

NEONATAL GANGRENE OF THE EXTREMITY: A COMPLICATION OF UMBILICAL CATHETERIZATION

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ABSTRACT

We report a case of severe tissue ischemia after umbilical catheterization in a preterm newborn. Umbilical catheters can accidentally enter branches of the iliac artery during attempted placement in the umbilical vein. If these misplacements are not recognized by radiology and promptly corrected, arterial obstruction may lead to ischemia and infarction of the extremities. This is the first report of below-knee gangrene due to peripheral vasospasm or thrombosis occurring after umbilical vein catheterization (UVC). We discuss that the radiographic verification is essential before infusing medications.

KEY WORDS: Catheterization, Gangrene, Neonate, Umbilical vein.

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INTRODUCTION

Umbilical catheters are routinely used in treating premature infants. UVC is an accepted procedure for continuous infusing fluids and medication to sick newborn. It is associated with various complications, such as hemorrhage, thrombosis, infection and vascular perforation.¹ Furthermore, Since James first described in 1959, the placement and use of umbilical artery

catheters (UAC), arterial lines have become routine practice in neonatal intensive care units for arterial blood gases and blood pressure monitoring.² We present the case of ischemic necrosis and gangrene of foot as a complication of umbilical vein catheterization in a premature newborn.

CASE REPORT

A female infant of 32 weeks' gestational age was delivered by cesarean section because of early amniotic membrane rupture. The mother was healthy and APGAR scores were normal. Her birth weight was 1650g. The neonate developed respiratory distress syndrome two hours after birth and was immediately transferred to the neonatal intensive care unit. After two days a 4-French umbilical venous line was inserted. The infusion flow rate was satisfactory so X-ray did not verify its correct position. The femoral pulses and circulation in the lower limbs both were normal immediately before and after catheterization. However, the right leg blanched two hours after catheter placement. The infant's

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Fig-1: Bruised skin and tissues necrotic of right foot.

right leg was elevated, and the left leg was warmed, but the right side continued to have poor perfusion. Because there was no improvement, 4 mm/kg 2% nitroglycerin ointment was applied over the right leg. Perfusion did not improve after six hours, so the catheter was removed due to suspicion of incidentally umbilical artery catheterization. Throughout the next few days, the bruised skin and underlying tissues became necrotic (Figure-1). Concurrently, her cardiopulmonary condition began to worsen and eventually she expired by septic shock manifestation after two weeks.

DISCUSSION

The vast majority of preterm and severely ill newborn infants are monitored and managed using an umbilical arterial and venous catheter. However radiology plays a critical role in evaluating proper catheter placement and recognizing potential complications. On the other hand, UACs have been associated with complications such as local vascular (blanching or cyanosis of feet or toes) or more extensive ischemic compromise, Necrosis of the buttock^{1,3} and labium major³, Neonatal aortic thrombosis⁴, Renovascular hypertension.^{5,6} Ancora et al⁷ has reported a case of severe, peripheral, and diffuse tissue ischemia after UVC in a preterm newborn born to a preeclamptic mother. Also in some condi-

tions, peripheral gangrene could happen in premature neonates even without catheterization. In this case, gangrene of the right foot probably followed temporary irritation or displacement of the tip of the catheter into the iliac artery. The gangrenous changes were possibly caused by vascular occlusion resulting from catheter-induced vasospasm of the internal iliac artery. X-ray was not taken to determine the position of the catheter, so, we cannot document if the catheter was in UVC or UAC. If it was UVC, this is the first case in the literature that refers to foot gangrene after umbilical vein catheterization with unknown etiology. Purohit et al⁸ reported a case of a neonate who developed similar complications after umbilical artery catheterization. Although Boo et al⁹ had shown that the most significant risk factor to inducing local fibrin formation is the duration of catheter use; it was in our case only six hours.

In conclusions, the use of umbilical catheters is associated with complications and we feel that the radiology plays a critical role in evaluating proper catheter placement.

REFERENCES

1. Cumming WA, Burchfield DJ. Accidental catheterization of internal iliac artery branches: A serious complication of umbilical artery catheterization. *J Perinatol* 1994;14(4):304-309.
2. Baserga MC, Puri A, Sola A. The use of topical nitroglycerin ointment to treat peripheral tissue ischemia secondary to arterial line complications in neonates. *J Perinatol* 2002;22(5):416-419.
3. Vernooij CM, Hogeman PH, Nikkels PG, Blok CA, Brouwers HA. Necrosis of the left buttock as a complication of umbilical catheterisation in neonatal resuscitation. *Arch Dis Child Fetal Neonatal Ed* 2007;92(1):F48.
4. McFadden PM, Ochsner JL. Neonatal aortic thrombosis: Complication of umbilical artery cannulation. *J Cardiovasc Surg (Torino)*. 1983;24(1):1-4.
5. Merten DF, Vogel JM, Adelman RD, Goetzman BW, Bogren HG. Renovascular hypertension as a complication of umbilical arterial catheterization. *Radiology* 1978;126(3):751-57.
6. Adelman RD, Morrell RE. Coarctation of the abdominal aorta and renal artery stenosis related to an umbilical artery catheter placement in a neonate. *Pediatrics* 2000;106(3):E36.
7. Ancora G, Soffritti S, Faldella G. Diffuse and severe ischemic injury of the extremities: A complication of umbilical vein catheterization. *Am J Perinatol* 2006;23(6):341-344. Epub 2006 Jul 13.
8. Purohit DM, Levkoff AH, DeVito PC. Gluteal necrosis with foot-drop. Complications associated with umbilical artery catheterization. *Am J Dis Child* 1978;132(9):897-899.
9. Boo N, Wong N, Zulkifli S, Lye M. Risk factors associated with umbilical vascular catheter-associated thrombosis in newborn infants. *J Paediatr Child Health* 1999;35:460-465.