

Hepatic Lesions of Total Parenteral Nutrition (Tpn) Secondary to Umbilical Venous Catheter (Uvc) Malposition in A Very Low-Birth Weight Infant in China

Li Wang¹, Xiao-ping Luo^{1*}, Yan-wei Liu¹

¹Department of Neonatology, The Hospital of the First Affiliated Hospital, Sun Yat-sen University, Guangzhou 510080, Guangdong, China.

*Corresponding author: Xiao-ping Luo, Department of Neonatology, The Hospital of the First Affiliated Hospital, Sun Yat-sen University, Guangzhou 510080, Guangdong, China.

Received date: February 22, 2021; Accepted date: April 19, 2021; Published date: April 26, 2021

Citation: Li Wang, Xiao-ping Luo, Yan-wei Liu (2021) Hepatic Lesions of Total Parenteral Nutrition (Tpn) Secondary to Umbilical Venous Catheter (Uvc) Malposition in A Very Low-Birth Weight Infant in China. *J. Archives of Medical Case Reports and Case Study*. 4(2);

DOI:10.31579/2692-9392/036

Copyright: © 2021 Xiao-ping Luo, This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Umbilical vein catheterization (UVC) is a common operation for vascular access in preterm infants. However, there are complications associated with their use. We here a case of extravasation of the fluids due to misplacement of the catheter causing hepatic collection of TPN in a very low-birth weight preterm (VLBW) infant.

Keywords: valsalva's maneuver; extended valsalva's maneuver; nasal balloon autoinflation, middle ear ventilation; eustachian tube patency classification

Introduction

Umbilical vein catheterisation (UVC) is a common procedure performed in neonatal intensive care unit (NICU) [1]. UVCs allow quick access for intravenous fluid and drug administration, blood products and parenteral nutrition to acutely ill neonates; besides these benefits, there are complications associated with their use [2-4]. One of uncommon complication is extravasation of the fluids due to misplacement of the catheter. Inapposite position of UVCs can sometimes cause such leakage into the liver tissue with significant damage to the liver parenchyma or lead to necrosis of the area [3, 5]. We present a case of preterm baby who developed partial necrosis of liver following a malposition UVC with successful recovery following discontinuation of the catheter and abdominal paracentesis of the fluid.

Case Report

This female neonate weighing 1.42kg, was born at 36 1/7 weeks of gestation, after 8 hours of ruptured membranes, by vaginal delivery. There was no history of maternal hypertension or diabetes. The mother has regular prenatal examinations during pregnancy. GBS screening negative. After birth, Apgar score is good. But the baby had poor respiratory efforts at one hour after birth requiring nasal continuous positive airway pressure (nCPAP) and non-invasive ventilation. For vascular access, a 3.5 Fr double lumen UVC were inserted uneventfully. The tip of the catheter was placed to the right of the vertebral column, at the level of T10 vertebra, below the level of the diaphragm (**Figure 1A**).



Figure 1A: Abdominal X-ray shows the tip of the catheter to the right of the vertebral column at the level of the T[10-11]vertebra.

The UVC were used for all infusions, including TPN.

On day 3 of life, the patient showed signs of sepsis with temperature instability, dyspnea, circulatory system instability and increased serum inflammatory parameters (CRP 22.8 mg/l, reference range <8 mg/L). Vancomycin (20 mg/kg q12 h) and piperacillin-sulbactam (75 mg/kg q8

h) were started. On day 5, she received a single dose of intravenous immunoglobulin (1 g/kg). On day 6 of life, abdominal distension developed. The radiography revealed a gasless abdomen (Fig. 1B) and abdomen ultrasonography revealed significant amount of free fluid but no pathology at the liver.



Figure 1B: Abdominal X-ray of the patient at the 6th day of umbilical venous catheter placement. The tip of the catheter is at the level of the T12 vertebra (arrow).

There was no evidence of any perforation or necrotising enterocolitis (NEC). On day 9 of life, the signs of sepsis did not improve and the laboratory tests showed an elevated CRP (69.9 mg/l) thrombocytopenia,

abnormal liver enzymes (ALT 199U/L, reference range <40 U/L) and coagulation defects. A CT scan demonstrated a 5.3-cm complex air-containing fluid collection in the liver (Figure 2).



Figure 3b: US showed a solid-cystic echogenic lesion measuring 3.6×2.8cm with internal visible separation after the US-guided drainage.

The surgeons performed an US-guided hepatic collection aspiration without fluid withdrawal and recommended conservative treatment. At 11 days later, the patient developed fever again. Subsequently, repeat US

examination showed the lesion do not have been absorbed measuring 3.0×2.3cm with no vascularity (Figure. 3c).



Figure 3c: Repeat US examination showed the lesion do not have been absorbed measuring 3.0×2.3cm with no vascularity

The surgeons performed again an US-guided hepatic collection aspiration. Repeat follow-up US examination at 2 weeks later demonstrated the lesion to have decreased to 2.5×0.9cm with a hyperechoic lesion (likely from calcium in the lesion). On day 27 of life, the baby cured and discharged. A CT scan, performed at day 44 of life

(17 days after discharge) for follow-up of these lesions revealed a 1.3-cm punctate low density shadow in the left lobe of the liver. At 7 months of age, a follow-up US revealed dystrophic calcifications in areas previously described as abnormal fluid accumulation in the liver (Figure 3d).



Figure 4d: A follow-up US in infant who underwent a US-guided aspiration of hepatic collection 6 months after the procedure shows a resolving lesion with residual dystrophic calcifications.

Discussion:

This case showed that the UVC was improperly placed and prolonged parenteral nutrition infusion, which the entry of hypertonic fluid into the liver tissue may lead to parenchymal injury or parenchymal necrosis. This was consistent with previous reports [4-5]. UVC is a commonly used procedure in the NICU. However, great care must be taken to ensure

proper placement to prevent possible short-term and long-term complications. The tip of the umbilical catheter must be placed over the diaphragm, at the junction of inferior vena cava and right atrium corresponding to T9 [5-6]. Since UVC is placed by estimating (shoulder-umbilical length) rather than confirming the placement process in real time, UVC may inadvertently enter the portal vein system during placement. In addition, it is possible to transfer the tip of the venous

catheter into the portal vein, even at the appropriate initial location. Hence, it is important to emphasize that UVC placement in the inferior vena cava is necessary, although the ideal location is the inferior vena cava/right atrium confluence.

The confirmation of the location of the UVC tip is usually done with radiography. But a recent study has shown that x-rays often do not accurately locate UVC in premature infants and real-time US or echocardiography is a more accurate technique to determine the appropriate location of UVC tip [7]. Although UVC should be removed as soon as possible, it can be retained for up to 14 days if the catheter placement is appropriate [8].

Our cases demonstrated the effectiveness of this method, US-guided drainage and the necessity of multidisciplinary combined treatment for acute and severe cases. The prognosis of this case is good. Although the use of UVC is part of the daily management of the NICU, it is important to be aware of their potential complications and to monitor their location with X-ray or US study. Catheter-related complications must be considered whenever there is acute abdominal distension with UVC in place.

Conclusion:

The malposition of the UVC is the most likely to occur hepatic collections/necrosis. The position of UVC should be carefully monitored by regular x-rays or bedside ultrasound. Abdominal distension with UVC should cause suspicion of total parenteral nutrition hepatic collection. Liver ultrasound is the best way to diagnose newborns with parenteral nutrition infiltration of the liver. Generally, if managed appropriately, the prognosis of this condition is good.

References:

1. Coley BD, Seguin J, Cordero L, Hogan MJ, et al. Neonatal total parenteral nutrition ascites from liver erosion by umbilical vein catheters. *Pediatr Radiol* 1998;28(12):923-927.
2. Hui JY, Lo KK, Lo J, Chan ML, et al. Neonatal total parenteral nutrition ascites secondary to umbilical venous catheterisation. *J HK Coll Radiol* 2001;4:288-290
3. Adesanya O, Naqvi M. term neonate with liver laceration, obstructive uropathy, and ascites-secondary to extravasation of total parenteral nutrition: a complication of malpositioned umbilical venous catheter. *Glob Pediatr Health* 2016;3.
4. Yeh J, Boechat MInes, smith J, et al. Massive liver mass and parenteral nutrition extravasation secondary to umbilical venous catheter complications. *J Clin Neonatol* 2014;3:158–160
5. Egyepong J, Jain a, Chow p, et al. parenteral nutrition-ascites with acute renal failure as a complication from an umbilical venous catheter in an extremely low birth weight infant.
6. Greenberg M, Movahed H, Peterson B et al (1995) Placement of umbilical venous catheters with use of bedside real-time ultrasonography. *J Pediatr* 126:633–635
7. Franta J, Harabor a, soraisham as. Ultrasound assessment of umbilical venous catheter migration in preterm infants: a prospective study. *Arch Dis Child Fetal Neonatal Ed* 2017;102:F251–255
8. Sequin J, Fletcher MA, Landers S et al (1994) Umbilical venous catheterizations: audit by the Study Group for Complications of Perinatal Care. *Am J Perinatol* 11:67–70



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article Click Here: [Submit Article](#)

DOI:10.31579/2692-9392/036

Ready to submit your research? Choose Auctores and benefit from:

- ❖ fast, convenient online submission
- ❖ rigorous peer review by experienced research in your field
- ❖ rapid publication on acceptance
- ❖ authors retain copyrights
- ❖ unique DOI for all articles
- ❖ immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more www.auctoresonline.org/journals/archives-of-medical-case-reports-and-case-study