

Hemophilia A:  
presentation with neonatal  
circulatory collapse

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We report on a 3630 gram male Caucasian infant born at term by vaginal delivery following an uncomplicated pregnancy. Family history was unremarkable; parents were non-consanguineous and had a well 2-year-old girl.

At 12 hours of age, the baby was found to be shocked, pale and cold. He was floppy and unresponsive with a widespread petechial rash. A capillary blood gas showed: pH 6.85 (normal 7.35-7.45),  $p\text{CO}_2$  15.3 kPa (normal 4.5-6), bicarbonate 19.5 mmol/l (normal 18 - 25), base deficit -14.3 mmol/l (normal -3 to +3) and lactate 12 mmol/l (normal 0.5-2.0). The mean blood pressure (MBP) was 37 mmHg and the hematocrit was 50% (normal 50-60).

He was intubated and resuscitated with a bolus of 10 ml/kg of 0.9% saline and transferred to the Neonatal Intensive Care Unit (NICU). Despite inotropes, blood and fluid infusions his peripheral perfusion continued to deteriorate. An arterial blood gas confirmed worsening metabolic acidosis (base deficit -27 mmol/l). The hemoglobin was 98 g/l (normal 140-220) and repeat hematocrit was 20%, suggesting acute blood loss.

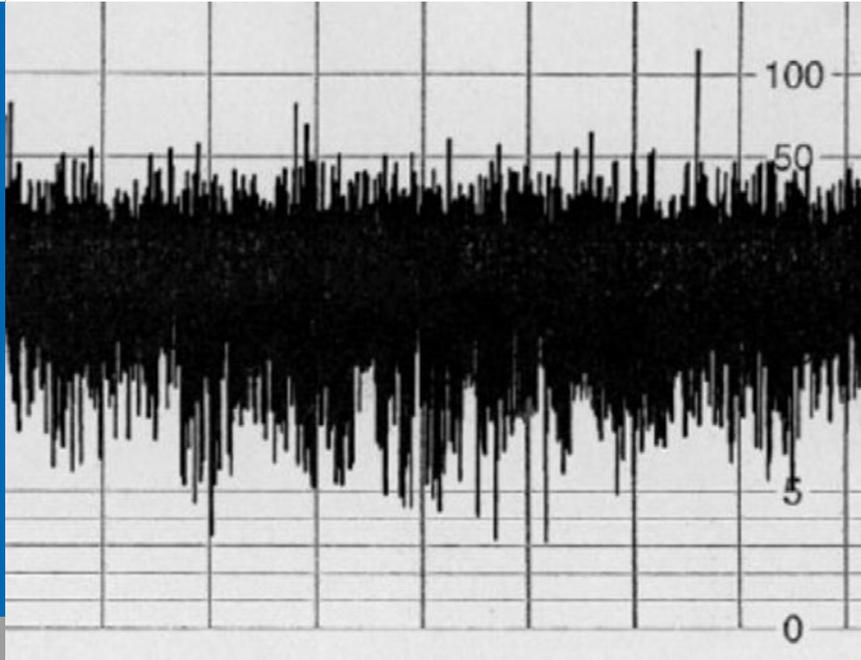
A cranial ultrasound scan showed no evidence of intracranial bleeds. Cerebral function monitor showed a normal trace (Fig. 1).

Conventional X-ray (Fig. 2) showed an abnormal bowel gas pattern and abdominal ultrasound confirmed free fluid in the abdomen suggestive of blood (Fig. 3). Further boluses of blood were administered resulting in an improvement of metabolic acidosis.

A surgical opinion was sought, and clotting studies were performed. The abdomen was non-tender, non-distended and not discolored. The initial blood results showed a white cell count of 23.5 G/l (normal 10-26) and platelet count of 330 G/l (normal 150-450). The infant's blood group was O negative, direct Coomb's test was negative, C-reactive protein was 2 mg/l (normal < 10) and serum electrolytes were normal. Clotting tests showed a prothrombin time (PT) of 26.7 seconds (s) (normal  $13 \pm 1.43$ ), activated partial thromboplastin time (aPPT) of 214.5 s (normal  $42.9 \pm 5.8$ ), thrombin time (TT) of 20 s (normal  $23.5 \pm 2.38$ ) and fibrinogen level of 0.77 g/l (normal  $2.83 \pm 0.58$ ). The very prolonged aPPT suggested Hemophilia A and a Factor VIII assay was performed showing a level of 0.01 U/ml (1%) (normal  $1.00 \text{ U/ml} \pm 0.39$ ). A bolus of recombinant Factor VIII was administered to raise levels to 100%, and a Factor VIII infusion was started.

A repeat abdominal ultrasound scan showed increased blood in the abdominal cavity, with a normal appearance of the intraabdominal organs. A conservative approach was adopted, cryoprecipitate was administered and a further 20 ml/kg of blood was transfused and the

clinical status continued to improve. Over the next 12 hours, there was normalization of the clotting and the baby was extubated into air. Factor VIII infusion was continued for 9 days and the baby made an uncomplicated recovery.



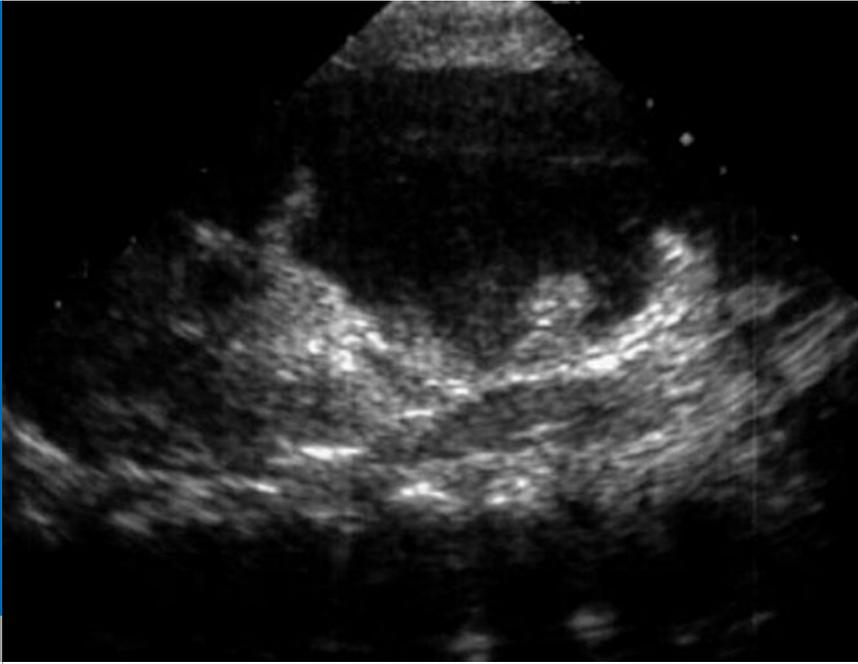
**Fig. 1**

*Normal trace of cerebral function monitor.*



Fig. 2

*Bowel gas pattern suggestive of free fluid.*



**Fig. 3**

*US of abdomen confirming the presence of free intraabdominal fluid.*

The presentation of acute collapse with a widespread petechial rash suggested sepsis as the most likely diagnosis. The initial hematocrit was within normal limits and only once initially resuscitated did the repeat hematocrit suggest acute blood loss. An ultrasound scan of the abdomen confirmed the presence of free fluid making a subcapsular hematoma of the liver the most likely diagnosis, although the ultrasound failed to show any parenchymal damage.

In a large study (1), emergency ultrasound to evaluate children for injury caused by blunt trauma was found to be highly accurate and specific. However, the ultrasound detection of free fluid is only moderately sensitive for diagnosing intraabdominal injury, but the combination of free fluid and/or a parenchymal abnormality is more sensitive. In another study (2), ultrasound was deemed sufficient and accurate in the evaluation of the majority of the children sustaining blunt abdominal trauma. In our case, despite the presence of free fluid, it was decided that an explorative laparotomy should be delayed pending clotting results.

The very prolonged aPTT resulted in an immediate factor\_ VIII assay being performed, confirming the presence of severe hemophilia A (Factor VIII < 1%). Hemophilia A (3) is an X-linked recessive disease, the gene being located at the tip of the X-chromosome (q28), coding for the coagulation factor VIIIc. It has an incidence of 1 in 10'000, and affects all racial groups.

The disease affects males almost exclusively with a spontaneous mutation rate of 30%.

Only 30-50% of patients with severe hemophilia present with manifestations of neonatal bleeding (e.g. after circumcision). Approximately 1-2% of neonates have intracranial hemorrhage (4). At birth, neonates may present with hematomas and prolonged bleeding from the umbilical cord. After the immediate neonatal period, bleeding is uncommon in infants until they become toddlers, when trauma-related soft-tissue hemorrhage occurs.

The management of neonatal hemophilia (5) involves avoiding trauma, anticoagulants and padding the cot and playpen. With episodes of bleeding, pressure and cold compresses should be applied to the area. For ordinary hemostasis, Factor VIIIc activity should be raised to 50% of normal and activity maintained above 50% for 48-72 hrs. Epsilon-aminocaproic acid and desmopressin to raise factor VIIIc activity may also be used. Hemophilia is a lifelong illness and requires a multidisciplinary approach to the ongoing management of the child and family.

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