



Unexpected Complication of Blunt Trauma: Evisceration

Künt Travmanın Nadir Bir Komplikasyonu: Eviserasyon

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Abstract

Traumatic abdominal wall hernia with evisceration is an uncommon injury secondary to blunt abdominal trauma in all age groups. Bicycle handlebar injuries among children are significant causes of blunt abdominal trauma such as penetrating trauma. We present a case of evisceration in a 14-year-old child after blunt injury with handle bar. We assume that early management and prompt abdominal exploration and surgical repair provide good clinical outcome without complication.

Keywords: Evisceration, blunt injury, children

Öz

Eviserasyonun eşlik ettiği travmatik abdominal herni, künt abdominal travma sonrası tüm yaş gruplarında nadir görülen bir yaralanmadır. Çocuklarda bisiklet gidonu ile yaralanmalar penetran travmalarda olduğu gibi künt travmaların da önemli bir sebebidir. Burada, bisiklet gidonu ile künt yaralanma sonrası 14 yaşındaki bir eviserasyon olgusu sunduk. Bu olgu, erken müdahale, acil abdominal eksplorasyon ve cerrahi onarım ile komplikasyonsuz, iyi klinik sonuçlar alınabileceğini göstermiştir.

Anahtar Kelimeler: Eviserasyon, künt travma, çocuk

Introduction

Traumatic injury is the leading cause of emergency department (ED) visits, comprising approximately one-third of admissions for children younger than 14 years of age. While penetrating trauma is common in adults, blunt injury accounts for approximately 90% of traumatic injuries in childhood.¹ Bicycle accidents are one of the major causes of blunt injury in children.

Bicycle accidents can lead to serious and, rarely, fatal injuries. In addition to head injury, which is the leading cause of death and long-term disability, injuries of the musculoskeletal system and internal organs are important cause of bicycle-related morbidity. While most handlebar injuries are superficial due to focal force applied to the abdominal wall, it can also result in severe internal organ injury, traumatic abdominal wall hernia (TAWH) and evisceration. Abdominal evisceration secondary to blunt trauma is exceedingly rare form of TAWH.² Herein,

we present a 14-year-old boy with small bowel evisceration caused by blunt abdominal trauma following a bicycle handlebar injury.

Case

A 14-year-old boy was admitted to the pediatric ED due to small bowel evisceration. While he was cycling, he lost the control of the bicycle and stroked the end of the handlebar, then fell onto the bicycle. He had felt pain and realized that the small bowel eviscerated from the lower abdomen. The eviscerated intact ileal bowel segments were covered with saline-soaked gauze by health care providers during transport to the hospital (Figure 1). First physical examination in the ED revealed that the patient was stable, cooperated and oriented. His pulse rate was 120 beats/minute, respiratory rate was 22/minute, peripheral O₂ saturation was 100% and the blood pressure was 140/87 mmHg. His Glasgow

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coma score was 15. No accompanied injuries were found on physical examination. He was suffering from severe pain only. Laboratory tests were all normal (Table 1). A nasogastric tube was inserted. Intravenous fluid and antibiotics (cefuroxime sodium and metronidazole) were administered. The patient was immediately examined by pediatric surgeons in the ED department. Exploratory laparotomy was planned to repair the evisceration and to find out accompanied abdominal injuries. The exploration was performed through the abdominal defect that was approximately 10 cm in diameter located in the infraumbilical region extending to the left abdominal quadrant. Enlargement of the wound was not required. All intestinal segments and solid organs from esophageal hiatus to the rectum were explored. The omentum was damaged in several areas and the small bowel mesentery was opened at approximately 120 and 150 cm distal to the Treitz ligament. There was no intestinal perforation or solid organ injury. The damaged omentum tissue was excised and the injured intestinal mesentery areas were repaired primarily with 4/0 polyglycolic acid. The abdominal cavity was irrigated with warm saline and the intestinal segments were placed. The wound margins were debrided and the abdominal wall was reconstructed in layers with 0/0 polydioxanone (Figure 2). There was no need to use mesh or suction drain. The patient

was fed on the postoperative first day and discharged on the post-operative 5th day. He was followed up for 6 months uneventfully.

Discussion

In the emergency departments, clinicians must initially identify and promptly address life-threatening conditions for blunt injury in all trauma patients. The most common types of injury in bicycle trauma patients have been reported to be abrasions and contusions.² Although injury locations may include all parts of the body, 15% patients sustain abdominal and/or genital injuries.³ In childhood cycling trauma, internal abdominal injuries arise from handlebar impact. Bicycle handle bar can act as a spear and apply a focal force to the abdominal wall. Direct impact from the end of the handlebar occurs following low speed crashes, typically results in isolated but often severe injuries. Severity of these injuries may have a wide range from splenic, pancreatic and liver injuries to bowel perforation.⁴ TAWH and evisceration rarely occur after blunt trauma. The prevalence of TAWH that is disruption of the abdominal muscles without disruption of the overlying skin, is 0.2%-1%.^{5,6} Evisceration with TAWH, described as grade VI injury by Dennis et al.⁷ based on CT scan findings, is uncommon with the incidence of approximately 1 in 40,000 admissions related to trauma.⁸ In the literature, case reports showed that most of eviscerations in adults occurred after high-energy injuries caused by falls from horse, road traffic accident, and pedestrian-vehicle collisions.⁹ To the best of our knowledge, there are only two cases of evisceration secondary to blunt trauma caused by handlebar with low energy in



Figure 1. Eviscerated bowel segments after trauma

Table 1. Laboratory parameters of the patient			
Hemoglobin	11.6 g/dL	Alanine aminotransferase	27 IU/L
White blood cell	16.8x10 ³ /μL	Aspartate aminotransferase	29 IU/L
Platelet	296x10 ³ /μL	Amylase	67 IU/L
Creatinine	0.56 mg/dL	Lipase	12 IU/L
Blood urea nitrogen	20 mg/dL	Albumin	4.03 g/dL



Figure 2. Postoperative wound image and circular trace of handlebar

pediatric age group.^{10,11} Although the injury mechanism has not been completely understood yet, it is considered that high- or low-energy with focal force is transferred to the patient in a small area. The external blunt force causes significant increase in intra-abdominal pressure leading to disruption of muscles and fascia with intact skin. TAWH occurs especially in the anatomically weak points e.g., the lateral rectus, lower abdomen, and inguinal regions. TAWH is thought to result from simultaneous surge in abdominal pressure and the presence of shearing forces that synergistically disrupt the abdominal wall musculature and fascial layers. Additionally, the skin may also be disrupted with shearing force to allow evisceration and this is one of the indications for immediate laparotomy.^{6,12} The risk of TAWH and evisceration may increase in children, having relatively thin abdominal wall structure and especially in those with a history of abdominal surgery.

Although TAWH and evisceration are significant clinical conditions, the main factor determining mortality is the presence of additional organ injuries. Clinicians must consider accompanied injuries representing up to 30% of cases.¹³ Solid organs within the pediatric abdomen have a larger surface area relative to adult organs, thus, a greater area is exposed to potential injury. The organ attachments are also more elastic increasing the risk of tearing and shearing injuries.

Management of evisceration begins at the scene of the injury, with stabilization and moist dressing over the wound before surgical intervention. Treatment approach must include the assessment of associated organ injuries and the viability of the eviscerated organs, making excision if needed, reducing the eviscerated abdominal contents, and immediate abdominal wall reconstruction. Primary closure with non-absorbable suture material avoiding the use of mesh with the inherent risk of septic complications may not always be possible.¹⁴

Bicycle-related abdominal injuries can easily occur in the daily life of children, due to the fact that bicycling is an important part of sports activity or transportation and, children are more vulnerable to blunt abdominal injury. Evisceration related to blunt trauma, after bicycle accidents, has excellent prognosis with emergent and efficient management although it is an extremely rare condition. In this situation, clinicians should make prompt and thorough search for accompanied abdominal injuries. In this case report, we aimed to highlight the clinical features and management of evisceration which is an unusual condition after blunt trauma caused by handlebar.

Ethics

Ethics Committee Approval: Dokuz Eylül University Faculty of Medicine.

Informed Consent: The parents of patient signed written informed consent form.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.U., B.S., O.Z.K., D.Y.S., Concept: E.U., M.D., Design: E.U., M.D., Data Collection or Processing: E.U., B.S., D.Y.S., F.A., Analysis or Interpretation: M.D., E.U., O.Z.K., H.Ç., Literature Search: M.D., E.U., D.Y., Writing: E.U., M.D., O.Z.K.

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References

1. Krauss BS, Harakal T, Fleisher GR. General trauma in a pediatric emergency department: spectrum and consultation patterns. *Pediatr Emerg Care*. 1993;9:134.
2. Mehan TJ, Gardner R, Smith GA, McKenzie LB. Bicycle-related injuries among children and adolescents in the United States. *Clin Pediatr (Phila)*. 2009;48:166.
3. Teisch LF, Allen CJ, Tashiro J, Golpanian S, Lasko D, et al. Injury patterns and outcomes following pediatric bicycle accidents. *Pediatr Surg Inter*. 2015;11:1021-5.
4. Nadler EP, Potoka DA, Shultz BL, Morrison KE, Ford HR, et al. The high morbidity associated with handlebar injuries in children. *J Trauma*. 2005;58:1171-4.
5. Brenneman FD, Boulanger BR, Antonyshyn O. Surgical management of abdominal wall disruption after blunt trauma. *J Trauma*. 1995;39:539-44.
6. Choi HJ, Park KJ, Lee HY, Kim KH, Kim SH, et al. Traumatic abdominal wall hernia (TAWH): A case study highlighting surgical management. *Yonsei Med J*. 2007;48:549-53.
7. Dennis RW, Marshall A, Deshmukh H, Bender JS, Kulvatunyou N, et al. Abdominal wall injuries occurring after blunt trauma: Incidence and grading system. *Am J Surg*. 2009;197:413-7.
8. Hardcastle TC, Coetzee GJN, Wasserman L. Evisceration from blunt trauma in adults: An unusual injury pattern: 3 cases and literature review. *Scand J Trauma Resusc Emerg Med*. 2005;13:234-5.
9. Cawich S, Islam S, Harnarayan P, Young-Pong C. Abdominal Wall disruption with evisceration after blunt trauma. *BMJ Case Rep*. 2014;4.
10. Lowell ME, Brett M, Enion DS. Mountain bike injury to the abdomen, transection of the pancreas and small bowel evisceration. *Injury*. 1992;23:499-500.
11. Nguyen MH, Watson A, Wong E. A 6-year-old boy presenting with traumatic evisceration following a bicycle handle bar injury: a case report. *Cases J*. 2009;31:6315.
12. Den Hartog D, Tuinebreijer WE, Oprel PP, Ptaka P. Acute traumatic abdominal Wall hernia. *Hernia*. 2011;15:443-5.
13. Ganchi PA, Orgill DP. Autopenetrating hernia: a novel form of traumatic abdominal wall hernia-case report and review of the literature. *J Trauma*. 1996;41:1064-6.
14. Cayten CG, Fabian TC, Garcia VF, Ivatury RR, Morris JA. Patient Management Guidelines for Penetrating Intraoperative Colon Injuries. 1998;1-15.