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Case Report

Catheter-Directed Thrombolysis in a Neonate with Infrarenal Thrombosis: A Case Report

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ABSTRACT

Background: Aortic thrombosis represents an uncommon yet severe condition in this population, often associated with umbilical arterial or venous catheterization, sepsis, prematurity, or thrombophilia. Due to its low frequency, standardized management guidelines are lacking, and therapeutic decisions are frequently extrapolated from adult data. Available treatment options include anticoagulation, systemic or catheter-directed thrombolysis, and surgical thrombectomy, each with variable reported outcomes. Given the limited evidence and absence of consensus, individual cases contribute valuable insight into therapeutic safety and effectiveness in neonates with aortic thrombosis.

Case Report: A late preterm female neonate, weighing 2,500 grams, presented with congenital pneumonia and suspected sepsis, necessitating orotracheal intubation and antibiotic administration via an umbilical venous catheter. On day five, she developed vasospasm in the right lower limb, unresponsive to catheter removal. Doppler ultrasound revealed infrarenal abdominal aorta thrombosis extending to the iliac arteries. Despite being hypotensive and in poor condition, she underwent successful thrombectomy and catheter-directed thrombolysis with alteplase, with post-procedure Doppler demonstrating improved blood flow. Outpatient management with low molecular weight heparin was continued, and follow-up revealed no further thrombotic events, with thrombophilia tests remaining normal. Due to the low incidence of thromboembolic events in children, most treatment information is extrapolated from adult guidelines, with anticoagulation, thrombolytic agents, and thrombectomy as options, though no consensus exists on their use, particularly in neonates.

Conclusion: This case demonstrates the utility and effectiveness of catheter-directed thrombolysis as a safe treatment method for these patients.

Keywords: Aortic thrombosis, Neonatology, Thrombectomy, Thrombolysis

Introduction

Thrombotic events in the pediatric population are rare, with a prevalence of 2.6 to 6.4 per 100,000 live births (1). Thrombosis occurs more frequently in sick neonates, particularly preterm infants, though risk factors in this population are not well elucidated (1). Aortic thrombosis, though uncommon, is clinically significant in neonates due to its potential for major complications depending on the occlusion level (2). It is associated with umbilical catheter use in 80% of cases but can also result from conditions such as thrombosed ductus arteriosus aneurysm, sepsis, thrombophilia, mechanical ventilation, or gestational age (1, 2). Despite its clinical importance, neonatal aortic thrombosis management lacks standardization due to limited studies and unified guidelines. This case report presents a neonate with aortic thrombosis treated with thrombectomy and catheter-directed

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thrombolysis, resulting in favorable outcomes. Informed consent for publication was obtained from the patient's legal guardian, and ethics committee approval was secured.

Case report

A female late preterm neonate, weighing 2,500 grams, with no relevant medical history, was diagnosed extrainstitutionally on the first day of life with congenital pneumonia and suspected sepsis, requiring orotracheal intubation and antibiotics administered via an umbilical venous catheter. On the fifth day, she was transferred to our institution due to vasospasm in the right lower limb, which persisted after catheter removal. Doppler ultrasound revealed thrombosis of the infrarenal abdominal aorta extending to the iliac arteries, prompting referral on the sixth day of life (Figure 1).

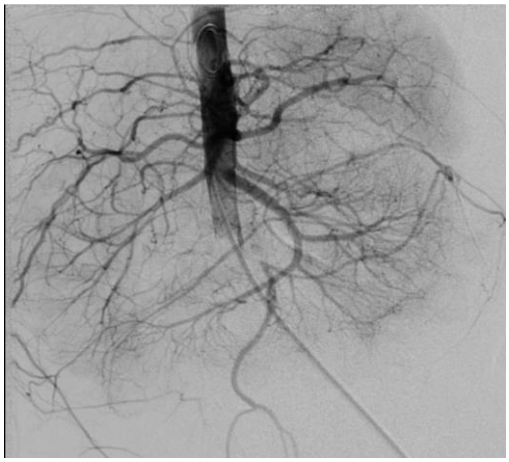

Figure 1. Infrarenal abdominal aorta occluded by thrombus. Absence of contrast filling in the common iliac arteries is observed

Upon admission, the patient was hypotensive, in poor general condition, requiring ventilatory, inotropic, and vasoactive support, with absent femoral pulses. A thoracoabdominal AngioCT showed occlusion of the infrarenal abdominal aorta and common iliac arteries, with patency of the external iliac and inferior mesenteric arteries via collateral circulation. Blood tests indicated thrombocytopenia (85,000 mcL) and hypofibrinogenemia (48 mg/dL), attributed to the underlying infectious process.

In the catheterization laboratory, angiography confirmed infrarenal abdominal aorta occlusion by a thrombus, with no contrast filling in the common iliac arteries. A partial thrombectomy was performed on the mid-abdominal aorta, followed by catheter-directed thrombolysis with alteplase. A 50 cc vial of alteplase was diluted in 250 cc of normal saline, from which 5 cc was administered as an intravenous bolus, followed by an infusion at 0.03 mg/kg/h without complications. The infusion continued for 12 hours, with fibrinogen levels maintained above 100 mg/dL, platelet count above 100,000, and positive D-dimer. Improved distal perfusion in the lower extremities was observed, leading to discontinuation of the infusion and initiation of anticoagulation with low molecular weight heparin (enoxaparin, 1 mg/kg every 12 hours, with anti-Xa levels between 0.5 and 1 IU/mL).

Post-procedure Doppler ultrasound showed restored flow in the aorta and common femoral arteries with triphasic waves, though residual thrombi in the abdominal aorta did not significantly affect blood flow (Figure 2). Given

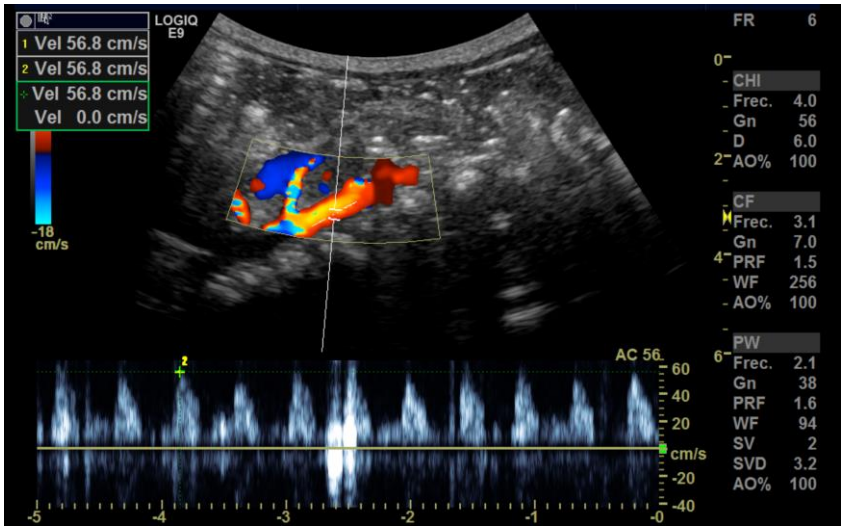

Figure 2. Vascular Doppler image of the descending aorta after catheter-directed thrombolysis showing normal flow

clinical improvement, outpatient anticoagulation with low molecular weight heparin was continued for six weeks. Thrombophilia studies, conducted after anticoagulation completion, showed normal protein S and C levels, normal platelet aggregation, and normal anti-factor Xa levels, with only decreased antithrombin III function (60%) noted, without other indications of thrombophilia. Follow-up at one month and one year showed no new symptoms or thrombotic events, and repeated thrombophilia tests remained normal.

Publication consent was obtained from the patient's guardians, and ethics committee approval was secured.

Ethical Approval

This study was reviewed and approved by the institutional ethics committee under the reference number 2024.166.

Discussion

Thrombotic diseases in neonates are a significant clinical challenge due to their rarity and variable manifestations. They are more common in the femoral, iliac, and cerebral arteries, with aortic thrombosis being rare (2). A study from 1978 to 1999 found 77% of cases were associated with umbilical arterial catheters, and only 8% were due to thrombophilic disorders (3). A recent study identified catheters as the primary risk factor, followed by surgical procedures, mechanical ventilation, infection or sepsis, gestational age, and respiratory distress (1). In this case, the umbilical catheter, concurrent infection, and mechanical ventilation likely contributed to thrombus formation. The rapid onset, location, and extent of the thrombus are notable.

Due to the low incidence of pediatric thromboembolic events, specific protocols are lacking, and most data are from case reports. Diagnosis typically relies on imaging, with contrast angiography as the gold standard, though Doppler ultrasound is effective and avoids contrast exposure (3–6). Treatment recommendations are largely extrapolated from adult guidelines (3, 7, 8). Options include anticoagulation, thrombolytic agents, and thrombectomy, but no consensus exists, particularly for neonates (3, 7). Commonly used treatments include low molecular weight or unfractionated heparin and fibrinolytic agents, with alteplase being the most frequent due to its short half-life and efficacy in binding fibrin-bound plasminogen for rapid thrombus dissolution (2, 5, 6, 8). Catheter-directed thrombolysis or thrombectomy, as used in this case, is also reported (3).

No consensus exists on which patients require thrombophilia studies (7). While these studies do not affect acute treatment, we recommend evaluating hematological disorders in all patients, regardless of risk factors. In this case, thrombophilia studies were negative on two occasions (post-anticoagulation and one year later), though low antithrombin III levels were noted, a rare cause of aortic thrombosis (9). This deficiency can be asymptomatic for extended periods and manifest in later events (9, 10).

Conclusion

Limited cases of aortic thrombosis in pediatric patients are reported, and no evidence-based guidelines exist. However, thrombolysis and thrombectomy, combined with anticoagulation, appear safe and effective in the short and long term. In this case, therapy was successful without complications. Further studies are needed to consolidate the literature.

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Conflicts of interest

Not applicable.

References

1. Song S, Li Z, Zhao G, Li X, Wang R, Li B, et al. Epidemiology and risk factors for thrombosis in children and newborns: systematic evaluation and meta-analysis. *BMC Pediatr*. 2023;23(1):292.
2. Lapite A, Abu-Arja MH, Han H, Lee-Kim Y, Sartain SE, Cohen CT. Management of neonatal and infant aortic thrombosis: A single-center case series. Pediatr Blood Cancer. 2024;71(11):e31283.
3. Gerardin JF, Anderson CS, Armstrong AK, Grifka RG. Descending aorta thrombus in a neonate mimicking coarctation of the aorta: Mechanical thrombectomy using the AngioJet® catheter. *Cathet Cardio Intervent*. 2013;81(2):E134-138.
4. Resontoc LPR, Yap HK. Renal vascular thrombosis in the newborn. *Pediatr* Nephrol. 2016;31(6):907–915.
5. Kaulitz R, Luhmer I, Wilken M, Kallfelz HD. Thrombotischer Verschluß der Aorta abdominalis im Neugeborenenalter - erfolgreiche Lysebehandlung. Klin Padiatr. 1992;204(03):141–144.
6. Amonkar PS, Gavhane JB, Kharche SN, Kadam SS,

Bhusare DB. Aortic thrombosis in a neonate with COVID-19-related fetal inflammatory response syndrome requiring amputation of the leg: a case report. Paediatr. Int. Child Health. 2021;41(3): 211–216.
7. Al Nuaimi M, Williams S. Successful systemic thrombolysis in a neonatal occlusive abdominal aortic thrombus secondary to hypernatremic dehydration: A case report and literature review. J Pediatr Hematol Oncol. 2020;42(7):e589–592.
8. Woods GM, Kim DW, Paden ML, Viamonte HK. Thrombolysis in children: A case report and review of the literature. Front Pediatr. 2022;9:814033.
9. Sánchez J, Velasco F, Alvarez R, Roman J, Torres A. Aortic thrombosis in a neonate with hereditary antithrombin III deficiency: successful outcome with thrombolytic and replacement treatment. Acta Paediatrica. 1996;85(2):245–247.
10. Smith N, Warren BB, Smith J, Jacobson L, Armstrong J, Kim J, et al. Antithrombin deficiency: A pediatric disorder. Thromb Res. 2021;202:45–51.