

# Use of Double Lumen Umbilical Catheters in Stable Premature Infants

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Double lumen catheters (DLC), umbilical or peripherally inserted, are commonly used in NICU. (1) The main objective of using DLC is to have additional intravenous access. However, in stable preterm infants, its use in early days of life may compromise nutrient delivery.

## Case Scenario:

A preterm infant weighing 900 grams was born at 26 weeks of gestation. The delivery was conducted due to maternal pre-eclampsia. The infant was stable at birth with Apgar scores of 7 and 8 at one and five minutes. He was placed on nasal continuous positive airway pressure (NCPAP). His vital signs including the blood pressure were stable. Soon after admission to neonatal intensive care unit (NICU) two double lumen umbilical catheters, venous and arterial, were inserted. After verifying the position with x-ray, admission fluids, including the starter total parental nutrition (TPN), were ordered. Total fluids were kept at 80 ml/kg/day. The rate of TPN infusion was set at 1.5 ml/hr; the other 1.5 ml/hr was run through the lumens of the catheters, see Table 1, column 1.

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## Discussion:

Table 1 showed the options of fluid administration at admission. As noted in option one, 50% of the total fluids is consumed in maintaining the patency of other lumens. It is now standard of care to start protein containing fluids soon after birth in the pre-term infant. The idea is to prevent negative nitrogen balance and provide adequate nutrition soon after birth. As noted in the case scenario, the use of double lumen catheters (DLC) resulted in the loss of 50% of the total fluid as it is consumed by other lumens, compromising the delivery of essential nutrients to the preterm

**Table 1: Options of running IVF using single and double lumen umbilical catheters**

Total Fluids	UVC port 1 (TPN fluid)	UVC port 2 (IVF + Heparin)	UAC port 1 (IVF + Heparin)	UAC port 2 (IVF + Heparin)
3ml/hr (80 ml/kg/day)	1.5 ml/hr (40 ml/kg/day)	0.5 ml/hr (13.3 ml/kg/day)	0.5 ml/hr (13.3 ml/kg/day)	0.5ml/hr (13.3 ml/kg/day)
3ml/hr (80 ml/kg/day)	2.5 ml/hr (67 ml/kg/day)	Heparin flushes	0.5 ml/hr (13.3 ml/kg/day)	Heparin flushes
3ml/hr (80 ml/kg/day)	2.5 ml/hr (67 ml/kg/day)	Single port	0.5 ml/hr (13.3 ml/kg/day)	Single port

TPN: Total Parental Nutrition (Dextrose and Protein)

IVF: Intravenous fluid (D10, 0.45 NS, 0.25 Na acetate)

UVC: Umbilical Venous Catheter

UAC: Umbilical Arterial Catheter

First option: Double lumen catheters, one running TPN, other three running IV fluids

Second option: Double lumen catheters, one running TPN, one IVF and other two heparin flushes

Third option: Single lumen catheters, both running fluids, no extra IVF or heparin flushes needed

infant.

The second option while still using DLC is to use frequent heparin flushes to keep lumen patent. However, this will result in frequent breaks in the central line circuit and also extra use of heparin. That could be a potential source of medication errors.

The use of DLC does not provide any extra benefits in newborn infants. This has been shown in a recent Cochrane review. (2) Double lumens have been shown to be an additional risk factor for central line-associated bloodstream infection in pediatric patients (CLABSI). (3)

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Basing on this brief review, we suggest that routine use of double lumen umbilical catheters in stable premature infants should be viewed critically and its use should be limited to sick unstable neonates that might need vasopressors and/or fluid resuscitation.

References:

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