Neonatal haemoperitoneum due to splenic rupture: a case report

Stephanie LH Cheung[1,2] *, MB, ChB, MRCS, **Bess SY Tsui**[1,2], FRCSEd (Paed), FHKAM (Surgery), **Rosanna MS Wong**[3], FHKAM (Paediatrics), **YH Tam**[1,2], FRCSEd (Paed), FHKAM (Surgery)

[1] *Department of Paediatric Surgery, Hong Kong Children's Hospital, Hong Kong SAR, China*
[2] *Division of Paediatric Surgery and Paediatric Urology, Department of Surgery, Prince of Wales Hospital, Hong Kong SAR, China*
[3] *Department of Paediatrics and Adolescent Medicine, Hong Kong Children's Hospital, Hong Kong SAR, China*

* Corresponding author: clh106@ha.org.hk

This article was published on 6 Jun 2024 at www.hkmj.org.

Hong Kong Med J 2024;30:245–7
https://doi.org/10.12809/hkmj2310935

Case presentation

Our female neonate presented in May 2023 was born full term at 39^{+4} weeks in a local private hospital with a birth weight of 3.2 kg. There were no abnormalities on antenatal check-up. She was born by vacuum-assisted vaginal delivery due to non-reassuring cardiotocography tracings. The Apgar score was 9 at 1 minute and 10 at 5 minutes of life. The first 24 hours postnatally was normal with meconium passage and feeding initiated.

She was noted to have apnoea, pallor and abdominal distension at 26 hours of life. Haemoglobin level had dropped to 3 g/dL. Urgent fluid boluses and packed cell transfusions were given. Post-transfusion haemoglobin level was raised to 10.3 g/dL. Her initial platelet counts were normal but clotting profile was deranged (international normalised ratio=1.49) and she was given fresh frozen plasma transfusion. Clinically, the patient did not require inotropic support. Urgent ultrasound of the abdomen revealed ascites with echogenicity suspicious of haemoperitoneum, with an echogenic heterogeneous lesion over the left suprasplenic area measuring 5 × 2 × 4 cm^3 which was suspicious of a haematoma. The spleen was not enlarged and the liver and kidneys were normal. Elective intubation and urgent transferral were arranged to the neonatal intensive care unit for further management.

Upon arrival, the baby was noted to be pale with gross abdominal distension (Fig 1). She was tachycardic with pulse of 190 bpm and mean arterial pressure of 40 mm Hg. She responded to fluid resuscitation with a total of 180 mL of normal saline boluses and packed cell transfusion and did not require inotropic support. Haemoglobin level on arrival was 6 g/dL. Urgent computed tomography of the abdomen was arranged which revealed haemoperitoneum with a large left subphrenic haematoma (6.3 × 3.6 × 6.9 cm^3) likely arising from the spleen. Contrast extravasation was noted over the medial aspect of the spleen suggestive of active bleeding. The size and enhancement of the spleen was normal. The rest of the abdomen was normal.

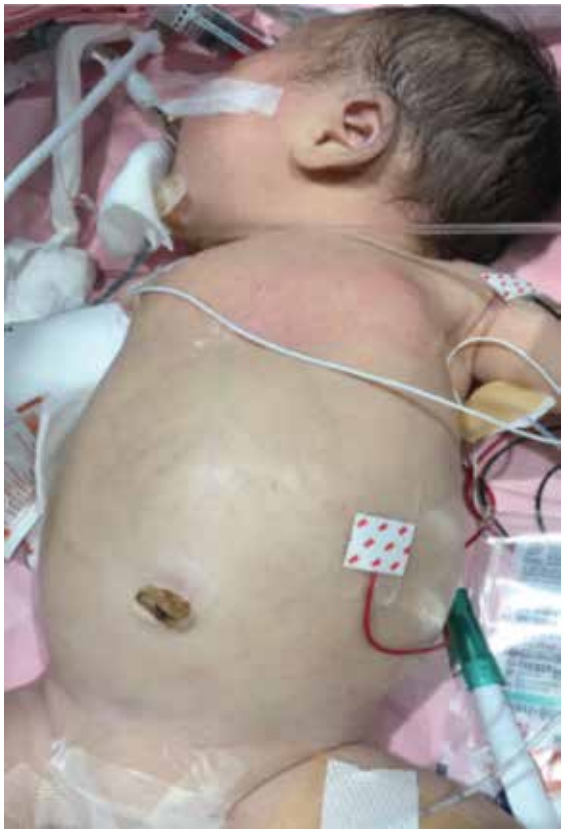

FIG 1. The neonate with abdominal distension and discoloration

Urgent surgical exploration was performed in view of active bleeding and haemodynamic instability of the patient despite resuscitation. Laparotomy revealed large amount of old blood clots. The spleen had a normal configuration and orientation and was located over the left upper quadrant. A 1.5-cm linear tear was noted over the medial side of the lower pole of the spleen (Fig 2). Secure haemostasis could not be achieved despite the use of packing, oxidised regenerated cellulose and suturing, hence splenectomy was performed. The short gastric vessels were divided by cautery and splenic hilum

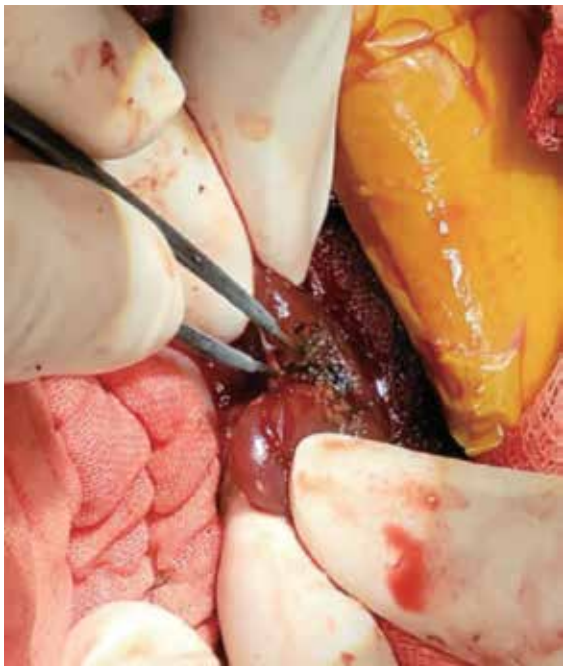

FIG 2. Laparotomy. Splenic rupture is shown

transfixed and over-sewn with 5-0 polydioxanone sutures (Ethicon, Cincinnati [OH], United States). A small spleniculi was noted and it was left untouched. The surgery lasted for 1 hour 34 minutes and total blood loss including the drained old blood was 750 mL.

Postoperative recovery was unremarkable. Her haemoglobin level stabilised on postoperative day 1, extubated on postoperative day 4, and full enteral feeding achieved on postoperative day 7. She was discharged on day 8 after receiving necessary post-splenectomy vaccinations.

Discussion

Splenic rupture in newborns is a rare disease entity. There were more mortality cases than survival in literature. A review of literature from 1970 revealed 37 cases of splenic rupture in a neonate reported in literature.[1] This rupture is usually associated with traumatic birth or other intrinsic pathology of the parenchyma such as haemophilia or erythroblastosis fetalis.[2] However, there were also >10 cases of spontaneous splenic rupture with no preceding risks or predisposing factors in literature. Splenic injury usually occurs in two stages, first with subcapsular haematoma formation and then with urgent symptoms presenting when the splenic capsule gives way resulting in haemoperitoneum. The signs and symptoms of haemoperitoneum are vague and often easily missed. The common symptoms are blood loss causing pallor, abdominal distension and radiological evidence of intraperitoneal effusion without pneumoperitoneum,[3] which resembled our index case. Rarely, haemoperitoneum can also present with scrotal swelling or haematoma. Splenic rupture usually occurs within the first day of life but rarely can present as late as 5 days of life. The initial haemoglobin level in these neonates is often very low (<6 g/dL) and require immediately blood transfusion support.

Due to the friable nature of splenic tissue in a neonate, more than half of the cases described in literature proceeded to splenectomy, like our index case. Ten cases settled with conservative treatment with transfusion of blood products, but these cases usually present later (>10 hours of life) and the neonates had stable haemodynamics. There were cases where laparotomy was performed and haemostasis was secured without splenectomy.[1] Other methods for haemostasis were employed. In a case report in 1976 where the spleen was almost transacted at its lower pole, the laceration was repaired by chromic catgut mattress sutures and the patient survived.[4] The second case used an absorbable mesh for haemostasis.[5] The third case reported was in 2002, where the splenic capsule ruptured with oozing and gel-foam and oxidised regenerated cellulose was used to pack the spleen.[2] Second-look laparotomy was performed 48 hours later which revealed that the bleeding had stopped after removal of packing materials. One case in literature utilised interventional radiology for splenic artery embolisation to stop the bleeding.[3] The choice of conservative versus surgical versus interventional radiological treatment depends on the haemodynamic of the patient and availability of expertise and material. Due to the rare nature of the condition, no evidence reported superiority of one treatment method over another.

Conclusion

Neonatal splenic rupture is a rare emergency with high mortality. High index of clinical suspicion and early establishment of diagnosis is necessary for timely treatment. Our patient presented classically with a difficult delivery and typical presentation of abdominal distension, pallor and hypovolaemic shock. Splenectomy is still the mainstay of treatment but other approaches are also feasible.

Author contributions

All authors contributed to the concept or design, acquisition of data, analysis or interpretation of data, drafting of the manuscript, and critical revision of the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

Funding/support

This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethics approval

The patient was treated in accordance with the Declaration of Helsinki. The parents of the patient provided written consent for publication of this case report.

References

1. Hui CM, Tsui KY. Splenic rupture in a newborn. J Pediatr Surg 2002;37:E3.
2. Matsuyama S, Suzuki N, Nagamachi Y. Rupture of the spleen in the newborn: treatment without splenectomy. J Pediatr Surg 1976;11:115-6.
3. Raats JW, van Dam L, van Doormaal PJ, van Hengel-Jacobs M, Langeveld-Benders H. Neonatal rupture of the spleen: successful treatment with splenic artery embolization. AJR Rep 2021;11:e58-60.
4. Chang HP, Fu RH, Lin JJ, Chiang MC. Prognostic factors and clinical features of neonatal splenic rupture/hemorrhage: two cases reports and literature review. Front Pediatr 2021;9:616247.
5. Fasoli L, Bettili G, Bianchi S, Dal Moro A, Ottolenghi A. Spleen rupture in the newborn: conservative surgical treatment using absorbable mesh. J Trauma 1998;45:642-3.

Answers to CME Programme

Hong Kong Medical Journal April 2024 issue

Hong Kong Med J 2024;30:94-101

I. Impact of a novel pre-hospital stroke notification programme on acute stroke care key performance indicators in Hong Kong: a multicentre prospective cohort study with historical controls

A	1. True	2. True	3. True	4. False	5. False
B	1. False	2. True	3. True	4. False	5. True

Hong Kong Med J 2024;30:147-62

II. Hong Kong consensus recommendations on the management of pancreatic ductal adenocarcinoma

A	1. False	2. True	3. True	4. False	5. True
B	1. True	2. True	3. False	4. True	5. True