



Straddle injury with anal sphincter and rectal rupture in a young girl

Case report



Ann. Ital. Chir.
Published online (EP) 29 July 2015
pii: S2239253X15023865
www.annitalchir.com

Renato Pietroletti*, Federica Delreno*, Amalia D'Orsi*, Stefano Caoci**, Francesco Carlei*

*Post-Graduate School of Gastrointestinal Surgery, University of L'Aquila, L'Aquila, Italy

**Department of Pediatrics University of Rome "La Sapienza", Rome, Italy

Straddle injury with anal sphincter and rectal rupture in a young girl. Case report

As a result of increasing sport or car accident, straddle injuries in pediatric age are becoming increasingly frequent. Mild lesions of the external genitalia and urinary apparatus, are mainly observed in blunt trauma, whereas more severe lesions are reported in penetrating injuries; however, ano-rectal involvement alone, has been reported very rarely and especially in penetrating trauma. We describe herein a case of straddle trauma occurring in a 14yr old girl involved in a car accident. The girl reported anal sphincter rupture and rectal wall tear with a blunt mechanism. No other involvement of genitourinary apparatus was observed. The diagnostic and surgical approach of this rare consequence of a straddle, blunt injury are described and commented.

KEY WORDS: Anal sphincter rupture, Emergency laparoscopy, Perineal trauma, Rectal lesion, Straddle injury

Introduction

Straddle injuries in pediatric patients may be observed frequently since their incidence is increasing as a result of sport or motor vehicle accident¹⁻⁵.

External genitalia and urethra are usually involved in common practice, most of the times with low severity therefore a conservative treatment can be successfully adopted^{2,3,5}. On the other hand, involvement of the ano-rectum is not frequently observed and when report-

ed, it is always related either to severe penetrating injury or described as an associated lesion, accompanying severe uro-genital involvement²⁻⁵.

Ano-rectal involvement itself, is considered to be responsible for an increased severity of the trauma and correlated to an high incidence of complications^{2,3,6,7}.

In dealing with such situation, challenging problems are posed, requiring highly specialistic or multidisciplinary expertise, but no standard principles have been outlined. We describe a case of straddle injury involving only the ano-rectum in a young girl, who reported an isolated external anal sphincter lesion and a deep rectal tear. We discuss the diagnostic and therapeutic approach, making a review of the literature concerning this rare consequence of straddle type of trauma.

Case presentation

A 14yr old girl was admitted in our Surgical Ward following a car accident. Out of 5 occupants of the vehi-

Pervenuto in Redazione Febbraio 2015. Accettato per la pubblicazione Aprile 2015

Correspondence to: Prof R. Pietroletti MD, PhD, U.O.S.D. of Surgical Coloproctology, Hospital "Val Vibrata", Via alla Salara ,64027 Sant'Omero (TE), Italy (e-mail: renato.pietroletti@cc.univaq.it)

cle, the girl was the only one requiring our care, since she was complaining of mild perineal and lower abdominal pain. At physical examination, the patient was in good general health, showing normal heart rate and blood pressure. She appeared overweight, with a BMI=26. She presented a small, actively bleeding perineal wound, close to the anus at 12 o'clock in lithotomy (Fig. 1). The wound was irregular in shape and showed ecchymosed skin surrounding (Fig. 2) The trousers worn by the patient were intact, therefore a non-penetrating, blunt trauma mechanism was suspected. The girl was sitting in the centre of rear seats, with the legs astride of the armrest in between the two anterior seats, not wearing the safety belt. She impacted the perineum against the armrest during the car accident. We planned a CT scan and examination under anaesthesia.

CT scan was unremarkable, reporting soft tissue edema surrounding the rectum and no fluid collection in the abdomen or pelvic cavity, neither fractures of pelvic bones nor other abnormalities. In the operative room, under general anaesthesia, the patient was catheterized, placed in lithotomy with abdominal and perineal skin prepared for surgery. I.V. antibiotic prophylaxis was started with metronidazole 500 mg and cefotaxime 2g.

Careful inspection of the perineal wound, demonstrated a full thickness disruption of the external anal sphincter located at 12 o'clock. Rigid sigmoidoscopy was performed, exploring the rectum up to 25 cm from the anal verge. A large defect of the anterior rectal wall was detected, in continuity with the external wound, extending up to 15 cm, involving all the layers of the bowel with disruption of the recto-vaginal septum. No lesions of external genitalia and vaginal wall were detected at gynaecological examination.

Surgical management was as follows: positioning of Eisenhammer retractor with gentle opening of the anus,

repeated rectal washing and wound toilette with diluted iodo-povidone/saline solution with elimination of a large amount of blood clots; suturing of the rectal lesion in double layer (muscle layer with interrupted, polyglactin suture, mucosa in continuous), down to the dentate line. Sphincter repair was performed with overlapping sphincteroplasty, after full mobilization and preparation of the damaged sphincter muscle, with interrupted, polyglactin sutures. The skin was closed partially and drained with a Penrose drain.

In order to protect the rectal and external anal sphincter sutures, a loop colostomy was planned. Low pressure pneumo-peritoneum was obtained with "open" technique by means of a 2 cm skin incision in the left iliac fossa and placement of 12 mm trocar. Thus, a full videolaparoscopic exploration of abdominal cavity was conducted, reporting only a small amount of bloody fluid collection in the pelvis and no detectable lesions of abdominal or pelvic organs.

After enlarging the incision in the left iliac fossa, the sigmoid colon was mobilized and delivered out for a loop colostomy.

Antibiotic was continued in the P.O. period at full dose (metronidazole 500 mg t.i.d. and cefotaxime 2g b.i.d.). Postoperative course was uneventful and the patient discharged in 8th postoperative day. Colostomy was closed after six weeks, having checked sphincter function by clinical and ano-rectal physiology studies, with normal results.



Fig. 1: The irregular wound, caused by the blunt, straddle injury to the perineum of the girl.



Fig. 2: The external anal sphincter lesion is indicated

DISCUSSION AND CONCLUSIONS

Blunt perineal trauma with straddle mechanism are increasingly observed as a consequence of sport practice or motor vehicle accidents. A broad classification⁸ of traumatism in the perineal area can differentiate: A) straddle injury (the most frequent), B) non-straddle, blunt trauma, C) penetrating trauma; the latter may be differentiated into transanal or transperineal and further subdivided into extraperitoneal or intraperitoneal. Nevertheless, straddle injuries seldom require surgical treatment since, more commonly, involve external genitalia and/or urethra^{1,3,4} with a low severity of the lesion^{2-4,8} ranging from hematoma to laceration. However, when severe injuries occur after a perineal trauma, involving the anorectum or urogenital tract, they may be challenging for treatment, requiring dedicated expertise and multidisciplinary team.

Anorectal involvement in straddle trauma, has not been reported to occur frequently in the literature; Dowd reported no anal injuries in 100 pts⁹ with straddle trauma, similarly did Waltzmann in 204 patients⁵. More recently, Saxena reported only 2 anal lesion in 91 patients observed in a 10 years period⁴.

But even rarer appears the occurrence of isolated anal and rectal lesions in case of straddle injury with non-penetrating, impalement mechanism, as in the case reported by us; we could not found a similar case in the literature. Therefore we may hypothesize the presence of concomitant favoring/predisposing factors.

Out of the five occupant of the car, the only patient reporting a serious lesion was the young occupant of the rear seats; no one of the other passengers complained for significant trauma. This may suggest other factors as determinant for the injuries reported by the girl; first of all the position, astride of the armrest, exposing the perineum to trauma. Secondly the frail, not fully matured tissues of early pubertal perineum, compared to those of adult woman where estrogen warrants a better distensibility¹⁰. A third factor responsible for the severity of the injury may be represented by the girl overweight, acting as an amplifier of impact energy^{3,4,11}.

In case of perineal injury, the presence of a wound in the perianal area and/or in the external genitalia, even if small, may be suggestive of deep organs (rectum, bladder, etc.) involvement and should trigger extensive investigations to rule out such event^{2,8}, including examination under anaesthesia. In our patient, the examination conducted in the operative room was of utmost importance, enabling us to identify the large rectal tear and anal sphincter disruption. Isolated anorectal lesion in case of straddle trauma are very rare, occurring more frequently in concomitance with genital/urinary involvement or in penetrating injuries

The concomitance of anorectal involvement with urogenital injuries, according to the classification of Onen

implies an high score of severity leading to an high incidence of postoperative complications^{1,2,12}.

Therefore fecal diversion it is strongly advisable in such circumstances, by means of protective colostomy.

When traumatic lesions of external genitalia, urinary apparatus or anal sphincter occur, concerns may arise in terms of prognosis, regarding both a not negligible incidence of postoperative complications and functional defects that may be observed in the long term^{2,8,13,14}. However recent data, have shown good continence in the long term after anorectal trauma in children⁷.

In case of rectal and/or anal sphincter lesions, primary repair has been often described as the procedure of choice, frequently performed in the literature^{2,3,7-8}, with or without diverting colostomy. Interestingly, the use of colostomy does not seem to be the main factor for the reduced incidence of complications reported in the most recent series. Rectal and wound wash out is believed to be of high therapeutic value, for the reported reduction of septic complications^{2,8,13}.

In presence of blunt or penetrating abdominal trauma, videolaparoscopy in emergency^{15,16} can be an important diagnostic tool for the exact definition of intra-abdominal involvement with high specificity and sensitivity.

However radiologic investigations, particularly CT scan, play a fundamental role, especially when endoscopic studies are inconclusive due to poor visualization¹⁷.

Nevertheless, in our case intense oedema of the perirectal fat was reported at CT scan and this did not enabled the correct diagnosis. In contrast, proctoscopy and rigid sigmoidoscopy with accurate washing, identified the rectal lesion. Subsequent videolaparoscopy ruled out pelvic and abdominal organ involvement.

When the patient is anesthetized, the laparoscopic exploration of the abdomen and pelvis adds few minutes to the perineal procedure and reassure about potential visceral lesion. When colostomy is planned, the choice of laparoscopy is reinforced, adopting, as we did, the simple technique of "open" pneumo-peritoneum.

In conclusion, dealing with a blunt, straddle injury in a pediatric patient may be a challenging situation, requiring a complex approach and experienced surgeons in order to obtain good postoperative results and minimizing the risk of long term functional disturbances for the genito-urinary tract and anorectal function.

Riassunto

Negli incidenti stradali o sportivi è possibile l'eventualità di lesioni traumatiche indicate come "straddle injury", "trauma a cavalcioni", per caduta o urto del perineo su un corpo solido a gambe divaricate. Per lo più si tratta di traumi chiusi di lieve-moderata entità, esitanti in ematomi ecchimosi o abrasioni.

Il caso descritto riguarda una quattordicenne vittima in un incidente stradale di un trauma chiuso "a cavalcio-

ni". Alla presentazione lamentava dolore e sanguinamento perineale e all'esame obiettivo una ferita lacero contusa in sede perianale anteriore.

La TC non risultava diagnostica. L'esame in anestesia documentava la rottura completa dello sfintere esterno a livello della commissura anale anteriore, in continuità con una rottura a tutto spessore del retto per un'estensione prossimale di circa 15 cm.

Dopo lavaggio e sutura delle lesioni, la laparoscopia verificava assenza di lesioni nella pelvi e nella cavità addominale, e consentiva il confezionamento di una colostomia su bacchetta mediante allargamento dell'accesso laparoscopico. Decorso post-operatorio regolare e dimissione in VIII giornata. A sei mesi chiusura della colostomia previa verifica di normalità dei parametri di fisiologia anorettale. Al follow up recente assenti incontinenza o soiling.

I traumi chiusi "a cavalcioni" coinvolgono per lo più il settore uro genitale, ma il coinvolgimento anorettale si riscontra in quelli di maggiore gravità e/o con meccanismo penetrante. Il caso descritto aveva comportato un'importante lesione anorettale pur trattandosi di un trauma chiuso perineale, verosimilmente per la dinamica dell'incidente e lo stato di sovrappeso. Essenziale è l'esame in anestesia generale, di valore superiore alla diagnostica per immagini, che è utile per escludere lesioni viscerali o ossee. L'approccio laparoscopico è utile anche per l'eventuale confezionamento di una colostomia di protezione.

References

- Scheidler MG, Schultz BL, Schall L, Ford HR: *Mechanisms of blunt perineal injury in female pediatric patients*. J Pediatr Surg, 2000; 35(9):1317-319.
- Onen A, Oztürk H, Yayla M, Basuguy E, Gedik S: *Genital trauma in children: Classification and management*. Urology, 2005; 65(5):986-90.
- Worthington T: *Genital and anal injuries requiring surgical repair in females less than 21 years of age*. J Pediatr Adolesc Gynecol, 2008; 21(4):207-11. doi: 10.1016/j.jpog.2007.10.010.
- Saxena AK, Steiner M, Höllwarth ME: *Straddle injuries in female children and adolescents: 10-year accident and management analysis*. Indian J Pediatr, 2014; 81(8):766-69. doi: 10.1007/s12098-013-1096-6. Epub 2013 Jul 4.
- Waltzman ML, Shannon M, Bowen AP: *Monkeybar injuries: complication of play*. Pediatrics, 1999; 103(5):e58.
- Ameh EA: *Anorectal injuries in children*. Ped Surg Int, 2000; 16(5-6):388-91.
- Russel KW, Soukup ES, Metzger RR, Zobell S, Scaife ER, Barnhart DC, Rollins MD: *Fecal continence following complex anorectal trauma in children*. J Pediatr Surg, 2014; 49(2):349-52.
- Iqbal CW, Jrebi NY, Zielinski MD, Benavente-Chenhalls LA, Cullinane DC, Zietlow SP, Moir CR, Ishitani MB: *Patterns of accidental genital trauma in young girls and indications for operative management*. J Pediatr Surg, 2010; 45(5):930-33. doi: 10.1016/j.jpedsurg.2010.02.024.
- Dowd MD, Fitzmaurice L, Knapp JF, Mooney D: *The interpretation of urogenital findings in children with straddle injuries*. J Pediatr Surg, 1994; 29(1):7-10.
- Pokorny SF: *Genital trauma*. Clin Obstet Gynecol, 1997; 40:219-25.
- Sinclair KA, Knapp JF: *Case records of the Children's Mercy Hospital: A 12-year-old girl with a straddle injury*. Pediatr Emerg Care, 2011; 27(6):550-52. doi: 10.1097/PEC.0b013e31821dc6cf.
- Mohr AM, Pham AM, Lavery RF, et al.: *Management of trauma to the male external genitalia: The usefulness of the American Association for the Surgery of the Trauma organ injury scales*. J Urol, 2003; 170:2311-315.
- Herr MW, Wascher RA, Gagliano RA Jr: *Historical perspective and current management of traumatic injury to the extraperitoneal rectum and anus*. Curr Surg, 2005; 62(6):625-32.
- Spitzer RF, Kives S, Caccia N, Ornstein M, Goia C, Allen LM: *Retrospective review of unintentional female genital trauma at a pediatric referral centre*. Pediatr Emerg Care, 2008; 24(12):831-35. doi: 10.1097/PEC.0b013e31818ea064.
- Khubutiya MSh, Yartsev PA, Guliaev AA, Levitsky VD, Tlibekova MA: *Laparoscopy in blunt and penetrating abdominal trauma*. Surg Laparosc Endosc Percutan Tech, 2013; 23(6):507-12. doi: 10.1097/SLE.0b013e3182937c37.
- Feliz A, Shultz B, McKenna C, Gaines BA: *Diagnostic and therapeutic laparoscopy in pediatric abdominal trauma*. J Pediatr Surg, 2006; 41(1):72-7.
- Leaphart CL, Danko M, Cassidy L, Gaines B, Hackam DJ: *An analysis of proctoscopy vs computed tomography scanning in the diagnosis of rectal injuries in children: Which is better?* J Pediatr Surg, 2006; 41(4):700-03.