



## NEONATAL LIVER ABSCESS IN PRE-TERM: CASE REPORT

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### ABSTRACT :

**Introduction:** Hepatic abscesses in preterm newborn are rare, difficult to diagnose, and require high awareness from the specialist. It occurs more frequently in septic patients, especially in those who have infection of their umbilical vein catheterization. **Aim:** To describe a case report of a neonatal sepsis secondary to a hepatic abscess on a very low birth weight preterm newborn. **Conclusion:** Umbilical vein catheterization is one of the most common vascular accesses amongst the newborns population for deep vein access; furthermore, in order to achieve safe administration of drugs and parenteral nutrition, it is necessary to confirm the catheter tip location after its insertion.

**KEYWORDS :** liverabscess, neonatal, umbilical catheter.

### INTRODUCTION

Neonatal liver abscess is a very rare condition associated with high rates of morbidity and mortality. There seems to be an increasing trend for this rare condition among newborns admitted to neonatal intensive care units. (NOWAKA, 2011)

Neonatal liver abscess may be idiopathic or secondary to umbilical infections by umbilical vein catheterization or sepsis, which are the most common predisposing factors. Other predisposing factors include central catheters for total parenteral nutrition (TPN), necrotizing enterocolitis, umbilical, gallbladder or liver surgery, and prematurity. (HASSE, 2015)

The diagnosis of hepatic abscess in a septic newborn requires a high suspicion index. Ultrasonography (US) and computed tomography (CT) with intravenous contrast (IV) are useful for the diagnosis of this condition, and should be performed as soon as possible (SIMEUNOVIC, 2009). After diagnosis, correction of the predisposing factor (eg. withdrawal of the umbilical catheter), associated with open or percutaneous drainage of the abscess and appropriate directed antimicrobial are recommended. In developing countries, liver abscesses in preterm infants are still associated with a high mortality rate of up to 50%, even with adequate care and treatment. (YIGITER, 2008)

Central vein catheters are commonly used in neonatal intensive care. Catheterization of the umbilical vein is one of the fastest and easiest methods for deep vein access. The advantages of central venous catheters compared to peripheral vein cannulas in neonates are commonly known and include: the

possibility of total parenteral nutrition, safe administration of many drugs and elimination of stress and pain associated with repeated peripheral vein puncture. (SCHALAPBACH, 2009)

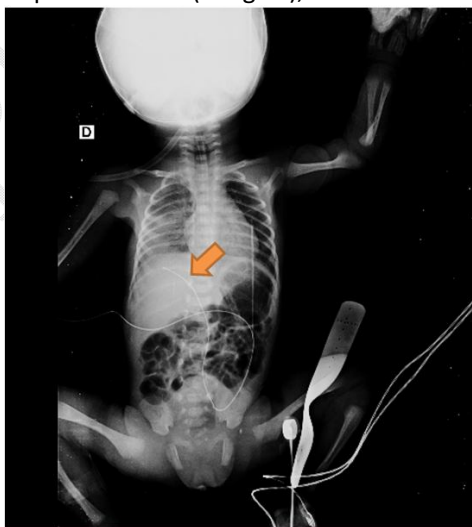
Unfortunately, central vein catheterization is also associated with risk of multiple complications. Incorrect placement of the tip of the cannula raises the possibility of complications. Those may include: systemic infections related to catheters, gas embolism, substantial blood loss during catheterization or cannula detachment, thromboembolic complications, and cardiac tamponade. When there is inadequate insertion of the catheter into the portal vein, thrombosis of the hepatic vessels, necrotizing enterocolitis, intestinal perforation, portal hypertension or hepatic cyst may occur. Infusion of hypertonic fluids into the hepatic tissue can lead to substantial damage to the liver parenchyma and necrosis of this tissue. (SHAH, 2009)

In this case report, extensive diagnostic investigation and cooperation of many specialists was necessary. The newborn was finally diagnosed with a complication of umbilical vein catheterization, i.e. extravasation of large volumes of parenteral nutritional fluid into the hepatic parenchyma due to an incorrect placement of the catheter. The reported premature newborn had secondary hepatic abscess after administration of parenteral nutrition and umbilical catheter medications and was successfully treated with broad-spectrum antibiotics and surgical drainage of the abscess.

### CASE REPORT

Preterm C.M.Mnewborn, 32 weeks and 4 days of gestational age, small for gestational age, very low birth weight (birth weight: 1.330g), was born from cesarean delivery, due to non-reassuring heart, Apgar score 8/8, progressed to early respiratory distress, progressed to early respiratory distress, requiring non-invasive ventilatory support. He was transferred to the Neonatal Intensive Care Unit (NICU), where umbilical catheterization, chest X-ray, blood cultures, biochemistry and arterial blood gas analysis were performed, according to the hospital protocol.

In the NICU, initially there was improvement of the respiratory pattern, with, withdrawn from the ventilatory support between 12 and 24 hours of life. The first chest x-ray was performed at two hours of life and showed umbilical catheter in the hepatic location (Image 1), with a catheter withdrawal.

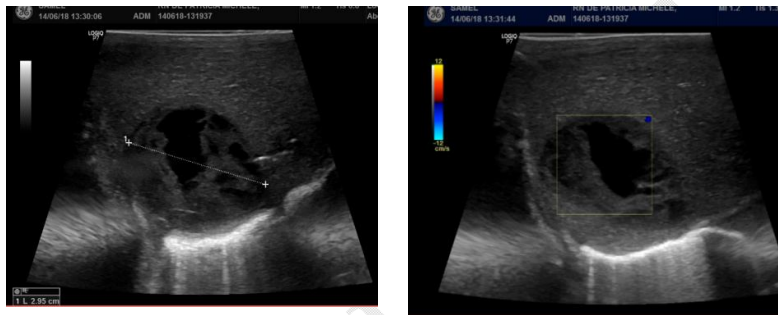


**Image 1:** abdominal x-ray 1h after birth. Umbilical catheter located in the liver. NICU Hospital e Maternidade Samel, Manaus-AM

On the third day of hospitalization the patient presented with apnea, requiring oxygen support and caffeine. An echocardiogram showed Patent Foramen Ovale (1.5 mm).

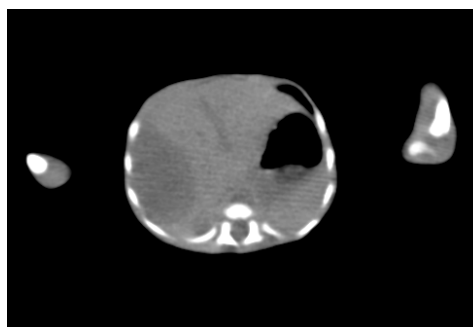
Next, an abdominal ultrasound (US) was performed, showing a cystic trabeculated lesion in the right hepatic lobe, query hepatoblastoma.

There was new onset of respiratory distress, and non-invasive ventilation by prongs (VNIPP) was started. The patient then developed cutaneous pallor, cyanosis and tachycardia, with worsening of the respiratory pattern with signs of poor peripheral perfusion, oliguria and livedo reticularis, needing endotracheal tube (ETT) and mechanical ventilatory support, antibiotic therapy (ampicillin and gentamicin), dopamine and fentanyl. The umbilical catheter was removed and a PICC-line was placed (Peripherally Inserted Central Catheter). The blood culture was positive for *Staphylococcus Aureus*. On the seventh day of hospitalization, a progress abdominal US showed an homogeneously increased echogenicity of the hepatic parenchyma, associated with a multiseptated, mixed nodular (solid/cystic) lesion in the right hepatic lobe between segments VI and VII, with hyperechogenic trammels, no vascular flow, measuring 3.0x2.5x2.9cm. The hypothesis of a hepatic abscess was considered. (Image 2).



**Image 2:** Abdominal US: cystic trabeculated lesion in the right hepatic lobe measuring 3,0x 2,5x 2,9 cm, suggestive of liver abscess. NICU Hospital e Maternidade Samel, Manaus-AM.

On the 15th day of hospitalization, vasoactive drugs were stopped and the patient was extubated. Pediatric surgery was involved for a possible US guided drainage. The surgery team ordered an Abdominal Computed Tomography scan (abdominal CT) which showed image suggestive of net formation (Figure 3). Teicoplanin was started and an US guided puncture was performed, retrieving 1ml of thick purulent liquid. Abscess fluid culture was also positive for *Staphylococcus aureus*.



**Image 3:** Progress Abdominal CT showing fluid containing hypoattenuated hepatic lesion. NICU Hospital e Maternidade

A progress Abdominal CT was performed two days after the procedure, revealing a fluid containing hypo attenuated lesion, with thickened walls and expanding aspect, measuring 3x3.3x2.3cm, with a total volume of approximately 11.8cm<sup>3</sup>, occupying the upper third of the right hepatic lobe. The patient was taken to the operating room (OR), where a surgical drainage was performed, removing 15 ml of purulent secretion from the hepatic abscess. A left Penrose drain was placed. Culture from the fluid was positive for diplococci. The patient left the OR in mechanical ventilatory support. Two days after the procedure, the Penrose drain was removed, complicating with suture dehiscence and abdominal distension. An abdominal X-ray showed signs suggesting pneumoperitoneum. At that moment, dopamine and dobutamine were restarted, the patient was reintubated taken to the OR once again, for were a kinking of a bowel loop was visualized, secondary to an internal herniation through the drain hole. Antibiotic therapy was continued for 21 days with slow and gradual improvement. The patient was discharged from the NICU 35 days after surgery.

## DISCUSSION

The central veins cannulation is a common procedure in neonatal intensive care. This procedure is part of the Hospital and Maternity Samel protocol for newborns with gestational age below 34 weeks who require respiratory support at admission. One of the most used vascular access is the umbilical vein, especially in the first day of life. Cannulation of the umbilical vein is considered relatively simple, yet it requires aseptic technique. The procedure is usually short in duration and it does not require general anesthesia. The tip of the catheter should be positioned in the inferior vena cava, over the diaphragm. After catheterization, the position of the catheter should be assessed by radiological exams of the abdomen and chest. (SHAH, 2009)

One of the disadvantages of this method is the possibility of incorrect positioning of the catheter, leading to a greater number of complications, including cardiac tamponade, hydrothorax and thromboembolic complications (SIMEUNOVIC, 2009). During the catheter placement, it is common for it to move toward the liver through the portal vein. This should grant immediate removal of the catheter. Using a misplaced catheter in an hepatic vessel results in many serious complications that may endanger the life of the newborn (HASE, 2011).

The differential diagnosis included liver abscesses in the course of a systemic infection, hamartoma of the liver and, as less commonly, hepatoblastoma, a hepatic mass with similar ultrasonographic findings (NOWACKA, 2011), hence it being reported on the first abdominal US. This was clarified with further imaging (abdominal CT) and an oncology consult. The retrieval of purulent fluid from the US guided puncture corroborated the diagnosis.

The infusion of hypertonic fluids into the liver via catheters improperly positioned in the portal vein can damage the parenchyma producing necrosis or abscess, thus, the hepatic abscess should enter the differential diagnosis of the newborn with sepsis. Computed tomography and abdominal ultrasonography are diagnostic methods for documentation of intrahepatic expansive lesions and evolution of the abscess (HASSE, 2011). Hepatic abscesses may be difficult to diagnose in neonates, in part because of their supposed rarity and lack of suspicion. Signs such as septic appearance, fever, food intolerance, vomiting, abdominal distension, abdominal tenderness and hepatomegaly are not specific, as well as laboratory findings such as leukocytosis, neutropenia, thrombocytopenia, elevated ESR and normal or elevated liver enzymes (LEE, 2008).

Incorrect placement of the umbilical vein catheter and blood culture-proven sepsis are the most common predisposing factors for hepatic abscesses in the reported case, followed by central catheters for TPN, necrotizing enterocolitis, surgery and prematurity, with no other associated factors. The insertion of the misplacement of the umbilical catheter and prematurity were the causative factors of the hepatic abscess in our case. The most common causative pathogens are *Staphylococcus aureus*, *Streptococcus pyogenes* and *E. coli*. *Klebsiella*, *Pseudomonas*, *Corynebacterium acnes*, anaerobes and *Candida albicans* were also cultured from neonatal liver abscesses. Polymicrobial infection is found in 50% of the abscesses

(LAM, 2005), which did not occur in the report, where *Staphylococcus aureus* was the only bacteria identified.

Treatment consists of correcting the predisposing factor (eg, removal of the umbilical catheter), percutaneous drainage with or without ultrasound guidance, or open drainage of the abscess affecting multiple lobes of the liver and / or large abscess, as seen in our case. Adequate antibiotic therapy should be directed at the causative agent. In culture-negative lesions, broad-spectrum antibiotics encompassing gram-positive, gram-negative and anaerobic organisms need to be instituted. With prompt diagnosis and appropriate treatment, the outcome seems to be better compared to a fatally uniform state, although, unfortunately, the mortality rate may still be high, despite appropriate care and treatment (FILIPPI, 2009).

## CONCLUSION

Catheterization of the umbilical vein is one of the methods most used in neonatology to access a deep vein, but for safe administration of medications and parenteral nutrition, it is necessary to verify the location of the catheter tip after insertion and before infusing solutions.

Considering the possibility of a hepatic abscess in a newborn with an undifferentiated infection is necessary to ensure that early diagnosis and immediate treatment, even considering it is a rare condition. For the prevention of catheter misplacement, it is essential that the fixation is safe, as well as the institution of catheter bundle to ensure aseptic insertion with better results.

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## RESUMO

**Introdução:** Abscesso Hepático em recém-nascidos prematuros é raro, de difícil diagnóstico e requer do médico especialista alto grau de suspeição. Ocorre mais frequentemente naqueles que sofreram sepse, ou apresentaram infecção umbilical após cateterização desta veia. **Objetivo:** Descrever o caso clínico de um recém-nascido prematuro tardio que evoluiu com sepse neonatal secundária à abscesso hepático.. **Conclusão:** A cateterização da veia umbilical é um dos métodos mais utilizados na neonatologia para acesso a uma veia profunda, porém para uma administração segura de medicamentos e nutrição parenteral, é necessário verificar a localização da ponta do cateter após sua inserção.

**Palavras-chave:** Abscesso hepático, Recém-nascido, Cateter umbilical.