

Penetrating umbilical injury with evisceration through umbilical hernia in children

Page | 196

Dear Sir,

The association of penetrating umbilical injury through an umbilical hernia is worthy of note; because though this hernia is a frequent pathology of the anterior abdominal wall in children,^[1] such injury is rarely reported. Due to the inherent fascial defect in umbilical hernia, trivial injuries directed against it could lead to breach of the skin and peritoneum with evisceration of loops of intestine.

These case reports emphasize the need for prophylactic repair of umbilical hernias if they fail to close spontaneously after the age of 4 years even if they remain asymptomatic and for carefully storing away of harmful objects from children.

A 5-year-old boy was admitted to the Children Emergency Unit of the University of Calabar Teaching Hospital with a 24-hour history of evisceration of loops of intestine through the umbilicus. He was said to have fallen on a sharp wooden object in the home premises while playing with his peers. Suddenly loops of intestine eviscerated through his umbilicus, with associated recurrent bilious vomiting an hour later. Preceding the fall, the patient had an asymptomatic umbilical hernia with a ring diameter of about 2.0 cm. He was treated at home with bandaging for 24 hours before seeking medical treatment.

On arrival at the Children Emergency Unit, the child was examined and found to be very dehydrated. The vital signs were blood pressure (BP)- 85/60 mm Hg, heart rate- 160 beats/min, respiratory rate- 46 cycles/min and temperature (rectal)- 37.0°C. There was a 2.0-cm opening in the umbilical cicatrix through which loops of non-viable small bowel eviscerated.

The patient was adequately resuscitated and given anti-tetanus prophylaxis. Under a general anesthetic, a laparotomy was done, during which the gangrenous bowel was prevented from slipping back into the peritoneal cavity. About 30-cm length of the non-viable ileal segment was resected, followed by an end-to-end ileo-ileostomy. Injury to other intra-abdominal viscera was excluded by careful exploration. The abdominal wound and fascial defect were repaired with nylon suture and umbilicoplasty

was done. The wound healed primarily, and he was discharged home on the eighth post-operative day. The patient was reviewed in the outpatient clinic 8 weeks after discharge, when he was found to be doing well.

A 10-year-old boy presented to the Children Emergency Unit of the University of Calabar Teaching Hospital with a 24-hour history of a protrusion of a fleshy tissue through the umbilicus. He was playing at home when he fell on a piece of iron rod. He failed to tell his parents for fear of being beaten until when he developed persistent severe abdominal pain. There were no associated gastro-intestinal symptoms. Prior to the fall, the patient also had an asymptomatic umbilical hernia with a ring diameter of about 1 cm.

On examination in the Children Emergency Unit, he was found to be in painful distress. The vital signs were blood pressure (BP)- 100/65 mm Hg, pulse rate- 80 beats/min, respiratory rate- 28 cycles/min and temperature (rectal) 37.2°C. There was a 1.0-cm defect in the umbilical cicatrix through which a tongue of viable omentum protruded.

The abdomen was full and moderately tender. He was resuscitated and given anti-tetanus prophylaxis. Under a general anesthetic, a laparotomy was done, during which the tongue of omentum was prevented from slipping back into the peritoneal cavity. There was hemoperitoneum of about 30 mL without any visceral injury. The exteriorized omentum was ligated and excised. The abdominal wound and fascial defect were repaired with nylon suture and umbilicoplasty was done.

The wound healed primarily, and he was discharged home on the seventh post-operative day. He was reviewed in the outpatient clinic 8 weeks after discharge and found to be doing well.

Penetrating umbilical injury with evisceration through the umbilicus in a child has been reported,^[2] but the report did not mention whether there was an associated hernia. It is however very rare that penetrating injury involves the umbilicus and leads to evisceration of loops of intestine as the

intact umbilicus is not naturally a weak point in the anterior abdominal wall.

The anatomy of the umbilicus is probably responsible for the rarity of penetrating injuries through it. In the normal umbilicus, there is a single layer of fused fibrous tissue consisting of the superficial fascia, the rectus sheath and linea alba, as well as the fascia transversalis with the peritoneum adherent to the deep aspect of this.^[3] Therefore, though the umbilicus is actually the thinnest area of the anterior abdominal wall, it is very tough and unyielding.

This is however not the case when an umbilical hernia exists irrespective of size. The herniation is through the linea alba, and the ring is formed by the fusion of all the layers of the anterior abdominal wall.^[4] This leaves a defect covered only by skin, fat and peritoneum that could yield readily during abdominal injuries directed against the umbilicus. In fact, this defect is sometimes too weak to withstand the stress of raised intra-abdominal pressure associated with coughing, vomiting or difficult defecation in early life or with the presence of an overlying inflamed umbilical skin,^[5] thereby leading to spontaneous rupture of infantile umbilical hernia.^[6,7]

Our two cases are peculiar in that both patients had untreated umbilical hernias prior to the penetrating umbilical trauma, and so the force required to breach the peritoneum when directed against the umbilical hernia was far less than that required when directed against an intact umbilicus. It is worthy of note that the objects culpable in these injuries are those found commonly in the environment in which these children grow up. Firearms are noted to cause similar injuries in developed countries.^[8]

Common causes of penetrating abdominal trauma in children in our environment are falls onto sharp objects, sporting injuries and, rarely, road traffic accidents and violence.^[9] The gores of domestic animals like cows, goats and rams sometimes cause abdominal trauma which results in intestinal evisceration.^[10] Pieces of broken glass have also been reported to cause penetrating injury with intestinal evisceration^[2] and omentocoele.^[11] The umbilicus alone could be the site of this injury, especially when there is a co-existing hernia.

The diagnosis of penetrating injury aims to establish peritonitis consequent on violation of the peritoneum and hemodynamic instability. While a limited number of diagnostic modalities may be applied, clinical examination remains the primary tool to decide which patient requires operation.

The traditionally recommended management

when an injury violates the peritoneum with evisceration^[12,13] of the intestine or omentum is exploratory laparotomy. Currently, selective management^[14] of children with such penetrating injury is adopted because of the concern about the high number of unnecessary laparotomies in adults with penetrating injuries.^[15] This is so because much of the information on nonoperative management has been derived from adult experiences.^[16] Because the decision as to who should have selective non-operative management is difficult, several diagnostic methods, including ultra-sound scan (USS), computerized tomography (CT), diagnostic peritoneal lavage (DPL) and diagnostic laparoscopy, may be used in some carefully selected patients.^[14] This form of management requires supervision and frequent observation of the patients.

Our two patients were subjected to laparotomy, though the second case could have been suitable for selective management while repairing only the umbilical hernia. With the availability of some of these diagnostic modalities in most of our health institutions now, non-operative treatment of penetrating abdominal trauma in carefully selected children should be possible and needs be considered.

On the whole, these injuries are preventable. Parents should monitor and store away all potentially harmful objects from their children. Because an umbilical hernia remains a weak site for penetrating umbilical injury, any hernia that has failed to close spontaneously after 4 years of age should be prophylactically repaired even if it remains asymptomatic.

**Usang E. Usang, Ayi E. Archibong,
Ayodele O. Ogunkedede**

Paediatric Surgery Unit, University of Calabar
Teaching Hospital (UCTH), Calabar, Nigeria

Address for correspondence: Dr. Usang E. Usang,
G.P.O. Box 195, Calabar Road, Calabar, Nigeria.
E-mail: usangue@yahoo.co.uk

DOI: 10.4103/1596-3519.57246 **PMID:** 19884700

References

1. Fall I, Sanou A, Ngom G, Diena M, Sankale AA, Ndoye M. Strangulated umbilical hernias in children. *Pediatr Surg Int* 2006;22:233-5.
2. Jarquin MR, Calderon JLA, Perez FF. An unusual domestic accident: a penetrating abdominal wound with intestinal evisceration in a child. *Pediatr Surg Int* 1998;13:435-6.
3. Devlin HB. Essential anatomy of the abdominal wall. In: *Management of Abdominal Hernias*. 1st ed. London:

- Butterworths; 1988. p. 10-27.
4. Skandalakis JE, Gray SW, Rowe JS. Hernias. In: *Anatomical complications in General Surgery*. Int. ed. New York: McGraw-Hill, Inc; 1986. p. 252-81.
 5. Ameh EA, Chirdan LB, Nmadu PT, Yusufu LM. Complicated umbilical hernias in children. *Pediatr Surg Int* 2003;19:280-2.
 6. Ahmed A, Ahmed M, Nmadu PT. Spontaneous rupture of infantile umbilical hernia: Report of three cases. *Ann Trop Paediatr* 1998;18:239-41.
 7. Jamabo RS. Spontaneous rupture of an umbilical hernia with evisceration of small intestines in a 16-year-old girl. *Port Harcourt Med J* 2007;1:119-20.
 8. Ozturk H, Dokuca AL, Otcu S. The prognostic importance of trauma scoring system for morbidity in children with penetrating abdominal wounds; 17 years of experience. *J Pediatr Surg* 2002;13:93-8
 9. Ameh EA, Nmader PT. Penetrating abdominal injuries in children in Nigeria. *Ann Trop Paediatr* 1999;19:293-96.
 10. Ameh EA. Major injuries from domestic animals in children *Pediatr Surg Int* 2000;16:589-91.
 11. Baeze HC, Garcia CLM, Garcia CJL, Gardida CR. Abdominal penetrating injury by broken glass bottle in children *Cir Ciruj* 1998;66:186-8.
 12. Nance FC, Wenner MH, Johnson LW, Ingram JC, Cohn I Jr. Surgical judgment in the management of penetrating wounds of the abdomen. Experience with 2212 patients. *Ann Surg* 1974;179:639-46.
 13. Rajdeo HP, Deodhar SD. Stab wounds of the abdomen. A study of 75 cases. *Indian J Med Sci* 1975;29:54-9.
 14. Ertekin C, Yanar H, Taviloglu K, Gluloglu R, Alimoglu O. Unnecessary laparotomy by using physical examination and different diagnostic modalities for penetrating abdominal stab wounds. *Emerg Med J* 2005;22:790-94.
 15. Saadia R, Degiannis E. Non-operative treatment of abdominal gunshot injuries. *Br J Surg*. 2000;87:393-7.
 16. Holland A, Kirby R, Browne GJ, Ross F, Cass DT. Penetrating injuries in children: Is there a message? *J Paediatr Child Health* 2002;38:487-91.

Paper presented at the 6th Annual General Meeting and Scientific Conference of the Association of Paediatric Surgeons of Nigeria (APSON) in Benin City on 22nd November 2007.