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Case Report
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The Gasless Abdomen; Could It Be Hiding Something More Sinister?

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Abstract

A 32+4 week gestation neonate, weighing 1860 grams, presented post-natally with a radiologically evident trachea-oesophageal fistula (TOF) and oesophageal atresia (OA) and, after surgical ligation of her fistula, went on to develop a chemical peritonitis from an extravasated femoral line. The extravasation was only identified after abdominal signs progressed, due to a radiologically gasless abdomen secondary to her TOF ligation which masked the intraperitoneal accumulation of her total parenteral nutrition (TPN). In the deteriorating neonate with central access, it is vital to consider alternative causes for the deterioration and early identification of line extravasation will reduce injury and patient compromise.

Keywords: Peritonitis, neonate, paediatric surgery, TPN

Introduction

Intra-abdominal pathologies in the neonatal population are potentially life-threatening and must be elucidated by careful assessment of the patient for characteristic signs, such as distension, vomiting, peritonism, or bilious aspirates. There is a significant conservation of signs across the variety of intra-abdominal diagnoses, each of which requiring different approaches to investigation and management. An abdominal radiograph is often used as an adjunct to clinical assessment in arriving at a diagnosis and can be a useful tool in identifying perforations, distended bowel loops, and atresias/volvuli [1]. In the event of a gasless abdomen, these features are not apparent and so thorough clinical assessment becomes vital.

Case Report

Baby was born at 32+4 weeks gestation via emergency caesarean section for maternal pre-eclampsia. She was born in poor condition but responded well to basic resuscitation and was transferred to the neonatal unit on continuous positive airway pressure (CPAP). The baby was noted to have copious oral secretions and so insertion of a nasogastric tube (NGT) was attempted but was unsuccessful. A subsequent chest radiograph confirmed TOF+OA whereupon she was transferred to her local surgical centre for elective correction.

She was taken to theatre on day 1 of life and due to problematic hypotension and hypoxia intra-operatively – attributed to a diagnosis of neonatal septicaemia - the decision was taken to ligate her fistula and form a defunctioning gastrostomy so that her oesophageal repair could be deferred to a later date. On return from theatre the baby had a femoral arterial line and a femoral venous line *in situ*. The arterial line was removed due to impaired limb perfusion, but the femoral venous line remained *in situ*.

On day six it was noted that the baby's abdomen was erythematous around the gastrostomy site and so a septic screen was repeated, and she was commenced on second line antibiotics. Her CRP was 44, having been 73 post-operatively. The erythema gradually resolved but on day 10 of life she appeared quiet and mottled with a grossly distended, tender abdomen. Another septic screen was undertaken, the CRP now rising to 98, the radiological films repeated, and her antibiotic therapy was rationalised on discussion with the microbiology team. The abdominal radiograph remained unchanged and was now considered to be secondary to septic ileus. There was no improvement in the clinical picture and the CRP rose further to 126 so the decision was made to remove the femoral venous line, as a potential source of infection. When this was done TPN was seen leaking from the insertion site. With gentle abdominal palpation and positional changes 28mls of TPN

was removed from the baby's abdomen, representing approximately 3 hours' worth of infusion, with an immediate improvement in abdominal distension, colour and overall activity of the baby.

Serum electrolytes, lactate and glucose had all remained stable and within normal limits. The pressure readings on the infusion pump had remained low. On reviewing serial abdominal radiographs (Figure 1) there was no indication that the line had extravasated as this had been masked by the gasless appearances post-operatively.

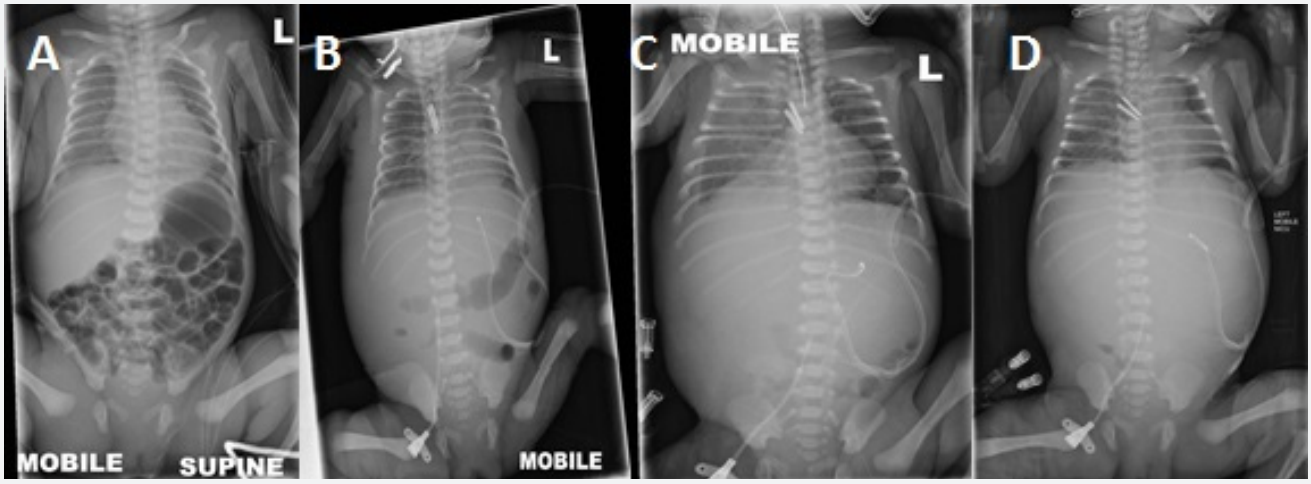

Figure 1: Serial abdominal radiographs show a pre-operative, gas-filled abdomen (A), a day 1 post-operative paucity of gas (B), followed by a gasless abdomen before (C) and after (D) the femoral line had extravasated.

Since the manual extraction of intra-abdominal TPN the CRP fell dramatically, and the clinical appearance continued to improve. Blood and femoral line tip cultures were negative. The baby later underwent an oesophageal anastomosis and was discharged home.

Discussion

Abdominal radiographs are an important tool in aiding the diagnosis of intra-abdominal pathologies and can often tip the balance in favour of certain differential diagnoses [2]. In cases where the radiograph is inconclusive, or there is no gas pattern, it falls to the attending clinicians to use clinical acumen to uncover the underlying pathology. There are common differentials that can explain an inflamed, distended abdomen that is associated with a rising CRP and general clinical deterioration of the patient, such as septic ileus, and these must of course be considered. Care must be taken, however, especially in neonates with central lines *in situ*, not to overlook the possibility of line extravasation. This case demonstrates that signs of nutritional failure, such as hypoglycaemia or electrolyte disturbance, or equipment failure such as high pump pressures are unreliable in identifying an extravasated line. The radiological finding of a gasless abdomen post-TOF ligation obscured the intra-abdominal accumulation of TPN, leading to a delay in identifying the cause of an acute deterioration and subsequent intervention that resolved it. We believe this case demonstrates the importance of a holistic clinical approach to the deteriorating or non-improving patient, and that seeking differentials alternative to established may reveal the cause of the deterioration, and therefore the correct treatment.

References

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