

### Spotlight on Safety Story

**Title of Spotlight on Safety Story:** *Life threatening pericardial tamponade and how Point Of Care Ultra Sound(POCUS) helps save lives in neonatal units*

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**Do you wish your name / unit to be removed before circulation to BAPM members?:** No

<b>Situation</b>	A 31 weeks baby suddenly collapsed in the neonatal unit due to large pericardial tamponade following TPN extravasation
<b>Background</b>	<p>A 31/40 week female baby was born via Category 1 caesarean section due to maternal pre-eclampsia. She required minimal resuscitation at birth, and was transferred to the neonatal unit. She was stable on high flow respiratory support. A 4.5 Fr UVC was sited on the day of birth, and was confirmed at T9- T10 on chest x-ray (Figure 1.) The following day, total parenteral nutrition (TPN) was commenced through the UVC.</p> <p>On day 5 of life, a clinical deterioration was noted with worsening respiratory distress and an increasing oxygen requirement. Respiratory support was escalated to CPAP, followed by BiPAP, but with no improvement in baby's condition. A capillary blood gas showed a respiratory acidosis with a pH of 7.0. The baby was intubated. Cefotaxime and Vancomycin were started to treat for sepsis with possible line source.</p>

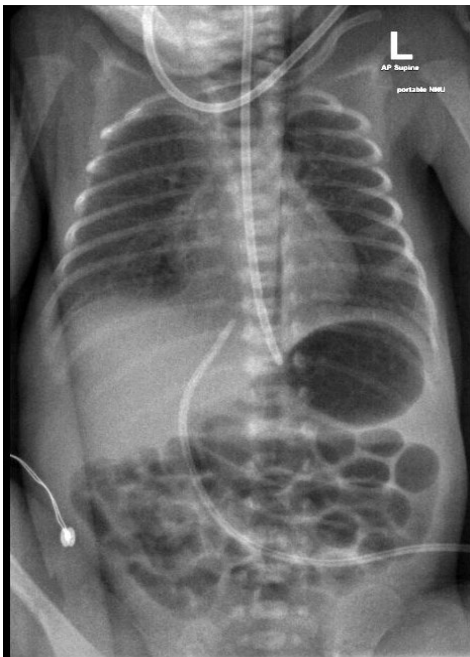
<b>Assessment</b>	<p>The baby became hypotensive, with a mean arterial pressure of 18mmHg, which was addressed with a 10ml/kg fluid bolus of 0.9% saline and commencement of Adrenaline at 0.1 microgram(mcg)/kg/hr before being increased to 0.2mcg/kg/hr. A CXR was performed when the baby started to deteriorate which showed diffuse right-sided opacity and an increased cardiac shadow (Figure 2).</p> <p>A bedside four chamber cardiac ultrasound demonstrated significant pericardial effusion. (Figure 3). Evidence of reduced cardiac function was seen on both ultrasound and clinically with a low mean blood pressure. Once the baby was intubated, urgent pericardiocentesis was performed. A total of 18ml of milky fluid was aspirated from the pericardial space and was sent for fluid analysis. A post pericardiocentesis ECHO showed that the pericardial effusion had almost completely drained except for a small residual effusion situated around the right atrium. Post intubation CXR showed ongoing right sided opacity, with ET position confirmed at T4, and UVC tip position at T9.</p> <p>Lung ultrasound was done and demonstrated a right-sided pleural effusion. Following this, thoracocentesis of the right pleural space was performed which aspirated 18mls of a similar milky fluid. This was also sent for analysis. A pigtail chest drain was inserted in the right pleural space and drained a further 10mls. The UVC was removed and a longline sited which was pulled back post xray to an acceptable subclavian vein position. The Xray shows normal size heart shadow and clearance of R sided pleural effusion (Figure 4).</p> <p>Analysis of the fluid showed no growth on microscopy and culture</p>
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<b>Recommendation</b>	<ol style="list-style-type: none"><li data-bbox="453 309 1485 439">1. In acute clinical deterioration where the cause is not clear, a POCUS (Basic 2D echocardiogram) should be performed. At least a 4 chamber view could provide some objective assessment of cardiac functions. In this case, POCUS had an essential role in avoiding inevitable death.</li><li data-bbox="453 472 1485 539">2. POCUS should be part of paediatric training especially in areas where intensive care is provided.</li><li data-bbox="453 573 1485 674">3. Line migration is not uncommon. This normally happens within the first 24 hrs of insertion. Repeat radiological evaluation of all lines after 24 hrs should be done to exclude line migration.</li></ol>
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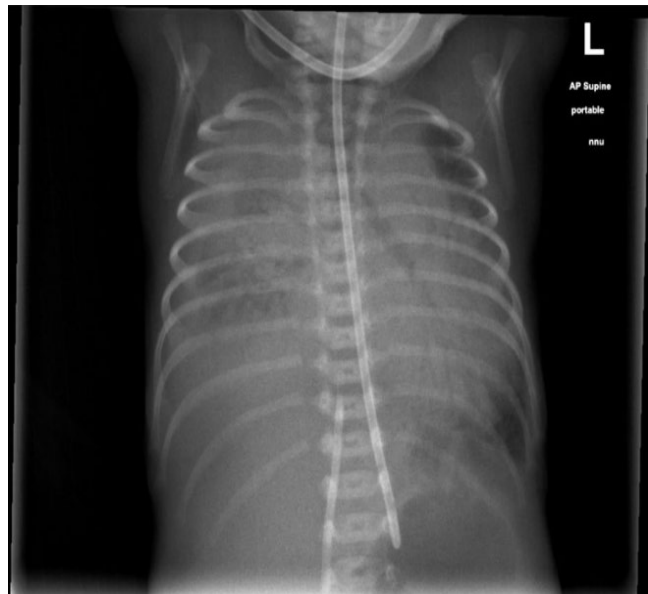
## Reference

1. **Migration of Central Venous Catheters in Neonates: A Radiographic Assessment**  
Ruby Gupta<sup>1</sup>, Amy L Drendel<sup>2</sup>, Raymond G Hoffmann<sup>3</sup>, Carla V Quijano<sup>4</sup>, Michael R Uhing<sup>1</sup>  
2016 May;33(6):600-4.  
DOI: 10.1055/s-0035-1570341. Epub 2016 Jan 5.
2. **Peripherally inserted central catheter migration in neonates: Incidence, timing and risk factors** C Acun 1, A Baker 2, L S Brown 3, K A Iglesia 4, J Sisman 5, Neonatal Perinatal Med ,2021;14(3):411-417. DOI: 10.3233/NPM-200684.

## Images:



*Figure 1 – Day 1–Chest and abdominal x-ray confirming UVC position at T9-T10*



*Figure 2 – Day 5–CXR showing diffuse right sided opacity with enlarged Cardiac silhouette*

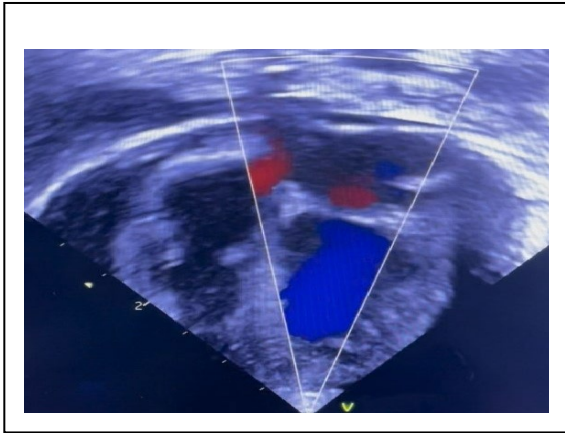


Figure 3- Image of echocardiogram on apical view demonstrating large pericardial effusion causing tamponade



Needle aspiration of the cardiac tamponade

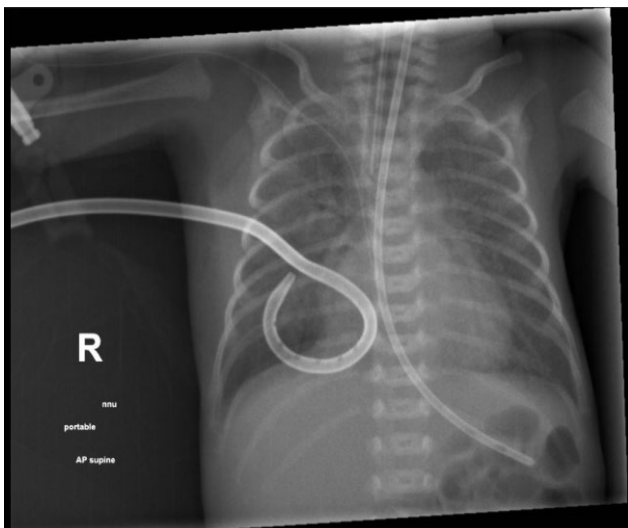


Figure 4 – CXR demonstrating position of ET tube at T4-T5 just above the carina, right-sided pigtail chest drain, and longline with tip in R atrium. Cardiac silhouette is normal after pericardial aspiration and R side pleural effusion is cleared