Unilateral persistent sciatic artery

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INTRODUCTION

Persistent sciatic artery (PSA) was first described by Green et al. (1) in a post-mortem case. PSA is a rare congenital vascular anomaly, with a prevalence of 0.03-0.06% of the population. It was found to be bilateral in about 32.2% of patients (2). Most reported PSA cases are found once symptomatic while the asymptomatic presentations are found incidentally.

The sciatic artery, a branch from the umbilical artery is the major source of the lower extremity (3). However, developmental errors arteries. The sciatic artery then regresses and the femoral system takes over the blood supply of the lower extremity. Based on prior publications, this PSA in this case report is the complete type (type II) as it reached the popliteal fossa and is the main provider of blood to the lower extremity.

DISCUSSION

Even though PSA is a rare embryologic malformation, various classifications for PSA have been described. Pillet et al. (4) classified PSA into 4 different categories: Type I with a complete PSA and a normal femoral artery, type II with a complete PSA and a hypoplastic femoral artery, type III with an incomplete superior PSA, where the upper part of this artery persists along with the femoral artery and type IV with an incomplete inferior PSA, where the lower part of this artery persists along with the profunda femoris artery (Figure 1C), and gave off genicular arteries, but the femoral artery was hypoplastic. In the complete type (types I and II), the PSA reaches the popliteal fossa and is the main provider of blood to the lower limb. In incomplete PSA (types III and IV), the PSA is usually hypoplastic, ending in the thigh, and the femoral artery continues into the popliteal fossa as the popliteal artery. Based on the classification by Pillet, the PSA in this case report is the complete type (type II) as it reached the popliteal fossa, divided into the anterior and posterior tibial arteries (Figure 1C), and gave off genicular arteries, but the femoral artery was hypoplastic. More recent classification of PSA was published by Ahn et al. (5) based on the presence of complete or incomplete PSA and femoral artery (superficial femoral artery). The present case report fits into the class III type of Ahn-Min’s classification where PSA is complete and femoral artery is hypoplastic (Figures 1C and E). Ahn et al. (5) reported that PSA is usually seen unilaterally (67.8%) with a slightly higher occurrence on the left side (35.6%) as opposed to the left side (32.2%). PSA in the present case was seen only on the left side.
Figure 1) Photograph showing (A) Division of common iliac artery (CIA) to external (EIA) and internal iliac artery (IIA) in the left limb (Anterior view) (B) PSA coursing inferior to periformis (PM) and medial to sciatic nerve (SN) (Posterior view) (C) PSA giving rise to anterior (ATA) and posterior tibial artery (PTA) (Posterior view) (D) Femoral artery (FA) giving rise to the profunda femoris artery (PFA) (Anterior view). Shown also is the femoral nerve (FN) (E) Hypoplastic femoral artery (FA) that terminates in the distal thigh (Anterior view). (Sup-Superior, Inf-Inferior, Med-Medial, Lat-Lateral).
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Interestingly, the diameter of the internal iliac artery (8 mm) in this cadaver was much larger than that of the external iliac artery (4 mm) (Figure 1A), raising the possibility that persistence of the sciatic artery could have been the result of inadequate development of the external iliac artery. Nicholson et al. (6) described two cases of PSA: in one case, both the external iliac artery and femoral artery were completely lacking, and in the other case, both of these arteries were unremarkable. Shah et al. (7) reported persistence of the sciatic artery in a newborn with hypoplastic external iliac artery, which further supports the possibility of incomplete development of the external iliac artery as a contributing factor for failure of the sciatic artery to regress during embryological development.

In this cadaver, the femoral vein in the left lower limb was hypoplastic similar to the femoral artery and the popliteal vein was seen draining into the profunda femoris vein. Reports of such coexistence of venous variations along with PSA are extremely rare. Jiji et al. (8) reported a similar finding in which the popliteal vein communicated directly with the profunda femoris vein; however, these authors did not report any arterial variation (e.g., the persistence of the sciatic artery). Interestingly, the right lower limb which had normal arterial presentation also had venous abnormalities, where the popliteal vein drained both into the femoral vein and the profunda femoris vein. Parry et al. (9) reported PSA in a patient who also had a hypoplastic femoral vein and a persistent sciatic vein that drained into the profunda femoris vein. In the embryo, the sciatic vein runs along with the sciatic nerve, receives venous blood from lower extremity and usually regresses at 10-12 weeks. Similar coexistence of venous variation was also reported by Jung et al. (10) where the limb with PSA had a persistent sciatic vein and a large communicating vein between the profunda femoris vein and the popliteal vein. These authors also reported large communicating veins between the popliteal vein and the profunda femoris vein in the contralateral side without PSA.

In 25-40% of cases of PSA, aneurysms have been reported (11). Such aneurysms can lead to many other complications such as compression of the sciatic nerve, thrombosis and, in severe cases, loss of limb. Due to the larger than normal size of this artery in the posterior compartment of the thigh, PSA can lead to complications due to compression that occurs in repeated hip flexion (e.g., frequent bending or sitting down). Patients with PSA remain asymptomatic in their early years but begin to exhibit symptoms at the mean age of 40 to 60 years with equal gender preference. Clinical presentation may vary based on whether the PSA is complete / incomplete and the presence or absence of other venous variations as reported in this study. Physicians need to be aware of these possible anatomical variations to appropriately diagnose, treat and advise patients if lifestyle changes are necessary.

REFERENCES