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Pericardial Tamponade in Neonate Following Migration of a Sialastic Central Venous Catheter

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Central venous catheters constitute an essential part of most neonatal intensive care units (NICU). However, they are known to be associated with several complications. We here with report a rare lethal complication of pericardial effusion with cardiac tamponade occurred in a term neonate following central venous line.

Keywords: *Central venous catheters, Pericardial effusion, Cardiac tamponade.*

In Neonatal intensive care units (NICU), central venous catheters (CVC) play an important role in the management of an extremely preterm neonates and neonates undergoing surgical intervention. CVC are commonly used for monitoring central venous pressure, administering medications, total parenteral nutrition and for long term vascular access. However, the use of CVC have been

associated with complications such as sepsis, thrombosis, embolism, migration of catheter tip leading to pericardial effusion (PCE), cardiac tamponade, hydrothorax and ascites(1).

Case Report

A term male baby born by normal vaginal delivery with a birth weight of 3.5 kgs was referred at 40 hours of life to our NICU in view of progressively increasing abdominal distension, bilious vomiting and non-passage of meconium since birth. Plain and contrast X-ray abdomen were inconclusive. In view of progressive decline in the clinical status, laparotomy was done, which revealed colonic atresia and was managed with resection and end-to-end anastomosis. A CVC (Sialastic 2 Fr per Q cath) was inserted electively by right femoral cut down and the position of catheter tip in inferior vena cava confirmed by check -ray and total parenteral nutrition (TPN) was started. Baby remained initially stable for 72 hrs then there was a sudden desaturation, bradycardia and cardiac arrest. With effective resuscitation neonate was revived back. A rare complication of cardiac tamponade due to CVC migration was considered and TPN was stopped immediately. Chest X-ray did showed migration of catheter tip from inferior vena cava to right ventricle, but no change in cardio thoracic ratio. The catheter was immediately pulled out and tip repositioned outside the cardiac silhouette. Echocardiography (ECHO) confirmed significant pericardial effusion with tamponade and it was intervened immediately by ECHO guided subxiphoid percutaneous pericardiocentesis resulting in 18 mL of milky white fluid. Biochemical analysis of the fluid was very much

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similar in composition of the TPN, which the baby was receiving through the CVC. Same central line was used for next two weeks without any problem for TPN and medications and was withdrawn electively once the neonate established enteral feeds.

Discussion

Pericardial effusion (PCE) with tamponade is a rare complication of central venous catheters associated with high mortality. It occurs in 1% of all adults with central venous catheters and has a high mortality of 80%(2). In neonates with central venous catheters the incidence of PCE with tamponade is 0.5-2%(3) and mortality varies from 45-67%(4). The high mortality is mainly due to its sudden onset with rapid deterioration and the lack of awareness with delayed intervention added to it. Myocardial perforation and effusion can either occur at the time of cannulation or later due to slow damage to the integrity of the vascular wall resulting in either transmural diffusion of the infusate or erosion of the line in to the pericardial space. The most common presentation is sudden, unexplained cardiac arrest as in our baby and rest of them present as unexplained cardio respiratory instability such as hypotension, bradycardia, de saturation *etc.*(3). Though an urgent echocardiography may clinch the diagnosis, its absence should not delay the therapeutic pericardicentesis once the diagnosis is strongly suspected as in our child where sudden clinical deterioration occurred in an otherwise normal neonate with central venous line. The volume of fluid aspirated may be small. A volume of 11.4 ± 1.5 mL/kg body weight is enough to result in tamponade(5). In our child we had 18 mL aspirate, which was typically bloodless, similar in composition to the infusate (TPN)(4). The mean duration from the insertion of central venous line and presentation has been reported to be 3 days (range 0-37 days)(3), which is very much similar to our case. Several risk factors have been proposed to increase the risk of PCE with cardiac tamponade in a neonate with CVC. Neonatal cardiac atrium is more susceptible to damage as some areas have very little musculature(3). PCE is most commonly described with catheter tips placed within cardiac outline, though extra cardiac positioning does not

completely abolish the risk of PCE(6). The food and drug administration (FDA) of the United States of America recommends that for the safe placement of CVC "the catheter tip position should be confirmed by X-ray or other imaging modality and rechecked periodically(7). Catheter inserted via neck or arm vein have more chance of migration there by increases the risk of PCE(8). Polyethylene or polyurethane catheter in contrast to silastic catheter has more risk of PCE(9). Central venous catheters though form an essential component of neonatal care, they are associated with serious complications and hence should be used with caution. This case report of a term neonate who developed PCE and tamponade resulting from catheter migration is to highlight the need for high index of clinical suspicion in diagnosing and treating a rare highly fatal catheter related problem.

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