

## Percutaneous Central Line Extravasation Masquerading as an Abscess

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**Background:** Percutaneous central line insertion is a common procedure in the neonatal intensive care unit. **Case characteristics:** A preterm baby, who had a percutaneous central line inserted developed an erythematous swelling over the infraclavicular area. **Observation:** A diagnosis of abscess was made, and an incision and drainage done that revealed a white fluid with high triglyceride content, confirming lipid extravasation. **Outcome:** The lesion healed completely few days after removal of the catheter. **Message:** This case highlights the importance of proper placement and confirmation of central line position.

**Keywords:** *Central venous line, Complication, Abscess, Total parenteral nutrition.*

Percutaneously inserted central catheters (PICC) are commonly used in the neonatal intensive care units (NICU) to administer hyperosmolar solutions, total parenteral nutrition (TPN) and medications. However, PICCs have been associated with complications due to displacement, embolism, thrombosis or infection of the catheter [1]. Effusions into a body cavity can occur when a PICC passes into a small vein and damage the vascular wall occurs. Extravasation into pleural, pericardial, subdural and retroperitoneal, and renal pelvis have been described. [2-4] Central line migration and extravasation leading to superficial abscess is extremely rare [5]. We report a child who presented with a chest wall swelling which was due to extravasation of a malpositioned PICC into a superficial vein of the chest wall.

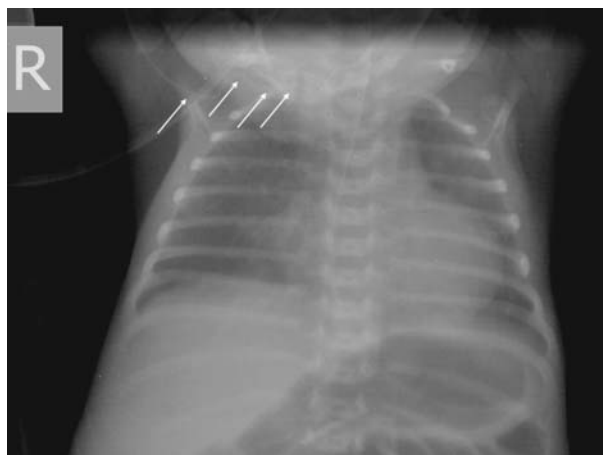
### CASE REPORT

The patient was the first of twins, born to a primigravida mother who had regular antenatal care in our hospital. The mother had spontaneous onset of labour at 29 weeks of gestation and baby was born by assisted breech delivery with a birthweight of 1280g and APGAR scores of 2, 6 and 7 at 1, 5 and 10 minutes, respectively. He was admitted into the NICU for preterm care and respiratory distress. He received 70 hours of continuous positive airway pressure for moderate hyaline membrane disease, and antibiotics for presumed sepsis. A right brachial PICC (Vygon, 2 Fr) was inserted and position was confirmed radiologically to be in the subclavian vein (**Fig. 1**) and TPN infusion was started. On day 27 of life, baby was noted to have an erythematous swelling in the right infraclavicular region. Pediatric surgery

consultation was obtained, and incision and drainage was done in view of a clinical diagnosis of abscess. A whitish coloured fluid was seen draining out and on flushing the PICC line, a fluid similar in appearance to lipid infusate was noted to be coming out (**Fig. 2**). Triglyceride estimation of the sample aspirated from the site was high (756 mg/dL), confirming that the fluid was extravasating TPN. The PICC line was removed and the drainage site started healing gradually. He was discharged on day 66 of life on breast feeds when he was gaining weight adequately. At follow-up of 18 months, the child is neurodevelopmentally normal.

### DISCUSSION

PICC is useful in the care and nutrition of sick and small neonates, and is one of the common procedures done in the NICU. The ideal position for catheters inserted through the upper limb is at the junction of superior vena cava (SVC) and right atrium while those inserted through the lower limb line should be in the inferior vena cava (IVC) at the level of diaphragm [3,6]. Risks involved in the use of PICC lines include infection, thrombosis, vessel perforation and extravasations [1]. Factors implicated in causing the vessel perforation and subsequent extravasation include occlusive mural thrombosis, localized phlebitis and erosion of the vessel wall by the catheter. When the end of the catheter creates an acute angle with the vessel wall, the jet of abrasive fluid directed on the wall may lead to formation of a thrombus attaching the catheter tip to the vessel endothelium [1]. This is more likely to occur if the catheter is in a smaller vessel with a slower flow of blood.



**FIG. 1** X-ray of the chest and abdomen showing the position of the PICC appearing to be in the right subclavian.

There have been reports of PICC extravasation causing pericardial effusion and also leakage of fluid into subdural space, renal pelvis, peritoneal cavity, retroperitoneal space and pleural space [3,4]. Extravasations into soft tissue have been reported less frequently. Baker, *et al.*[5] have described extravasation of a lower limb PICC presenting as an abdominal wall abscess similar to the presentation seen in our patient.

In our case, the initial position of the PICC was thought to be in the subclavian vein but was probably malpositioned into a superficial vein of the chest. This highlights the fact that optimal position of the PICC should always be ensured. Blind positioning of PICC based on anatomical landmarks and anthropometry leads to high malposition rates [7]. Single plane X ray alone may not be adequate in identifying the central line. In one series, 50% of line tips were not identified by plain X-ray; radio-opaque contrast injection increased detection rates to 93.5% [8]. Odd, *et al.*[9] showed radio-opaque contrast to increase the proportion of central line tip position identification from 39% to 55%. Groves, *et al.*[10] have described easy localization of the PICC line tip using colour doppler ultrasound with the line being flushed with saline at a rate of 0.1 mL/s. To avoid complications, either contrast injection or bedside ultrasound with colour doppler may be used to identify the central line tip position. Confirmation of central line tip and daily inspection by experienced personnel will help prevent delay in identification of complications [1].

*Contributors:* All the authors were involved in the diagnosis and management of the patient.



**FIG. 2** Infraclavicular swelling with extravasating intralipid after the incision and drainage.

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#### REFERENCES

1. Menon G. Neonatal long lines. *Arch Dis Child Fetal Neonatal Ed.* 2003;88:F260-2
2. Madhavi P, Jameson R, Robinson MJ. Unilateral pleural effusion complicating central venous catheterization. *Arch Dis Child Fetal Neonatal Ed.* 2000;82:F248-9.
3. Nowlen TT, Rosenthal GL, Johnson GL, Tom DJ, Vargo TA. Pericardial effusion and cardiac tamponade in infants with central catheters. *Pediatrics.* 2002;110:137-42.
4. Nadroo AM, al-Sowailem AM. Extravasation of parenteral alimentation fluid into the renal pelvis—a complication of central venous catheter in a neonate. *J Perinatol.* 2001;21:465-6.
5. Baker J, Imong S. A rare complication of neonatal central venous access. *Arch Dis Child Fetal Neonatal Ed.* 2002;86:F61-2.
6. Ramasethu J. Complications of vascular catheters in the neonatal intensive care unit. *Clin Perinatol.* 2008;35:199-222.
7. Johnston AJ, Bishop SM, Martin L, See TC, Streater CT. Defining peripherally inserted central catheter tip position and an evaluation of insertions in one unit. *Anaesthesia.* 2013;68:484-91.
8. Reece A, Ubhi T, Craig AR, Newell SJ. Positioning long lines: contrast versus plain radiography. *Arch Dis Child Fetal Neonatal Ed.* 2001;84:F129-130.
9. Odd DE, Page B, Battin MR, Harding JE. Does radio-opaque contrast improve radiographic localization of percutaneous central venous lines? *Arch Dis Child Fetal Neonatal Ed.* 2004;89:F41-43.
10. Groves AM, Kuschel CA, Battin MR. Neonatal long lines: localisation with colour Doppler ultrasonography *Arch Dis Child Fetal Neonatal Ed.* 2005;90:F5.