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Case Report

Neonatology Section

Cardiac Tamponade and Right Side Pleural Effusion in a Preterm Neonate

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ABSTRACT

Umbilical venous catheterization is a common procedure in NICU, especially for parenteral nutrition in preterm and as long term intravenous access for term babies. However these "life lines" are not without complications, they may even cause life threatening complications like pericardial effusion and cardiac tamponade. We report a case of newborn with cardiac tamponade and right sided pleural effusion as a complication of umbilical venous catheterization.

Keywords: Pericardial effusion, Respiratory distress, Umbilical venous catheterization

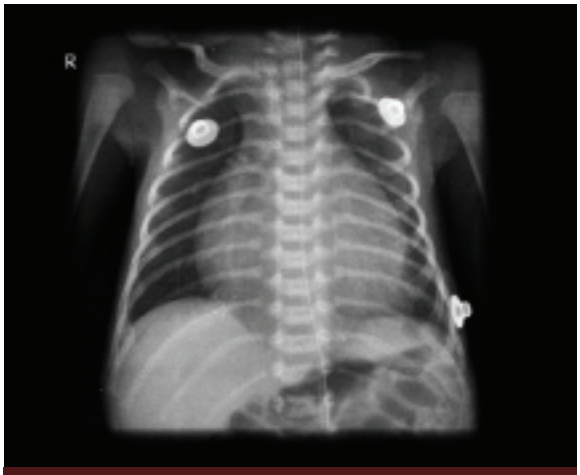
CASE REPORT

A 33 weeks preterm male baby, 2nd born of triplets presented with an unusual complication related to umbilical catheters. Mother had conceived after ovulation induction and had received two doses of steroids antenatally and was being regularly followed-up in our hospital without any other complications. Baby was delivered by LSCS with an APGAR of 6 and 7 at 1 minute and 5 minutes respectively and birth weight of 1.6 kg.

He was shifted to NICU for respiratory distress which settled soon and chest X-ray done was normal. Umbilical venous catheter was inserted for maintenance fluids and position confirmed with X-ray. Direct breast feeds initiated on day 2 of life and slowly feeds hiked up as baby tolerated feeds. On 8th day of life, baby had mild respiratory distress (Andersson Silvermann score –3) with oxygen requirement hence feeds stopped and continued on maintenance fluids alone. Respiratory distress worsened over the preceding 12 hours, with increased work of breathing and tachypnea (Andersson Silvermann score -6).

Sepsis evaluation was negative. However, chest X-ray showed cardiomegaly with globular contour [Table/Fig-1]. 2D ECHO done revealed massive pericardial effusion and right-sided pleural effusion. Emergency pericardiocentesis was performed under echocardiographic guidance along with right sided pleural tap. The drained fluid was straw colored with high glucose and normal cell count which was consistent with the infusate. Further investigations of the drained fluid ruled out possibility of infectious etiology [Table/Fig-2].

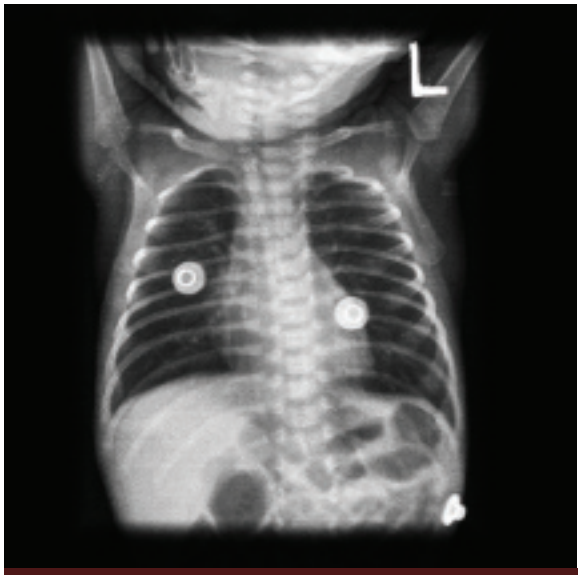
In view of possible complication of umbilical lines causing pericardial and pleural effusion, UVC was removed and fluids continued through peripheral lines. Baby was kept under close observation and further imaging showed resolution of pericardial effusion and no further fluid accumulation elsewhere [Table/Fig-3]. His condition



[Table/Fig-1]: Chest X-ray showing pericardial effusion.

Test Item		Pleural Fluid	Pericardial Fluid
Cell Count	RBC Count	905 cells/mm^3	350 cells/mm^3
	Total WBC count	100 cells/mm^3 DC on 50 cells N20 L30	20 cells/mm^3 DC on 50 cells N20L30
Chloride		102 mmol/L	99 mmol/L
Glucose		1250 mg/dL	1260 mg/dL
Protein		0.5 g/dL	0.1 g/dL
Specific Gravity		1.010	1.010
Culture		Sterile 5 days	Sterile 5 days
Macroscopic Appearance		Clear	Clear
AFB		Not seen	Not seen

[Table/Fig-2]: Chest X-ray showing pericardial effusion.



[Table/Fig-3]: Chest X-ray post-pericardiocentesis.

improved over next 48 hours and gradually feeding was established. Informed written consent of parents for publication of material related to clinical condition/image was taken.

DISCUSSION

Neonatal umbilical lines are a common procedure in NICU both due to the ease of insertion, easy availability and affordability [1] .They can infact be called as 'life lines' for newborns with fragile vessels and requiring long term TPN [2]. Though time and again, it has been stressed that umbilical catheters has to be used only when other safer alternatives are not available, a survey in United States of America NICU showed wide placement of UVC and UAC in the management of sick newborns [3,4].

However, there are innumerable risks associated with central lines like direct tissue injury, intravascular thrombosis, embolism, line related sepsis, pleural effusion, pericardial effusion with tamponade [1]. Of this pericardial effusion with tamponade is a rare complication with occurrence of 0.5%-2% and mortality rate of 45-67% [5] .The possible explanation for this is the perforation at the time of insertion and slow damage to the integrity of the vascular wall due to hyperosmolar solution, resulting in transmural diffusion of infusate into the pericardial space [2]. Other predisposing factors for effusion could be thoracic surgery secondary to PDA and chest tube placement for pneumothorax [6].

The desired location of catheter tip is just above the right diaphragm or at the level of thoracic vertebrae 8 or 9 at the junction between right atrium and IVC [3,4].The position of catheter tip should be checked immediately after insertion and serially monitored by X-ray or ultrasound [7]. However, complication related to pleural and pericardial effusion can occur inspite of the apparent appropriate position of long lines in X-ray [8].

Hong EJ et al., reported a 34 weeks preterm baby admitted to NICU for mild respiratory distress for which UVC was inserted for TPN [1]. Baby deteriorated and was found to have pericardial effusion which improved dramatically with pericardiocentesis.

Cartwright et al., in his largest series of central lines studies in newborn, consisting of 2186 catheters from 1984 -2002, has recommended the fixation of catheters at the level of right atrium and usage of radio opaque dyes to confirm position of catheter tips [6]. However, the most common cause of effusion related to CVL is thought to be the right atrial placement .The other explanations for effusion are probable migration of catheter tip or looping and being caught up against the wall of the right atrium or a fixation method that allows catheter migration. Migration of catheter tip may occur because of movement of baby's head and extremities and flushing of umbilical venous catheter by nursing staff [5]. Cartwright et al., also highlights the need to maintain records on CVL for future study and reference [6].

Neeraj Kumar et al., reported a case of bilateral chylous pleural effusion without pericardial effusion in 28 weeks, extremely low birth weight baby who had UVC insitu for partial parenteral nutrition [9].

In our case the chronology of events, high glucose content in the fluid, symptom resolution post-drainage and post removal of UVC supports the diagnosis of umbilical lines in causing pleural and pericardial effusion.

CONCLUSION

Umbilical lines are "life lines" in the care of newborns, especially preterm. However, they are not without complications, including life threatening pericardial tamponade. Hence, a judicious use of umbilical lines in NICU should be practiced. Any sudden deterioration of respiratory distress in a newborn with umbilical venous catheter insitu, common causes should be ruled out and line related complications like pericardial and pleural effusion should also be considered. Basic bedside echocardiography training in newborns should be a part of curriculum. In which case the prompt recognition of cardiac tamponade and pericardiocentesis could be life saving.

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