Cardiology in the Young

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Use of mechanical thrombectomy in very early-onset inflammatory bowel disease patient with extensive venous thrombosis

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Brief Report

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Abstract

Mechanical thrombectomy is generally used in adult patients with pulmonary embolism or extensive venous thromboembolism, but it is starting to become more prevalent in the children. We present a unique case of a 3-year-old female with very early-onset inflammatory bowel disease with extensive venous thromboembolism who underwent successful mechanical thrombectomy.

Very early-onset inflammatory bowel disease is a unique disease process seen in children less than 6 years of age. The early onset of this disease leads to a more severe course for these patients from a bowel perspective, and it can be associated with extraintestinal manifestations as well as systemic complications.[1–3] We present a unique case of a children with newly diagnosed very early-onset inflammatory bowel disease found to have extensive venous thrombosis who underwent successful mechanical thrombectomy.

Case report

A 3-year-old previously healthy female presented with fatigue and lower extremity oedema and was found to be extremely anaemic with a haemoglobin of 3.7g/dL. A CT scan was performed revealing extensive, near occlusive thrombus from the hepatic inferior vena cava down to the bilateral popliteal vein. An echocardiogram was performed showing no intracardiac thrombus. Esophagogastroduodenoscopy and colonoscopy were performed and showed areas of diffuse inflammation, mucosal oedema, and ulceration. Biopsies were obtained and pending at the time of initial intervention. Due to the extensiveness of the thrombus burden along with risk of gastrointestinal bleed given the endoscopy findings, the decision was made to perform mechanical thrombectomy instead of pharmacotherapy.

The patient was brought to the cardiac catheterisation lab and placed under general anaesthesia. A 7-French sheath was placed in the right internal jugular vein with the goal to debulk the inferior vena cava. Initial angiography showed extensive thrombus from the hepatic inferior vena cava down to the iliac vein bifurcation (Fig. 1). The Penumbra Indigo aspiration system (Penumbra Inc., Alameda, CA) was used for mechanical thrombectomy. We initially used the Penumbra lightning 7-French system with extensive clot removal (Fig. 2). The patient was transferred back to the ICU and started on therapeutic lovenox.

Repeat lower extremity ultrasounds, performed after 72 hours of therapeutic anticoagulation, showed no improvement of the left external iliac vein down to the popliteal vein. The patient continued to have significant swelling in the left lower extremity and refused to ambulate. She was brought back to the cardiac catheterisation lab, and a 7-French sheath was placed in her right femoral vein. Initial angiography depicted extensive thrombus burden (Fig. 3). Again using the Penumbra Indigo system we did extensive mechanical thrombectomy from the external iliac vein to the popliteal veins. We initially used the 7-French system but downsized to the 6-French system to advance more distally. Significant thrombus was removed, and there was angiographic improvement (Fig. 4). The patient was transferred back to the ICU and continued on lovenox for anticoagulation. She was able to be discharged home on lovenox and prednisone with concern for inflammatory bowel disease.

Discussion

Inflammatory bowel disease patients are higher risk for venous thromboembolism.[2–4] Patients with the very early-onset version have a more severe course with presumed higher incidence of

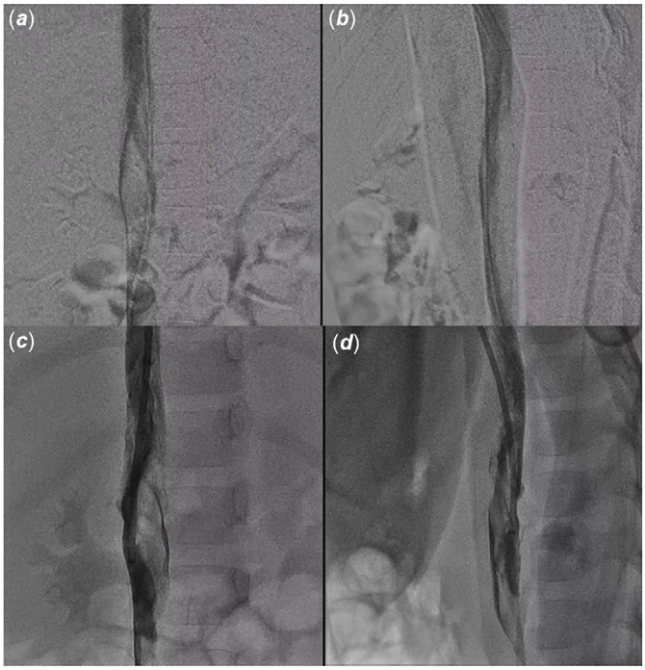

Figure 1. A) Digital subtraction RAO 0 deg, caudal 0 deg. B) Digital subtraction LAO 90 deg, caudal 0 deg. C) RAO 0 deg, caudal 0 deg. D) LAO 90 deg, caudal 0 deg. Angiography depicting extensive thrombus formation from above the renal veins down to iliac vein bifurcation.

Figure 2. Thrombus removed from inferior vena cava. Some clot is more white in colour, while other is a dark red.

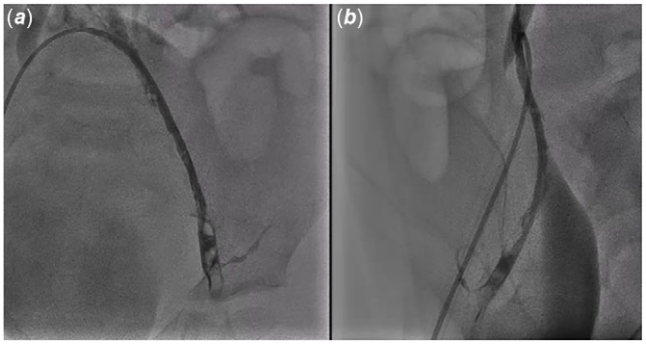

Figure 3. A) RAO deg, caudal deg. B) LAO 90 deg, caudal deg. Angiography depicting extensive thrombus formation from the iliac vein bifurcation to the common femoral vein.

systemic complications. We present a unique case of a young female with new-onset very early-onset inflammatory bowel disease found to have extensive thrombus burden from her hepatic inferior vena cava to her popliteal veins that underwent successful mechanical thrombectomy.

Venous thromboembolism in children can be approached many different ways, including medical therapy, mechanical thrombectomy, and catheter-directed medical therapy. The Penumbra Indigo aspiration system allows for debulking of extensive venous thromboembolism in children and can be performed through a 4-french sheath. This versatile system has been shown safe and effective in its use in pulmonary embolism in adults.[5] The system has been used in unique cases in the children such as obstructed renal vein in a transplanted kidney and central shunt thrombosis in pulmonary atresia.[6–7] Its different size capabilities allowed us to perform thrombectomy in the larger inferior vena cava as well as in the child's smaller vessels such as in the popliteal veins. This system can cause significant blood loss, haemolysis, and vessel damage, so care must be taken. Our patient received a significant amount of blood products prior to coming to the cardiac catheterisation lab the first time and had an initial haemoglobin of 8.8g/dL. She did receive another 15 ml/kg of packed red blood cells during the procedure and had post-procedure haemoglobin of 8.0g/dL. Due to the significant amount of debulking, some blood loss, and anaesthesia time, the decision was made to stage the procedure and bring the patient back 3 days later for more distal mechanical thrombectomy.

Conclusion

Mechanical thrombectomy using the Penumbra Indigo aspiration system is a viable option for children in which pharmacologic therapy is contraindicated. We present a patient with new-onset very early-onset inflammatory bowel disease found to have extensive venous thrombosis that successfully underwent mechanical thrombectomy.

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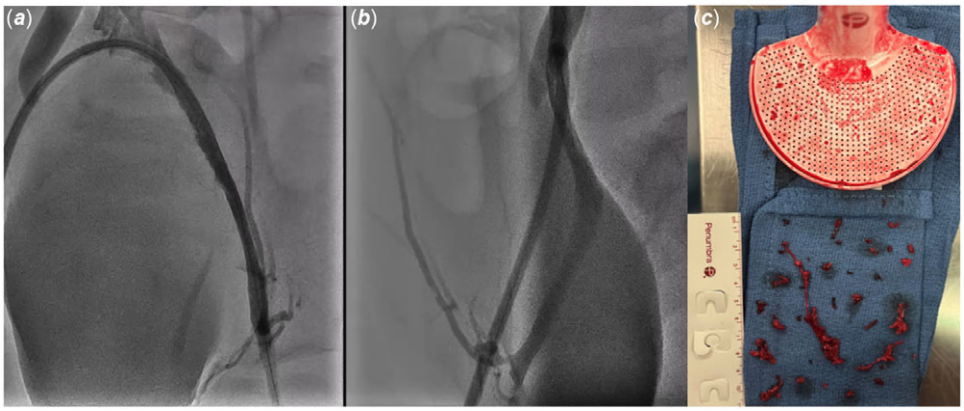

Figure 4. A) RAO deg, caudal deg. B) LAO 90 deg, caudal deg. Significant improvement in thrombus burden from the iliac vein bifurcation to the common femoral vein. C) Thrombus removed from the iliac bifurcation down to the popliteal vein.

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Competing interest. None.

Ethical standards. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in this case report.

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