CASE REPORT

A newborn with massive intra-abdominal haemorrhage

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SUMMARY

We describe an unusual case of an intra-abdominal teratoma with massive bleeding presenting as sudden cardiovascular collapse immediately after birth. The infant required massive volume and blood product transfusion, alongside emergent tumour resection, in order to obtain haemostasis and haemodynamic stabilisation. Haemorrhage of a sacrococcygeal teratoma is a known entity, but we are not aware of a previous report of massive intra-abdominal haemorrhage due to a teratoma, immediately after birth. This case emphasises the need to consider intra-abdominal pathology, including a teratoma, in the differential diagnosis of any newborn with early hypovolaemic shock and abdominal distention.

BACKGROUND

Massive internal bleeding is included in the differential diagnosis of an infant with hypovolaemic shock in the newborn period. Intra-abdominal haemorrhage in the newborn period is rare. When it occurs, prompt recognition of symptoms such as abdominal distension, pallor, tachycardia, mottling and prolonged capillary refill is essential for infant survival. Birth-related injury to the liver is a common aetiology.¹ Other reported causes of intra-abdominal haemorrhage in the newborn include splenic rupture, thrombocytopenia, haemophilia, rupture of the falciform ligament and umbilical vein rupture.^{2–4} Loss of 20–40% of blood volume in the neonate is needed for significant peripheral and circulatory compromise to occur.⁵ For infants in hypovolaemic shock, rapid administration of isotonic fluids and blood products is necessary in order to obtain haemodynamic stabilisation. In this report, we describe a rare case of a newborn in shock due to massive intra-abdominal haemorrhage caused by an intra-abdominal teratoma.

CASE PRESENTATION

A 3.2 kg infant girl was born at an outside hospital by vaginal delivery at 37 weeks gestation to a multiparous woman who presented to the hospital in spontaneous labour. The mother had received routine prenatal care beginning in the first trimester. A second trimester prenatal ultrasound was reported as normal. Spontaneous rupture of membranes occurred 8 h before birth. The fetal heart rate tracing was category 2. The Apgar score was 8 at both 1 and 5 min. Fifteen minutes after delivery, mild abdominal distention was noted, but the infant otherwise appeared healthy. Thirty minutes after delivery, she appeared mottled with a capillary

refill greater than 4 s and a markedly distended abdomen. An abdominal radiograph demonstrated minimal bowel gas and multiple small opacities consistent with calcification ([figure 1A](#)). The infant was promptly transferred to our institution. Over the next 90 min, her condition rapidly deteriorated despite mechanical ventilation and multiple isotonic fluid boluses. Initial laboratory values included a haematocrit of 42%, white cell count of 15 000/mm³ and a platelet count of 147 000/mm³. At 2 h, she was severely acidotic ([table 1](#)) with cardiovascular collapse despite full cardiorespiratory support and aggressive fluid administration and blood product transfusion ([table 2](#)).

INVESTIGATIONS

An abdominal paracentesis was performed approximately 2½ h after birth to evaluate the cause of abdominal distention. Given the infant's haemodynamic instability and severe metabolic acidosis at the time, there was a need to better understand the abdominal pathology prior to proceeding to an exploratory laparotomy. A total of 140 mL of blood was aspirated from the peritoneal cavity with paracentesis. Additional radiographic studies such as a CT scan or ultrasound of the abdomen were not pursued due to the infant's rapidly deteriorating condition. It was felt her only chance for survival was immediate surgical intervention to obtain haemostasis.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of intra-abdominal bleeding includes birth-related trauma to the liver, splenic rupture, rupture of the falciform ligament and umbilical vein rupture. The patient's condition deteriorated following the paracentesis and the decision was made to perform an emergent exploratory laparotomy despite her severely compromised condition, in an attempt to identify the aetiology of intra-abdominal bleeding and to restore haemodynamic stability.

TREATMENT

Given her severe cardiorespiratory compromise and known intra-abdominal haemorrhage, it was felt the patient's only chance for survival was an exploratory laparotomy. On entering the peritoneal cavity, blood gushed out in a dramatic fashion and a cauliflower-shaped tumour was visible occupying most of the abdominal cavity but clearly originating from the retroperitoneum ([figure 1B](#)). There was a 3–4 cm laceration across the midline of the tumour, which was actively bleeding. The patient's

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Figure 1 (A) Abdominal radiograph with minimal bowel gas and an intra-abdominal calcification (arrow); (B) intra-abdominal tumour during laparotomy; (C) gross tumour pathology demonstrating a heterogeneous, haemorrhagic, lobulated mass with multiple visible calcifications, measuring 11×9×5 cm and (D) tumour histology with components of ectoderm (arrow 1) and mesoderm (arrow 2).

condition improved rapidly once the tumour was excised and haemostasis was achieved. The lobulated mass measured 11×9×5 cm (figure 1C). Histopathology revealed an immature teratoma with elements of microscopic yolk sac tumour (figure 1D). Tumour marker evaluation revealed a normal β human chorionic gonadotropin level and an elevated α -fetoprotein level, which decreased appropriately subsequent to tumour resection. The infant was hospitalised for 17 days. At discharge, her neurological examination and a MRI study of the brain were normal.

OUTCOME AND FOLLOW-UP

At 1 year of age, the infant had normal growth and was meeting all developmental milestones. Results from the Bailey Infant Neurodevelopment Screen suggested she was at low risk for subsequent neurodevelopmental impairment. At 3 years, she was healthy with no cognitive deficits.

DISCUSSION

Rapid-onset haemorrhagic shock in the immediate newborn period is unusual and can be due to external (eg, sacrococcygeal teratoma, fetal trauma, fetal maternal haemorrhage, vasa previa) or internal (eg, hepatic injury, intracranial haemorrhage, congenital bleeding disorders) blood loss. The massive bleeding in this case can be explained by the presence of an intra-abdominal teratoma. The exact mechanism of the haemorrhage is not known. It was possibly due to rapid haemodynamic changes or extrinsic sheering forces that occurred during delivery resulting

Table 2 Fluid and blood product administration in the first 5 h

Packed red blood cells	150 mL/kg
Fresh frozen plasma	20 mL/kg
Normal saline	80 mL/kg
Cryoprecipitate	25 mL/kg
Total	275 mL/kg

in the rupture of blood vessels within the tumour.⁶ Bleeding occurred rapidly after birth because tamponade could not be achieved without tumour excision. Haemorrhagic shock shortly after birth has been reported previously in infants with a ruptured sacrococcygeal teratoma, but we are not aware of any previous reports similar to our patient's presentation.

Although rare, retroperitoneal teratomas are more typically diagnosed in the first year of life based on abdominal imaging that is obtained in infants with a palpable mass who are otherwise asymptomatic.⁷ There are also cases of children diagnosed following the development of an acute abdomen in which the teratoma resulted in an intra-abdominal abscess or peritonitis.⁸⁻⁹ Prenatal diagnoses of intra-abdominal teratoma have been reported. In each of these cases, the infants did well in the newborn period with subsequent elective tumour excision.¹⁰⁻¹¹

Learning points

- ▶ A retroperitoneal teratoma should be considered in the differential diagnosis of a newborn with intra-abdominal bleeding.
- ▶ Abdominal distention with intra-abdominal calcifications on abdominal X-ray should include intra-abdominal teratoma in the differential diagnosis.
- ▶ Aggressive fluid resuscitation, early identification of the source of bleeding, and emergent early exploratory laparotomy can successfully improve the outcome in newborn infants with massive intra-abdominal bleeding and haemodynamic compromise.

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Table 1 Blood gas data

Postnatal age (h)	pH	pCO ₂ (mm Hg)	Base excess
1	7.27	27	–12.4
1.5	7.20	20	–20
2	7.14	21	–22
3	6.99	11.5	–29
5.5 (postoperative)	7.04	26	–23

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