Parenteral nutrition solution in cerebrospinal fluid of a neonate: complication from a malpositioned central venous catheter

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Accepted 19 October 2021

DESCRIPTION

A premature infant was delivered at 30 weeks with a birth weight of 1440 g. The infant required intubation at birth for respiratory distress syndrome. On the second day of life, a peripherally inserted central catheter (PICC) was placed via the left saphenous vein for administration of total parenteral nutrition (TPN). The tip of the catheter was thought to be in the lower inferior vena cava from the plain anteroposterior (AP) radiograph (figure 1) and TPN infusion was commenced. Ten days later, the infant developed multiple apneic episodes and became hypotonic. A lumbar puncture was performed as part of the septic workup. The cerebrospinal fluid (CSF) peculiarly appeared milky white (figure 2). Biochemical analysis of the CSF revealed a high concentration of triglycerides (31.74 mmol/L) and proteins (1.05 g/L), suggesting TPN solution in the CSF. Serum triglycerides were normal (0.57 mmol/L). Blood and CSF cultures were negative. The infant's radiograph was reviewed again, realising the catheter was likely inadvertently placed in the left ascending lumbar vein instead. The infusion of TPN was terminated and the catheter removed, resulting in clinical improvement and resolution of the neurological symptoms. The infant had an uneventful recovery with no neurological sequelae.

Percutaneously inserted central venous lines are an essential part of the care of critically ill and premature neonates, allowing delivery of IV fluids and medication. Although PICC insertions are usually a safe and effective way to secure central venous access, serious complications could occur. TPN fluid leakage into the CSF is an unusual complication from a PICC insertion.[1 2] Since the ascending

Figure 1 Plain anteroposterior radiograph of the left lower limb and abdomen on day 2 of life. The peripherally inserted central catheter catheter tip location is shown with the thin arrow. The low-lying umbilical vein catheter (thick arrow) was planned for removal as part of the unit's policy.

Figure 2 Milk-white cerebrospinal fluid was obtained during lumbar puncture.

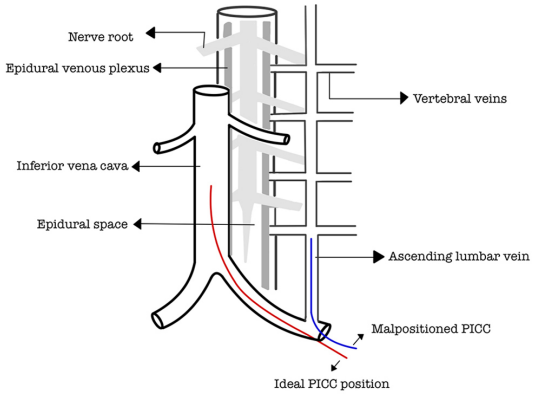

Figure 3 Schematic showing the relationship between the ascending lumbar vein, epidural venous plexus and epidural space. The malpositioned PICC is shown in contrast to its ideal position. PICC, peripherally inserted central catheter.

To cite: Chin L, Choo PPL, Ng DCE. *BMJ Case Rep* 2021;**14**:e246970. doi:10.1136/bcr-2021-246970

lumbar vein drains the epidural venous plexus into the common iliac vein, a PICC tip in the ascending lumbar vein could result in TPN entering the epidural venous plexus (figure 3). The hyperosmolar TPN infiltrates the thin-walled epidural veins, leading to extravasation of TPN into the epidural space. Additionally, pressure from the infusion pump could exacerbate the passage of TPN into the CSF.

We urge clinicians to recognise this complication arising from a misplaced central catheter. Our case highlights the importance of careful assessment of the catheter tip position. An addition of a lateral radiograph providing two views would be helpful to reduce such complications.[3] Likewise, ultrasound guidance may improve procedural success and safety for PICC placement.[4]

Learning points

- Careful assessment of the position of the central venous catheter tip is vital to prevent serious complications.
- The presence of milky white cerebrospinal fluid (CSF) with elevation in CSF lipids should prompt clinicians to confirm the position of the central venous catheter immediately.
- A lateral radiograph is recommended whenever an abnormal catheter position is suspected clinically or from findings of routine anteroposterior radiography.

Contributors LC conceptualised the manuscript. LC drafted the first version of the manuscript. PPLC and DCEN revised and added intellectual content. LC, PPLC, DCEN participated in the clinical care of the patient. All authors have read and agreed to the published version of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Consent obtained from parent(s)/guardian(s)

Provenance and peer review Not commissioned; externally peer reviewed.

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