall musculature: the full spectrum of traumatic hernia. South Med J. 1988;81:517–520.
10. Damschen DD, Landercasper J, Cogbill TH, Stolee RT. Acute t raumatic abdominal hernia: case reports. J Trauma. 1994;36:273–276.
11. Esposito TJ, Fedorak I. Traumatic lumbar hernia: case report and literature review. J Trauma 1994;37:123–126.
12. Taylor PR. Late presentation of a traumatic abdominal hernia associated with constipation. J Royal Society of Medicine 1989;82: 170.
13. Killeen KL, Girard S, DeMeo JH, Shanmuganathan K, Mirvis SE. Using CT to diagnose traumatic umbar hernia. AJR Am J Roentgenol 2000;174:1413–1415.
14. Gily HR, Stewart IP. Traumatic hernia. J Trauma 1983;23:250-1.
15. Choi HJ, Park KJ, Lee HY, Kim KH, Kim SH, Kim MC, et al. Traumatic Abdominal Wall Hernia (TAWH): A Case Study

Highlighting Surgical Management. Yonsei Med J 2007;48(3): 549–553.
16. Vasquez JC. Traumatic abdominal wall hernia caused by persistent cough. South Med J. 1999;92(9):907-8.
17. Iinuma Y. A case of a traumatic abdominal wall hernia that could not be identified until exploratory laparoscopy was performed. Pediatric Surgery Int 2005; 21(1):54-7.
18. Naoto G. Case of Delayed Traumatic Abdominal Wall Hernia that Occurred 17 Years after a Traffic Accident. Japan J Gastroenterol Surgery1999;32(11):2596-2600.
19. Mitra A. Traumatic abdominal wall hernia . BMJ Case Reports.2009;2009:bcr1020081171.doi:10.1136/bcr 10.2008.1171
20. Nwaejike N. Lateral abdominal wall hernia following blunt trauma- a rare case. Emergency Radiology 2009; 3(1):7-9.
21. Aguirre DA, Santosa AC. Abdominal Wall Hernias: Imaging Features, Complications, and Diagnostic Pitfalls at Multi–Detector Row CT. Radio Graphics 2005**;** 25:1501–1520.
22. Tan E Y, Kaushal S, Siow W Y, Chia K H. Traumatic abdominal wall herniation, Singapore Med J C a s e R e p o r t 2007; 48(10) : e270.
23. Agarwal N. Traumatic abdominal wall hernia in two adults: a case series. J Med Case Reports 2009;3:7324.
24. Gera PK. Bicycle handlebar injuries in Western Australia: from imprints to abdominal wall hernias. Med J Australia 2008;189(5): 295.
25. Haimovici L, Papafragkou S, Keesler E, Angus G. Handlebar hernia: traumatic abdominal wall hernia with multiple enterotomies. A case report and review of literature. J Pediatr Surg 2007; 42: 567-569.
26. Gill IS, Toursarkissian B, Johnson SB, Kearney PA. Traumatic ventral abdominal hernia associated with small bowel gangrene: case report. J Trauma. 1993;35:145-147.**311**
27.Fraser N, Milligan S, Arthur RJ, Crabbe DC. Handlebar hernia masquerading as an inguinal haematoma. Hernia. 2002;6:39–41.
28. Mahajna A, Ofer A, Krausz MM. Traumatic abdominal hernia associated with large bowel strangulation: case report and review of the literature. Hernia. 2004;8:80–82.

29. Walcher F, Rose S, Roth R, Lindemann W, Mutschler W, Marzi I. Double traumatic abdominal wall hernia and colon laceration due to a pelvic fracture. Injury. 2000;31:253–256.
30. Shiomi H, Hase T, Matsuno S, Izumi M, Tatsuta T, Ito F, et al. Handlebar hernia with intra-abdominal extraluminal air presenting as a novel form of traumatic abdominal wall hernia: report of a case. Surg Today. 1999;29:1280–1284.
31. Tomoyuki M. A case of traumatic abdominal wall hernia treated with direct suture of the abdominal muscle and the fascia. Yokohama Medical J 2005;56(5/6):559-563.
32. Mancel B, Aslam A**.** Traumatic abdominal wall hernia: an unusual bicycle handlebar injury. Pediatric Surgery Int 2003;l19(11):746-747.
33. Kilic N, Blakan E, Kristioglu I, Guney N, Dogruyol H. Abdominal wall ruptured by blunt trauma in a child. Eur J Surg 2000:166:265-266.
34. Sahdev P, Garramone RR, Desani B, Ferris V, Welch JP. Traumatic abdominal hernia: report of three cases and review of the literature. Am J Emerg Med 1992:10:237-241.
35. Chanvitan A. Traumatic abdominal wall hernia: A case Report. J Med Assoc Thai 1986:69:341.
36. Netto FA, Hamilton P, Rizoli SB, Nascimento B Jr, Brenneman FD,Tien H, Tremblay LN: Traumatic abdominal wall hernia: epidemiology and clinical implications. J Trauma 2006,61:1058-1061.
37. Nadler EP, Potoka DA, Shultz BL, et al. The high morbidity associated with handlebar injuries in children. J Trauma 2005; 58: 1171-1174.