

# Spontaneous Splenic Hemorrhage in the Newborn

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## Abstract

### Keywords

- ▶ spleen
- ▶ hemorrhage
- ▶ spontaneous
- ▶ neonate

Spontaneous splenic hemorrhage in the newborn is a rare entity. The presentation is usually with a triad of bleeding, abdominal distension, and hemoperitoneum. Rapid diagnosis is essential as left untreated, death is inevitable. We present a case with an unusual initial presentation of a scrotal hematocele and ultrasonography suggesting an adrenal hemorrhage. At laparotomy, splenic preservation was unsuccessful, and therefore, splenectomy was performed. The child recovered well from the procedure.

## New Insights and the Importance for the Pediatric Surgeon

Spontaneous splenic hemorrhage in the newborn is rare. Presentation may be delayed as in our case. Pediatric surgeons need to be aware of this as an entity.

## Introduction

Splenic ruptures are an uncommon entity that can be catastrophic, with the diagnosis frequently made at autopsy.<sup>1</sup> An early diagnosis of these injuries is imperative as delays are associated with an increased mortality.<sup>2</sup> As such, awareness of the condition and a high index of suspicion are required for prompt diagnosis. Splenic hemorrhage, however, presents variably and can mimic adrenal hemorrhage with similar clinical features and predisposing factors. Imaging, such as computed tomography (CT) or ultrasound (USS), therefore, aid in diagnosis with the presence of a hemoperitoneum being suggestive. We present an unusual case of spontaneous neonatal splenic rupture.

## Case Report

A full term 3.5 kg male infant was born in good condition via normal spontaneous vaginal delivery. There had been no antenatal concerns. He was discharged home following a normal baby check and represented on day 2 of life with a swollen, discolored, and tender left hemiscrotum. He appeared pale, but general and abdominal examination was normal with no evidence of discoloration or distension. His pulse was 180/min and capillary refill was < 2 seconds.

He was taken to the theater for a scrotal exploration urgently to rule out testicular torsion. There was a concern because the baby was pale and his hemoglobin level returned at 7.1 g/dL while on the table. Groin exploration

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revealed blood and clot around the cord structures. Although there was a scrotal hematoma, there was no blood within the tunica vaginalis and the testis was normal. A diagnosis of adrenal hemorrhage was presumed based on the presence of blood in the groin outside the processus vaginalis.

The neonate received a blood transfusion and returned to intensive care for continuous monitoring. USS showed a 6 × 6 cm hematoma in the left suprarenal area which was consistent with our suspicion of an adrenal bleed. Nonoperative management was attempted, but the baby deteriorated overnight and required a further 100 mL/kg of blood products. There was increasing abdominal distension and scrotal swelling. A CT scan revealed that the adrenal glands were normal and there was no evidence of retroperitoneal bleed. The blood was intraperitoneal and the spleen appeared displaced (**Fig. 1**). A splenic anomaly resulting in bleeding was suspected. As the baby was not stabilizing despite maximal resuscitation (40 mL/kg of blood, cold peripherally and with a capillary refill time of 3 seconds), we proceeded immediately to laparotomy (24 hours after admission). The abdomen was full of clot. The spleen was devoid of capsule on its lateral aspect and this was oozing blood. Splenic preservation was attempted unsuccessfully (using Surgicel [Ethicon, a Johnson & Johnson Company, Somerville, New Jersey, United States] and Floseal [Baxter Healthcare Corporation, Hayward, California, United States]), and splenectomy was required.

The patient had an uneventful recovery and was discharged on postoperative day 4. A thorough set of investigations were performed (coagulation profile, skeletal survey, direct Coombs test, and infection profile) and these were normal.

## Discussion

Intra-abdominal bleeding in the newborn is uncommon. The presentation can be variable and can occur as a consequence



**Fig. 1** Coronal CT of abdomen showing massive pneumoperitoneum.

of several etiologies. Some of the differentials entertained in this case included hemorrhagic disease of the newborn, sepsis with disseminated intravascular coagulation, perforated necrotizing enterocolitis, as well as a solid organ injury. This included adrenal injury, liver injury as well as a splenic injury.

Splenic injury is the least common of these conditions, with less than 50 case reports in the world's literature.<sup>3</sup> Various etiologies have been reported as a cause of splenic bleeds, with trauma being the most common. This includes maternal trauma with precipitate delivery<sup>4,5</sup> as well as birth trauma secondary to difficult delivery.<sup>3,6</sup> There are, however, a growing number of reports of spontaneous and idiopathic splenic bleeding after a normal delivery,<sup>7,8</sup> the likely mechanism in this case. The pathogenesis of this condition is not fully understood, although the mechanism may be related to an increased intrathoracic pressure that forced the liver and spleen out of the diaphragmatic hollow.<sup>9</sup> This subsequently causes severe tension on the supporting ligaments, with splenic rupture occurring in two stages following this precipitating event. The first stage is usually the formation of a subcapsular hematoma; this is followed by a sudden deterioration as the capsule eventually ruptures. This staged progression explains the delay in presentation, with most cases presenting beyond 10 hours of life, with our case presenting at 48 hours of life.

True spontaneous rupture of the spleen was first described by Peskin and Orloff in 1958.<sup>10</sup> There are four criteria:

1. No history of trauma
2. No evidence of disease
3. No evidence of perisplenic adhesions or scarring of the spleen
4. The spleen should be normal on gross and histological examination apart from the findings of hemorrhage and rupture

A fifth criterion was added in 1991 by Crate and Payne saying that there should be no evidence of recent viral infection (infectious mononucleosis, cytomegalovirus, typhoid, and HIV).<sup>11</sup>

Our case is interesting as it presented initially with isolated scrotal findings as previously reported by Perdomo et al.<sup>12</sup> The scrotum can act as a window for intra-abdominal pathology, however, in this case the hematoma appeared to have tracked via the retroperitoneum. We do not have an explanation for this except to conjecture that the blood tracked along the gonadal vessels via the splenorenal ligament. In other cases reporting scrotal hematoceles the blood tracked down through open internal rings into the inguinal canal.<sup>13–15</sup> Both internal rings in our patient were observed to be closed at laparotomy.

This case also illustrates how vital it is to obtain a prompt diagnosis—first as it is a life-threatening event and also to try and salvage the spleen, in turn not rendering the child to a lifetime infection risk. In this case, the diagnosis was delayed because the presentation was consistent with adrenal hemorrhage and the surgeon was not aware of neonatal splenic

rupture as an entity and differential diagnosis. If cross-sectional imaging had been instituted earlier, there may have been less of a diagnostic dilemma. A nonoperative approach with expectant monitoring may still have been the preferred initial management.

## References

- 1 Gruenwald P. Rupture of liver and spleen in the newborn infant. *J Pediatr* 1948;33(2):195–201
- 2 Sieber WK, Girdany BR. Rupture of the spleen in newborn infants; recovery after splenectomy. *N Engl J Med* 1958;259(22):1074–1076
- 3 Bickler S, Ramachandran V, Gittes GK, Alonso M, Snyder CL. Nonoperative management of newborn splenic injury: a case report. *J Pediatr Surg* 2000;35(3):500–501
- 4 Rothenberger DA, Horrigan TP, Sturm JT. Neonatal death following in utero traumatic splenic rupture. *J Pediatr Surg* 1981;16(5):754–755
- 5 Lloyd LG, de Witt W. Splenic rupture in a neonate – a rare complication. *SAJCH* 2011;5(3):94–96
- 6 Sokol DM, Tompkins D, Izant RJ Jr. Rupture of the spleen and liver in the newborn: a report of the first survivor and a review of the literature. *J Pediatr Surg* 1974;9(2):227–229
- 7 Hui CM, Tsui KY. Splenic rupture in a newborn. *J Pediatr Surg* 2002;37(4):E3Review
- 8 Acar K, Cinbis M. A Neonatal Death Due to Rupture of the Normal Spleen. *Int J Pediatr Neonatol* 2000;2(1):4928
- 9 Chryss C, Aaron WS. Successful treatment of rupture of normal spleen in newborn. *Am J Dis Child* 1980;134(4):418–419
- 10 Orloff MJ, Peskin GW. Spontaneous rupture of the normal spleen; a surgical enigma. *Int Abstr Surg* 1958;106(1):1–11
- 11 Crate ID, Payne MJ. Is the diagnosis of spontaneous rupture of a normal spleen valid? *J R Army Med Corps* 1991;137(1):50–51
- 12 Perdomo Y, Fiore N, Reyna T. Splenic injury presenting with isolated scrotal findings in a stable newborn. *J Pediatr Surg* 2003;38(11):1673–1675
- 13 Eraklis AJ. Abdominal injury related to the trauma of birth. *Pediatrics* 1967;39(3):421–424
- 14 Balliu PR, Bregante J, Pérez-Velasco MC, et al. Splenic haemorrhage in a newborn as the first manifestation of wandering spleen syndrome. *J Pediatr Surg* 2004;39(2):240–242
- 15 Bader D, Mogilner JG, Berger A, et al. Neonatal Splenic Rupture: An Unusual Manifestation. *Pediatr Surg Int* 1993;8(2):151–153