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Soccer-related severe blunt splenic injury in a young goalkeeper

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ABSTRACT

Abdominal injuries are rare in sports, but even minor traumas may result in potentially life-threatening injuries. The most frequent abdominal injury is abdominal wall contusion, following by blunt injuries of the kidneys and spleen. The cases of blunt abdominal injuries in soccer are rarely reported in the literature. We present a case of a grade IV splenic laceration in a 10-year-old soccer goalkeeper caused by the blunt abdominal trauma sustained during the gameplay. The trauma was successfully treated with a nonoperative management approach.

1. Introduction

Soccer (referred to as "football" in Europe) is the most popular team sport among youth worldwide. In addition to the growing global popularity of football, the number of injuries related to these contact sports increases. Among injuries, soft tissue injuries represent nearly two-thirds of all injuries, whereas bone and joint injuries comprised one-third or less [1]. Blunt injuries to intraabdominal organs associated with soccer are uncommon [2].

We herein present a case of a 10-year-old soccer goalkeeper sustaining a grade IV spleen laceration caused by blunt abdominal trauma while playing a contact team sport, successfully treated with nonoperative management (NOM).

2. Case report

A ten-year-old male goalkeeper was admitted to the pediatric emergency department (ED) with acute abdominal pain obtained by the opponent's football boot while defending a shot during a soccer game. The patient complained of immediate abdominal pain in the left upper quadrant of the abdomen and the left rib cage and could not return to the game. The pain continued to increase and was associated with nausea. On presentation, his initial vital parameters were normal, including a blood pressure of 110/60 mmHg and a heart rate of 80 beats/minute. His respiratory rate was 20 per minute, while the oxygen saturation was 100% without oxygen flow. His past medical history and review of systems were unremarkable. Physical examination on admission revealed two minor longitudinal superficial skin lacerations in the left upper quadrant and localized abdominal tenderness in that area. Blood analysis showed hemodynamic stability: a hemoglobin concentration of 11.4 g/dL, a white blood cell count of 15.6 × 10^9/l, and a C-reactive protein of 5.5 mg/l. All laboratory tests were normal.

Abdominal ultrasonography revealed a mild hemorrhage in the abdominal cavity. A contrast-enhanced abdominal and a CT scan showed an intraparenchymal hematoma, and multiple lacerations with secondary mild free fluid into the peritoneal cavity was observed (Fig. 1A). A laceration of the spleen's lower pole extended towards the hilum and mid-body but not involving the major splenic vasculature (Fig. 1B). The lesion was classified as a grade IV splenic injury according to the AAST scale. We opted for the NOM approach due to the patient's hemodynamic stability and the isolated spleen lesion. The patient was closely monitored for the hemodynamic parameters and pain control. Serial hemoglobin and hematocrit were stable with a hemoglobin nadir of 10.4 g/dL on hospital day two. The patient's recovery was uneventful, and he was discharged seven days after admission to the hospital with physical activity restrictions. A six-month follow-up showed no adverse events.

Abbreviations: AASTAmerican Association for the Surgery of TraumaCTComputed tomographicEDEmergency departmentNOMNonoperative managementUSGUltrasonography

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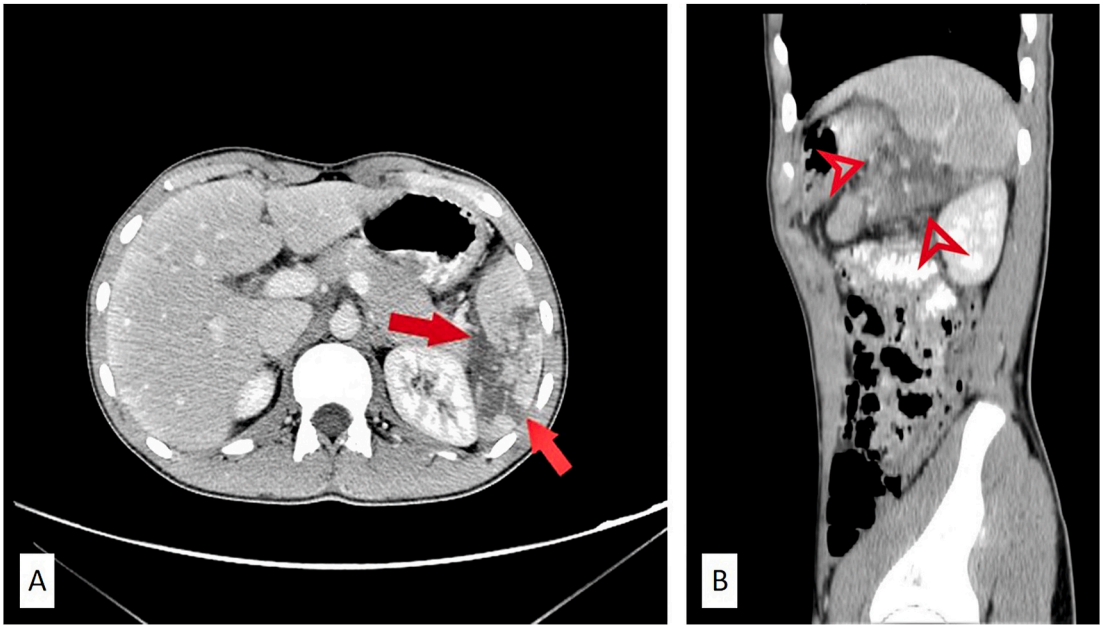

Fig. 1. A-B. A: Axial contrast-enhanced CT scan showing multiple lacerations of the spleen throughout the complete circumference of the parenchyma (red arrows); B: Sagittal reconstruction of contrast-enhanced CT scan showing a large hematoma of the lower pole of the spleen with decreased vascularization (red arrows) (AAST grade IV). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

3. Discussion

The present case illustrates that significant splenic laceration can occur in children from blunt abdominal trauma during soccer games. About three-quarters of the soccer-related injuries are sprains, strains, contusions, abrasions, and blisters that may require only basic first aid. Lower extremity injuries account for up to 80% of all injuries, while upper extremity injuries account for approximately 15% of all injuries [2]. Besides, fractures constitute approximately 4%–20% of injuries [2].

There are limited reports of soccer-related abdominal injuries, especially in children [2–4]. However, soccer is a contact sport, making many abdominal and genitourinary organ injuries possible. Among all recreational injuries in the trauma register from the regional pediatric trauma center in New York, genitourinary and abdominal injuries were noted in only 0.73% of the children aged 5–18 years [4]. Splenic lacerations are usually caused by direct blows to the abdomen. Besides the spleen, the most commonly injured abdominal organs in soccer due to direct blows are the liver and kidneys. Notably, up to 60% of pediatric patients with splenic injury from blunt abdominal trauma have other associated injuries [5]. Fortunately, our patient had an isolated splenic injury.

Due to the essential functions of the spleen, the modality of treatment in the last few decades has turned from splenectomy to salvage of the spleen. Patients with splenic injuries can be treated surgically or non-operatively. The NOM of hemodynamically stable patients is now the preferred treatment modality, especially in the pediatric population with a clear demonstration of safety, a documented reduction in the rate of splenectomy and transfusion, shorter hospitalization, and an extremely low risk of mortality [6].

The main factors associated with successful NOM outcomes include a low splenic injury grade, a small amount of hemoperitoneum, a systolic blood pressure >100 mm Hg, and a near-normal hematocrit [7]. The NOM's failure of splenic laceration is more frequent in higher grade injuries, higher injury severity score, hemoperitoneum, and polytrauma [8]. However, safe and successful NOM outcomes were recorded even in high-grade splenic injuries in hemodynamically stable patients, as confirmed in our case [9].

4. Conclusions

In conclusion, soccer-related splenic injuries are rare but possible in children, especially in goalkeepers. Hemodynamic stability is a major determinant of the successful NOM approach in pediatric patients with radiologically confirmed moderate and severe splenic lesions.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Authorship

All authors attest that they meet the current ICMJE criteria for authorship.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Kara E, Icoz G, Ersin S, Coker A Life-threatening abdominal injury during a soccer game: a rare clinical case. Ulus Travma Acil Cerrahi Derg 2011;17(2):180–2.
[2] Padlipsky PS, Brindis S, Young KD Splenic injury after blunt abdominal trauma during a soccer (football) game. Pediatr Emerg Care 2014;30(10):725–9.
[3] Koutures CG, Gregory AJ, American Academy of Pediatrics. Council on sports M, fitness. Injuries in youth soccer. Pediatrics 2010;125(2):410–4.
[4] Wan J, Corvino TF, Greenfield SP, DiScala C The incidence of recreational genitourinary and abdominal injuries in the Western New York pediatric population. J Urol 2003;170(4 Pt 2):1525–7 discussion 7.
[5] Tataria M, Nance ML, Holmes JH, Miller 3rd CC, Mattix KD, Brown RL, et al. Pediatric

blunt abdominal injury: age is irrelevant and delayed operation is not detrimental. J Trauma 2007;63(3):608–14.
[6] Koca B, Topgul K, Yuruker SS, Cinar H, Kuru B Nonoperative treatment approach for blunt splenic injury: is grade the unique criterion?. Ulus Travma Acil Cerrahi Derg 2013;19(4):337–42.
[7] Boyuk A, Gumus M, Onder A, Kapan M, Aliosmanoglu I, Taskesen F, et al. Splenic injuries: factors affecting the outcome of nonoperative management. Eur J Trauma Emerg Surg 2012;38(3):269–74.
[8] Forsythe RM, Harbrecht BG, Peitzman AB Blunt splenic trauma. Scand J Surg 2006; 95(3):146–51.
[9] Nijdam TMP, Spijkerman R, Hesselink L, Leenen LPH, Hietbrink F Predictors of surgical management of high grade blunt splenic injuries in adult trauma patients: a 5-year retrospective cohort study from an academic level I trauma center. Patient Saf Surg 2020;14:32.