PostScript

LETTERS

Neonatal long lines: localisation with conventional radiography using a horizontal beam technique

Neonatal long lines have improved our ability to care for extremely low birthweight infants. Unfortunately, the use of these catheters is not without risk. Apart from catheter associated infections, potentially serious—for example, pleural effusion, arrhythmia—and even life threatening—for example, cardiac tamponade—complications can occur when these lines are malpositioned.¹ In a recent issue of this journal, De and Imam² presented the case of a preterm infant in whom a long line had inadvertently been placed into the left ascending lumbar vein. When such catheters enter the spinal canal, paraplegia and even death can result.³ The authors emphasise the importance of verifying neonatal long line position using contrast, as the exact localisation of the catheter tip can be difficult on plain radiographs. As an alternative, Groves *et al*⁴ have described the use of colour Doppler to aid ultrasonographic line tip visualisation.

We would like to complement these observations with the description of a simple method to verify catheter tip position in the inferior vena cava using neonatal long lines (fig 1A) with a fine guide wire (27G CV single lumen catheter: Medex Medical Ltd, Rossendale, Lancashire, UK) and plain radiography. As the ascending lumbar vein can project over the inferior vena cava on a standard anterior-posterior plain abdominal film, we obtain instead a lateral view with the infant in an elevated supine position using a horizontal x ray beam. A long line with its tip projecting close to the vertebral bodies of the lower lumbar or upper sacral spine may already have entered the paravertebral venous system (fig 1B,C). When such a malpositioned catheter is further advanced, it will project over the vertebral bodies of the upper lumbar spine. In contrast, long lines that are correctly positioned in the inferior vena cava lie anterior to the upper lumbar spine (fig 1D).

In summary, the fine guide wire of the described neonatal long line (fig 1A) facilitates catheter insertion and, when combined with a horizontal beam technique, allows reliable catheter tip localisation in the inferior vena cava without contrast medium in preterm infants.

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Unexpected course of left leg percutaneous silastic catheters

Three cases of unrecognised, malpositioned saphenous vein percutaneous silastic catheters (PSCs) were identified among 21 saphenous

Figure 1 (A) A fine guide wire facilitates catheter insertion and allows its visualisation on plain radiography without contrast medium. Catheters that project close to or over the vertebral bodies (B) may have inadvertently entered the ascending lumbar vein, draining into the paravertebral venous plexus (C); in contrast, when correctly positioned in the inferior vena cava, the neonatal long line with the guide wire in place can easily be identified anterior to the vertebral bodies (D). IV, Intravenous; NGT, nasogastric tube; NLL, neonatal long line; UAC, umbilical artery catheter.

vein PSCs placed over a 13 month period in one neonatal intensive care unit. All had been inserted in the left leg, and the inserting practitioner failed to identify malpositioning of the PSC tip on a frontal abdominal view obtained with contrast (fig 1A). Radiologists later identified the probable abnormal position based on the course of the PSC, and lateral views of the abdomen on the same day of insertion showed the superficial position of the catheter tip in the anterior abdominal wall (fig 1B).

A literature review showed that most of the reported serious complications secondary to malpositioning of saphenous lines occurred with a PSC inserted via the left leg.¹⁻⁶ Chen *et al*¹ reported one new and three previously reported cases of paraplegia secondary to tracking of a PSC into the lumbar venous plexus from a left saphenous vein. Odaibo *et al*² and Kelly *et al*³ reported serious neurological and respiratory complications in pre-term infants from parenteral nutrition fluid in the cerebrospinal fluid via left leg PSCs. Baker and Imong⁴ reported abdominal wall necrosis as a complication of PSC via a left saphenous vein with the tip in a superficial abdominal vessel, and Coit and Kamitsuka⁵ reported similar findings, but had one case from a right leg, as did Cartwright.⁶

Healthcare providers need to be aware of the expected projection of a normally placed saphenous PSC. The appropriate course of the left leg PSC line passes from the left femoral and iliac veins, gradually ascending and becoming more medial until joining the

inferior vena cava over the right to mid spine at the L5 or L4 level. It then ascends over the right side of the spine or slightly to the right of the spine (fig 1C). Lines that end below the L5 level are not likely to be in the inferior vena cava. Lines that ascend to the left of the spine may be in an anomalous inferior vena cava but may be in a vertebral vein, in an anterior abdominal wall vessel, in the aorta, or extravascular.

We believe that tracking of the PSC line into an anterior abdominal wall vein can be subtle on the frontal abdominal radiograph, and serious catheter malposition related complications can be prevented by careful comparison with the expected course on the anterior-posterior projection (fig 1C). If uncertain, a lateral abdominal radiograph to verify the catheter course and tip location is needed.

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CORRECTION

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J K Calvert, P A Boyd, P C Chamberlain, *et al*. Outcome of antenatally suspected congenital cystic adenomatoid malformation of the lung: 10 years' experience 1991-2001 (*Arch Dis Child Fetal Neonatal Ed* 2006;**91**:F26-8). The surname of the fourth author of this paper was spelt incorrectly; the correct name is S Syed.

Figure 1 (A) Frontal abdominal view of malpositioned saphenous vein percutaneous silastic catheter inserted in the left leg. (B) Lateral view of the abdomen on the day of insertion showing the superficial position of the tip in the anterior abdominal wall of the catheter shown in (A). (C) Frontal abdominal view of an appropriately positioned catheter.

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