Under pressure – a forgotten complication of umbilical catheter insertion

Insertion of an umbilical catheter is one of the most commonly performed procedures on neonatal intensive care units, however the device is associated with a range of potentially serious complications. This article presents one such case – a complication of umbilical catheter insertion due to a tightened suture applied directly around the catheter. The need to reinforce good practice to reduce the risk of recurrence is discussed.

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Key points

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1. Umbilical catheter insertion is a commonly performed procedure in neonatology that is nevertheless fraught with the potential for a multitude of complications.
2. Complications may occur at all points in the process, including the final fixation of the catheter.
3. Direct fixation by tightened suture is noted to be associated with a number of complications, as reported here.
4. Indirect fixation by way of adhesive tape and anchor sutures reduces the risks from over-tight/loose catheter fixation.

Case history

A female infant born at term was admitted to the neonatal unit for management of severe respiratory distress from three hours of age, which was subsequently attributed to congenital pneumonia. The baby required intubation and ventilation and, in view of an anticipated poor condition, central venous access was obtained via the umbilical vein.

Following insertion of an umbilical venous catheter (UVC), the nursing team noted difficulty in infusing fluids via this route, with significantly elevated pressures on the infusion pump. The abdominal X-ray taken following UVC insertion was reviewed again: the UVC tip was seen in an apparently acceptable position, consistent with lying within the inferior vena cava. However, a disruption of the radio-opaque outline of the UVC was noted at L4/5 corresponding to the level of the umbilicus (**FIGURE 1**). Examination of the UVC fixation to the umbilical stump demonstrated a suture tied tightly around the UVC, deforming the plastic catheter and

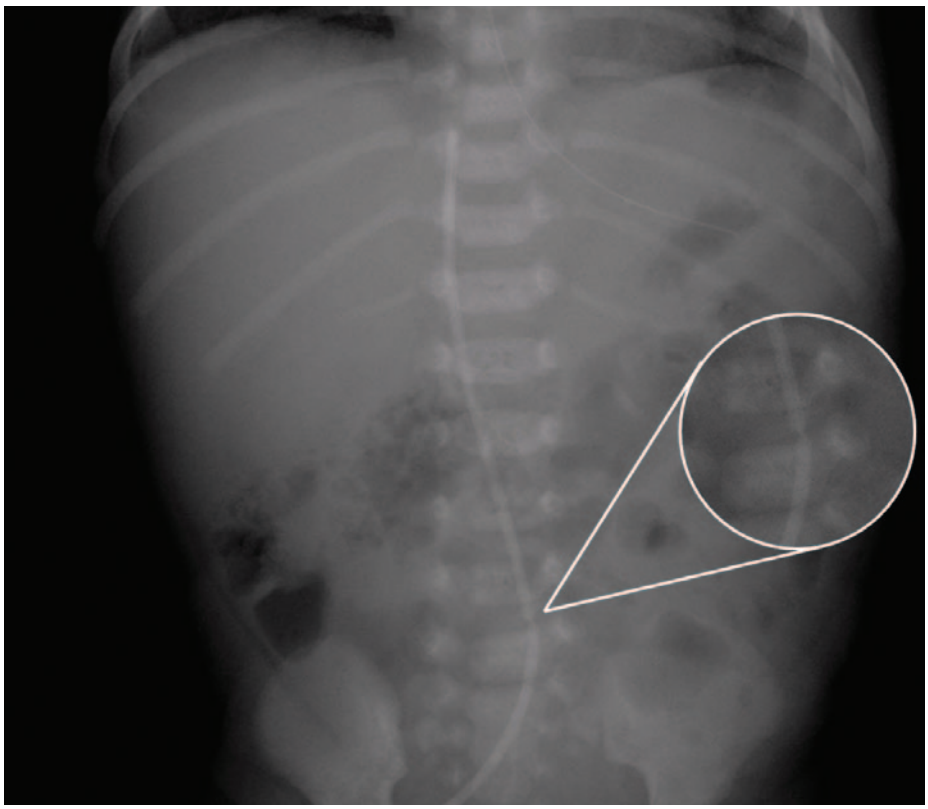

FIGURE 1 An abdominal X-ray demonstrating the UVC lying in an acceptable position but with a deformation of its radio-opaque outline at L4/5 corresponding to the point of fixation at the umbilical stump.

almost completely occluding the UVC.

The suture around the UVC could not be loosened without risking damage to it, necessitating removal of the entire catheter. A second UVC was inserted and medications and fluids were infused through it without complication.

Following the initial period of ventilation, the baby's condition improved significantly and permitted extubation to room air on day two of life. She was discharged home after completing seven days of antibiotics.

Discussion

A uniform approach to umbilical line fixation is not consistently employed across centres. However, it may be argued that the technique of sole fixation with a tightened suture predisposes to inherent complications. If the fixation is too tight it may occlude the catheter (as in this case) leading to a failure in the timely provision of medications and fluids. During attempts at removal or adjustment the catheter may be damaged, leading to leaking of infusions or even potential intravascular migration if full transection occurs.[1,2] Obviously, if fixation is too loose, the catheter may displace.

Guidelines do exist in this area, for example the Resuscitation Council's *Newborn Life Support*,[3] where it is recommended that adhesive tape is used to affix anchoring sutures to the catheter (as opposed to a tightened suture directly applied around the catheter), so as to prevent the focused pressure effect[4] (**FIGURE 2**). This methodology is advocated by the British Association of Perinatal Medicine (BAPM) in its guidance on the use of central venous catheters in neonates.[5] The authors' experience is that this technique results in a catheter that is more easily adjusted following initial insertion and removed at the end of use, and does not develop the aforementioned complications of over-tight fixation nor inadvertent dislodgment.

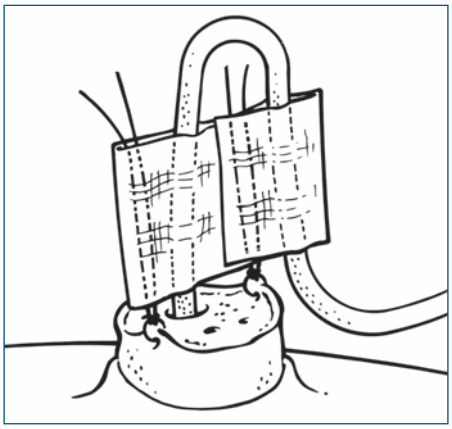

FIGURE 2 A recommended approach to umbilical line fixation.[3] Adhesive tape is used to affix anchoring sutures to the catheter to prevent a focused pressure effect. Reproduced with kind permission from the Resuscitation Council (UK).

Conclusion

This case report highlights a potentially serious incident involving umbilical catheter insertion and serves as a reminder for healthcare professionals to adhere to good practice to reduce the risk of complications.

Parental consent

The authors received written consent to publish this report from the patient's parents.

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