

A newborn with intracardiac mass which is generated secondary to umbilical vein catheterization

Summary

Umbilical vein catheterization is a routine procedure of neonatal intensive care units and only rare complications associated with catheter malposition have been described in the literature. We herein present an infant boy (28 day old, 4 kg) with an intracardiac mass diagnosed after umbilical vein catheterization. Patient was referred to our clinic with the diagnosis of catheter migration and thrombosis but this could not be confirmed during surgery. Pathological analysis of the excised intracardiac mass revealed nonbacterial thrombotic endocarditis. Our case confirms the essentiality of controlling a proper location of the umbilical venous catheter after its insertion.

Key words: neonate; thrombosis; umbilical venous catheters; Non-Bacterial Thrombotic Endocarditis

ÖZET

Umbilikal ven kateterizasyonu yenidoğan yoğun bakım ünitelerinde santral venöz erişim için rutin olarak uygulanan girişimlerden biridir. Literatürde kateter malpozisyonuna sekonder gelişen nadir komplikasyonlar bildirilmiştir. Burada umbilikal ven kateterizasyonunu takiben intrakardiyak kitle tanısı ile kliniğimize yönlendirilen erkek yenidoğan bir vaka sunulmaktadır. Operasyonda kateter migrasyonu veya tromboz gözlenmezken eksize edilen intrakardiyak kitlenin patolojik tanısı nonbakteriyel trombotik endokardit ile sonuçlanmıştır. Umbilikal venöz kateterin uygun lokasyonda olduğunun kontrolü komplikasyonların önlenmesinde temel gerekliliktir.

Anahtar kelimeler: yenidoğan, tromboz, umbilikal ven kateterizasyonu, nonbakteriyel trombotik endokardit

Introduction

Umbilical vein catheterization (UVC) is one of the easiest methods to access a central vein and is performed routinely in neonatal intensive care units. UVC is indicated in conditions when the infant is likely to require intravenous fluids / medications, parenteral nutrition and therapeutic plasma exchange on the early postnatal. Cardiac catheterization in the neonate via the umbilical vein with two-dimensional echocardiographic guidance is described as an effective and safe approach in the literature ⁽¹⁾. However, UVC may seldom cause fatal complications such as infection, venous thrombosis, catheter migration into cardiac or portal system and cardiac tamponade^(2,3,4).

This report describes an infant with an intracardiac mass which occurred following UVC, with the aim of enlightening the underlying pathology.

Case report

A 28 days old, 4 kg, baby boy delivered by caesarean section at term from a 38 year-old mother in rural Turkey, was referred to our clinic with the diagnosis of umbilical catheter migration. The mother had no complaint during her pregnancy. No evidence of congenital malformations was found on her prenatal ultrasonographic examinations. No family history of congenital heart defect was noted. In the early postnatal period, following a sepsis diagnosis, intravenous antibiotherapy regimen was ordered for 15 days by placing UVC. On the routine transthoracic echocardiography (TTE) examination after recover, it was revealed that catheter migration and thrombosis. The computed tomography angiography (CTA) (Figure 1) was performed at the 26 days of life and patient was referred to our clinic with suspicion of catheter migration and/or thrombosis. On admission, his general condition was good and TTE revealed a mass suggestive of a thrombus or umbilical catheter migration into the right atrium,

although these findings were not confirmed by scopy. To confirm the diagnosis and prevent potential embolic complications of intracardiac mass, it was decided to remove of it.

Surgical procedure:

Following median sternotomy, right atriotomy was performed and a 1x1x0.5 cm solid tissue mass originating from the inter-atrial septum was carefully resected (Figure 2). Inter-atrial re-septation was accomplished with a fresh autologous pericardial patch. Following the operation, patient was extubated on postoperative day 2. and discharged home on the postoperative day 10. Pathology of the intra-cardiac mass showed non-bacterial thrombotic endocarditis (NBTE) with vegetation consisting of calcification (Figure3) which could develop caused by endocardial trauma on the basis of malposition of umbilical catheter.

Discussion:

The appropriate location for the tip of the umbilical vein catheter is typically the cephalad portion of the IVC or the IVC–RA junction. Complications due to umbilical vein catheterization such as necrotizing enterocolitis, portal vein thrombosis and hepatic necrosis have been reported^(4,5). Still vegetations secondary to endocardial trauma are extremely rare⁽⁶⁾. Factors associated with thrombosis include endothelial damage during catheter placement, composition of the infusion solution, catheter characteristics, and the duration / location of catheter placement. Although it is used some formulations to achieve the ideal position of the catheter, such as shoulder- umbilical length or umbilical stump-xiphisternum length⁽⁷⁾, optimal approach is to perform under ultrasound guidance or to identify its location under fluoroscopy^(2,4).

An umbilical vein catheter can cross the interatrial septum from the right to the left via a true atrial septal defect or, more likely, via a patent foramen ovale. This kind of malpositions can

result when the catheter is introduced by a pediatrician without imaging guidance⁽³⁾. Rare complications including pericardial effusion, cardiac tamponade, arrhythmias and thrombotic events have been also reported^(4,5).

This case serves to illustrate an unusual clinical and surgical presentation of a NBTE located at the inter-atrial septum secondary to endocardial trauma of UVC without thrombotic complication in a neonate.

NBTE is a disease characterized by the presence of intra-cardiac vegetations, which consist of fibrin and platelet aggregates, in the absence of inflammation or bacterial infection^(8,9). Vegetations are typically small and irregular in shape, and easily friable and frequently a good source of emboli. Except vegetations, valvular tissues are free from pathologic process and inflammatory or reactive changes on valves are uncommon. NBTE has increasingly been recognized as a condition associated with an underlying disease, such as malignities especially mucinous adenocancer, autoimmune disorders, malnutrition and impaired general conditions (eg; Acquired Immune Deficiency Syndrome). NBTE is usually asymptomatic^(8,9) and its ante-mortem diagnosis is possible. Correction of the underlying cause is essential for cure.

Kim et al. reported the significant risk factors in neonates who had undergone UVC. A catheter being present for more than 6 days and intra-cardiac malposition of the catheter identified that correlated with catheter related thrombosis. Authors emphasize that the ideal position of the catheter should be assessed with imaging guidance during or after intervention of the abdomen and the chest⁽²⁾.

The main feature of this case, surgical findings of the mass could not be predicted as NBTE. Preoperative imaging by TTE or CTA could not indicate vegetations because the existence of calcification and fibrosis of endothelium in the course of catheter, which was mimicking catheter itself.

In conclusion, NBTE should be considered as a benign complication related to an umbilical venous catheter of the neonate that can be successfully managed.

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Figure 1 depicts the mass extending from the inferior vena cava to the right atrium by CTA.

Figure 2A,B: Operative photos show intraperative appearance of the mass.

Figure 3A,B: The microscopic examination of surgical specimen shows