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Vascular Access: A Clinical Conundrum in Endovascular Management of Iliac Pseudoaneurysm

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A 14-year-old girl with cerebral palsy and left lower extremity weakness since birth presented with severe right hip pain and right lower limb weakness. There was associated fever and leucocytosis. There was flexion deformity of the right thigh. She had a fall 3 months before the presentation. Imaging revealed thoracic scoliosis and vertebral segmentation anomalies affecting the thoracolumbar spine, posterosuperior dislocation of the right hip, a low-lying tethered cord with long segment syrinx, and lipomyelomeningocele. On computed tomography, there was a well-defined saccular outpouching measuring $2.8 \times 1.8 \times 1.9$ cm arising from the right external iliac artery at the L2 to L3 vertebral level (►**Fig. 1**). The aortic bifurcation was at a higher level (L1 vertebral level) (►**Fig. 1**). The right internal iliac artery arose from the proximal left common iliac artery (►**Fig. 1**). The right hip fluid culture and repeated blood cultures were negative. The possibility of vasculitis was ruled out as there was no vessel wall thickening and negative inflammatory markers. Given the absence of inflammation and infection, the iliac artery pseudoaneurysm was considered traumatic. An open reduction in right hip joint dislocation was not feasible due to the traumatic right iliac artery pseudoaneurysm. Considering the young age, surgical repair of the pseudoaneurysm was initially suggested. However, the deep pelvic location of the pseudoaneurysm and difficult posturing from cerebral palsy precluded surgery. An endovascular repair was favored. However, the patient was unable to straighten her right leg for femoral arterial access due to flexion deformity. The right hip joint collection was considered to interfere with manual compression following arterial sheath removal. Contralateral left femoral access was not an option due to the acute angle at the aortic bifurcation. The diameter of the left brachial artery was 3 mm, which would not be ideal for placing larger sheaths for stent graft placement. Despite the limitations, we considered right femoral arterial access as the best option. General anesthesia and muscle relaxants led to the relaxation of the adductor muscles, causing a decrease in flexion and adduction deformity of right leg. A right femoral arterial puncture was performed at the lower third of the common femoral artery and a 6F sheath was placed. A diagnostic angiogram of the infrarenal abdominal aorta and right external iliac artery confirmed the location of the pseudoaneurysm (►**Fig. 2A, B**). A stent graft of size 6 mm × 80 mm (Fluency, Bard, Georgia, USA) was deployed across the pseudoaneurysm, excluding the pseudoaneurysm from the iliac artery (►**Fig. 2C**). Manual compression achieved hemostasis following sheath removal. Postprocedure computed tomography revealed a patent stent with a thrombosed pseudoaneurysm sac. The patient was started on dual antiplatelet medication and is being considered for open surgical reduction in the right hip with detethering of the spinal cord.

This case primarily highlights the importance of difficult vascular access in patients with flexion and adduction deformity. The judicious use of general anesthesia and muscle relaxant helps in obtaining difficult femoral access. In the presence of hip collection and flexion deformity, modification of access site is sometimes necessary for achieving hemostasis by manual compression. Use of vascular closure device can be considered in such situation where manual compression is not suitable. Moreover, identification of this anatomical variation in the anomalous origin of the right internal iliac artery from the proximal left common iliac artery is crucial for endovascular planning,[1,2] as in the

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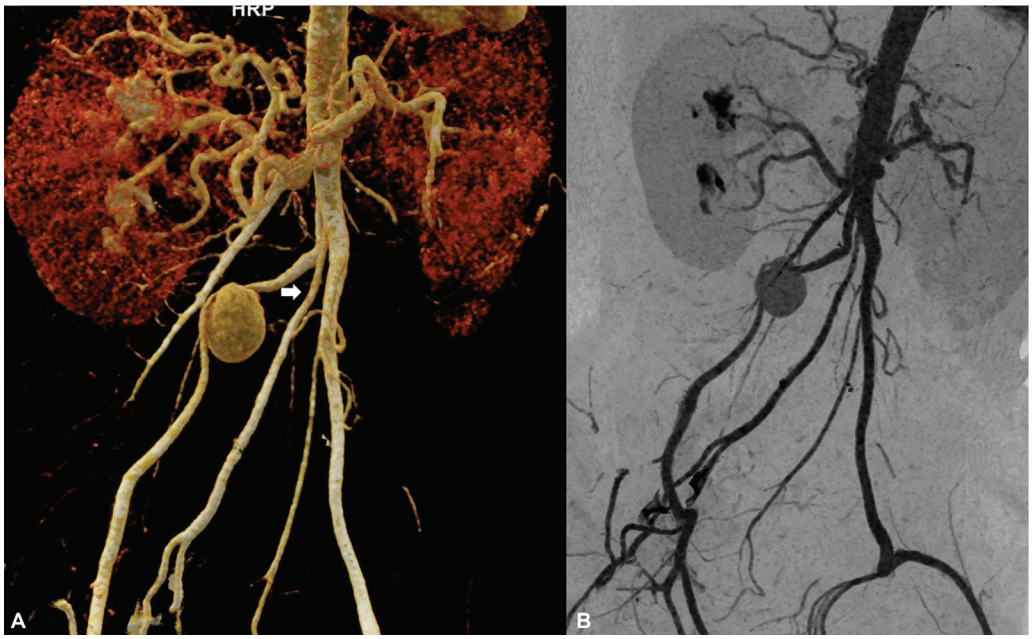

Fig. 1 Volume rendered (**A**) and virtual angiographic image (**B**) showing the origin of the right internal iliac artery (shown by white arrow) from the proximal left common iliac artery. Note the large pseudoaneurysm from the right external iliac artery.

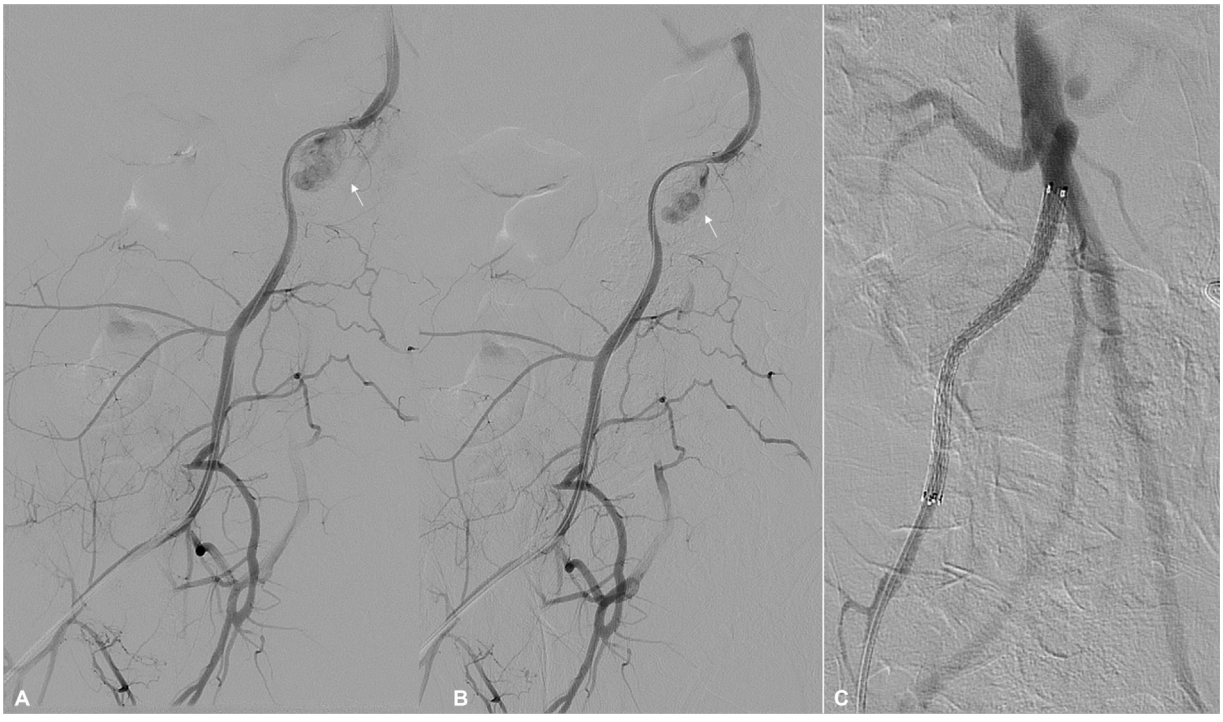

Fig. 2 Diagnostic angiogram of the right external iliac artery (**A**, **B**) revealed narrow-necked pseudoaneurysm arising (shown by thin white arrow) from the right external iliac artery with a postprocedure angiogram(**C**) revealing complete exclusion of pseudoaneurysm sac from the right external iliac artery.

absence of this anatomical variation, external iliac artery pseudoaneurysms would require coverage of the ipsilateral iliac artery and occlusion (with coils or plugs) of the internal iliac artery to prevent possible endoleak. Besides, this anatomical variation also gave adequate proximal landing zone of the stent graft. The high origin of abdominal aorta branches in children with myelomeningocele is also reported in the literature as anatomical variation, which is sometimes associated with acute angulation making contralateral femoral access difficult.

Note
IRB approval, consent statement, and clinical trial registration: The Institutional Ethics Committee waived off the need for patient written informed consent.

Data Availability Statement
The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Ethical Statement
All procedures performed in studies involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Presentation at a Meeting
None.

Source(s) of Support
None.

Conflicting Interest
None declared.

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