

**Case Report**

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**Vascular access complications in a preterm infant: Umbilical venous catheter fracture and cardiac tamponade****Emna Marmech<sup>1,2\*</sup>; Ines Selmi<sup>1,2</sup>; Amani Guizani<sup>1,2</sup>; Azzabi Ons<sup>1,2</sup>; Nadia Siala<sup>1,2</sup>**<sup>1</sup>Department of Pediatrics and Neonatology, Mongi Slim Hospital, La Marsa, Tunis, Tunisia.<sup>2</sup>University of Tunis el Manar Faculty of Medicine of Tunis, Tunisia.**\*Corresponding Author: Emna Marmech**Department of Pediatrics and Neonatology, Mongi Slim Hospital, La Marsa, Tunis, Tunisia.  
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**Abstract**

Vascular access in preterm infants is a critical yet challenging aspect of neonatal care, often fraught with complications. We report the case of a 30-week gestational age female infant who experienced two consecutive and life-threatening vascular access complications: An Umbilical Venous Catheter (UVC) fracture and subsequent cardiac tamponade from a tunneled central line. The UVC fracture occurred during an attempt to reposition the catheter, resulting in catheter migration. This was successfully managed with surgical retrieval. However, the placement of a tunneled central catheter in the right jugular vein was complicated by the development of cardiac tamponade, leading to acute hemodynamic collapse. The case under scores the importance of meticulous catheter management and the use of ultrasonography to confirm catheter positioning to prevent such potentially fatal outcomes. Prompt recognition and management of these complications are essential for improving neonatal outcomes.

**Keywords:** Umbilical catheter; Complication; Premature infant.**Introduction**

Central venous catheters are widely used in neonatal intensive care units. Although effective, their use is associated with various complications, including sepsis, thrombosis, migration, and pericardial effusion. A rare but potentially fatal complications are the intravascular rupture of the catheter, and the cardiac tamponade. In such situations, rapid diagnosis and appropriate care are crucial for survival.

**Aim:** This case report aims to emphasize the critical importance of adhering to rigorous protocols and techniques for the insertion and removal of central catheters.

**Case presentation**

A 30-week gestational age female infant, weighing 1100 g, was admitted to the neonatal intensive care unit. An Umbilical Venous Catheter (UVC) was inserted for parenteral nutrition.

A thoracoabdominal radiograph revealed that the catheter tip was overly inserted. During an attempt to reposition the catheter, the proximal end was inadvertently sectioned with a scalpel while removing the retaining suture. A subsequent X-ray showed the cut fragment migrating from the inferior vena cava to the jugular vein (Figure 1).

The infant was promptly transferred to the cardiovascular surgery unit, where the catheter tip was successfully retrieved via a cervical incision without the need for open surgery. A tunneled catheter was then placed in the right jugular vein.

One day later, the patient experienced acute hemodynamic deterioration, followed by cardiorespiratory arrest. An emergency chest X-ray showed cardiomegaly with a normally positioned tunneled central line. Cardiac tamponade was suspected and as there was no ultrasound equipment on site, the diagnosis was made by pericardiocentesis, yielding 18 ml of perfused

solution which saved the patient's life. The removal of the catheter resulted in rapid stabilization of ventilatory and hemodynamic status. The newborn has well evolved and a cardiac ultrasound performed at one month of age was normal.



**Figure 1:** X-ray chest and abdomen showing the fractured segment of umbilical venous catheter migrating from the inferior vena cava to the jugular vein.

### Discussion

Central catheters are indispensable in the care of critically ill neonates, offering vital vascular access for nutrition, medication, and monitoring. However, their use carries considerable risks, including infection, thrombosis and mechanical complications that are especially pronounced in preterm infants due to their delicate and immature anatomy. This case underscores two rare but life-threatening complications of central venous catheterization that clinicians must be aware of.

The initial complication, an Umbilical Venous Catheter (UVC) fracture, underscores the importance of meticulous technique during catheter insertion and adjustment. The use of sharp instruments such as scalpels near catheter lines can result in unintended fragmentation, as seen in this case. Migration of catheter fragments can lead to embolic events, posing significant risks to the neonate [1].

The subsequent complication, cardiac tamponade, following the placement of a tunneled Central Venous Catheter (CVC), is a rare but well-documented occurrence. Cardiac tamponade typically results from the perforation of the pericardium by the catheter tip, leading to the accumulation of fluid in the pericardial sac, which compromises cardiac function. Even if the catheter was well placed, our patient's heart wall may have been weakened by the first catheter. In fact, the neonates' pericardium is more susceptible to injury due to its thinness and proximity to the heart [2]. The rapid onset of hemodynamic instability in our patient emphasizes the need for immediate recognition and intervention in such cases. Ultrasound guidance during catheter placement has been advocated as a preventive measure to ensure proper positioning and to reduce the risk of complications like pericardial effusion and tamponade [3].

Additionally, this case underlines the necessity of continuous monitoring and vigilance after catheter placement. In high-risk patients, the early use of echocardiography to assess catheter position and pericardial status may be warranted, especially when there is any clinical suspicion of complications. The prompt removal of the catheter in response to suspected cardiac tamponade in this case led to the rapid resolution of symptoms, which underscores the importance of timely intervention.

### Conclusion

This case report highlights the importance of adhering to strict protocols during catheter insertion, maintenance, and adjustment, as well as the value of advanced imaging techniques such as ultrasound for catheter placement and monitoring. Early recognition and prompt intervention in the event of complications can be life-saving, as demonstrated by the favorable outcome in this case. Neonatologists and clinicians must remain vigilant to minimize the risks associated with these essential but potentially hazardous devices.

**Conflict of interest:** None.

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