Bilateral iliac vein compression secondary to bladder overdistension in a neonate

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ABSTRACT

We report the case of a neonate who developed acute venous congestion of the lower limbs after exomphalos repair. Abdominal compartment syndrome (ACS) was excluded as there were no other clinical and physiological features of this condition. Abdominal ultrasound demonstrated bilateral iliac vein compression and massive bladder distension. Relief of the bladder obstruction led to prompt resolution of the venous impairment. Such a condition has not been previously reported and thus pediatric health care providers should be aware that neonatal bladder distension can obstruct venous drainage. Such knowledge may prevent unnecessary decompressive laparotomy.

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We present a challenging case of a newborn baby who, following primary closure of exomphalos, developed bilateral lower limb cyanosis but without any other typical features of ACS, therefore excluding intraabdominal pressure as etiology. To the best of our knowledge, this is the first report in the pediatric literature of iliac vein compression secondary to postoperative urinary retention.

1. Case report

A female neonate with an antenatal diagnosis of exomphalos was born at 35 weeks of gestation in good condition by forceps assisted, vaginal delivery. On examination, the baby was large for gestational age (3.2 kg); had bilateral ear creases; large tongue and an exomphalos containing only small bowel. Plasma glucose level was 2 mmol/L in the first 24 h of life. In view of these features, a diagnosis of Beckwith–Wiedemann Syndrome was made. Cardiac echocardiogram demonstrated a 3 mm patent foramen ovale. Renal ultrasound was normal.

On day 3 of life, once the glycemia was stabilized, the baby underwent repair of the exomphalos under general anesthesia. The defect was measured at 4 × 4.5 cm. Bowel reduction and primary closure of the fascial edges with minimal tension were achieved without difficulty.

On day 1 postoperatively, progressive purple discoloration of both lower limbs was noted, in keeping with venous congestion. Both femoral pulses were of good volume, and capillary refill was 2 s peripherally. The possibility of ACS was raised, but respiratory and renal function had remained stable (the urine output was 1.7 ml/kg/h), and the abdomen was full, but soft and not tense. The baby was tolerating milk (5 ml/h by nasogastric tube) and passing stool.

Subsequently the baby had an episode of apnea that required stimulation and bagging for 5 min. She had been on a morphine infusion of 10 μg/h (as per routine post laparotomy regime), and, after a dose of naloxone, improved immediately. Capillary blood gases half an hour after the event showed mild respiratory acidosis. The abdomen was noted to have become gradually more distended and tense, while the lower limb discoloration was more marked. The nasogastric tube was aspirated to eliminate any gastric distension, which may have contributed.

Abdominal ultrasound with venous Doppler was undertaken: the inferior vena cava was not collapsed but there was no spontaneous flow in either iliac vein (Fig. 1). A significantly distended bladder was also identified with associated bilateral hydroureteronephrosis.

Insertion of a urinary catheter produced a volume of 98 ml and resulted in almost instantaneous resolution of the lower limb discoloration. The Doppler immediately afterward showed return of normal spontaneous flow through the iliac veins (Fig. 2). A repeated capillary blood gas was normal. Due to complete resolution of the problem, further indirect measurement of intraabdominal pressure was not indicated.
Two days later, repeat urinary tract ultrasound showed resolution of the bilateral hydroureteronephrosis. The catheter was removed, and the baby was able to void without trouble. The baby was discharged home on day 7 postoperatively.

2. Discussion

Iliac vein compression has been described in adults secondary to urinary retention [1,2] in association with bladder diverticulae [3,4], spinal injury [5] and prostatic enlargement [6,7]. This phenomenon has not been described previously in the pediatric literature.

There are a number of factors that may have contributed to this reversible urinary retention in this neonate. Opiates may cause urinary retention by activation of peripheral opioid receptors leading to inhibition of acetylcholine and noradrenaline and therefore inhibition of the sympathetic nerves; the parasympathetic innervation remains unchallenged and the internal urethral sphincter is unable to relax and allow micturition [8,9]. This baby demonstrated sensitivity to opiates, evidenced by her reversible apneic episode.

The baby underwent surgery less than 24 h prior to these events and general anesthetic drugs are also known to contribute to urinary retention by their inhibitory effects on bladder contractility [10].

The ‘size’ of the operation is also a factor; incisional hernia repair, midline laparotomy and sub-costal incisions increase the risk of retention [11].

Closure of any abdominal wall defect poses the risk of ACS, in particular neonates with developmental viscero-abdominal disproportion. Increased abdominal pressure causes compression of the inferior vena cava which leads to decrease in venous return from the lower portion of the body: this decreases cardiac output and perfusion to vital organs including the kidneys and the gastrointestinal system. The final result is hypotension, oliguria, gut ischemia and refractory metabolic acidosis. Lower limb perfusion is also limited, and absence of femoral pulses is common in ACS.

Intraabdominal pressure may be measured indirectly to aid diagnosis, using catheters in the stomach or bladder, and using trends in ventilator pressures. In our patient, bladder pressure would have been misleading due to the pathophysiological process, and therefore was not undertaken [12]. Following decompression of the bladder, due to complete resolution of clinical signs, further pressure monitoring was unnecessary.

Management of ACS following exomphalos closure consists of emergency abdominal decompression by reopening the abdominal wound; it is a lifesaving intervention resulting in improvements in metabolic acidosis, cardiopulmonary and renal function. Failure to recognize and treat ACS in such neonates can be fatal or cause of severe morbidity for loss of the entire midgut and as such urgent decompressive laparotomy is recommended.

3. Conclusion

This baby’s case, although previously unreported, should alert physicians to the possibility that bilateral iliac vein compression may be caused simply by an over-distended urinary bladder. Close observation of the baby followed bladder decompression, no further signs of a potential evolving ACS presented, and an unnecessary laparotomy was avoided.

Consent

Written informed consent was obtained from the patient’s parents for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Competing interests

None.

References