Congenital absence of left common and external iliac arteries

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ABSTRACT

Congenital atresia of the common and external iliac arteries is an extremely rare vascular anomaly, although often associated with limb ischemia and genitourinary malformations. We have presented a rare case of the congenital absence of the left common and external iliac arteries, with no limb ischemic symptoms or organ anomalies present. (J Vasc Surg Cases Innov Tech 2022;8:16-8.)

Keywords: Congenital anomaly; Iliac artery; Persistent sciatic artery

Congenital vascular malformation of the iliofemoral arteries is less common than that of the thoracic and abdominal aorta and is usually discovered incidentally or because of chronic lower limb ischemia. Greebe1 identified no more than six cases by angiography in a series of 8000 patients who had had symptoms related to limb ischemia, including intermittent claudication or leg pain. Furthermore, few reports of the complete absence of a common iliac artery have been presented. We have described a very rare case of the congenital absence of the unilateral common iliac artery. Our patient provided written informed consent for the report of her case and imaging studies.

CASE REPORT

A 44-year-old woman with no significant medical history, including no tobacco use or previous trauma, had been referred to our department for examination after a low ankle brachial index (ABI) was observed in the findings obtained as a part of a comprehensive health checkup. She had no symptoms related to limb ischemia, and the patient had reported no history of lower extremity pain nor any limitations to activities such as running or prolonged walking because of pain or fatigue. The left and right side ABI was 0.84 and 1.24, respectively. The left and right toe brachial index was 0.69 and 1.09, respectively. The left femoral pulse and dorsalis pedis pulse were both palpable, although weaker than those on the right side. The circumference and length of the lower extremities on both sides were equal. Blood tests showed that the white blood cell count and C-reactive protein level were within normal limits. Enhanced computed tomography was performed, which revealed the complete absence of the left common iliac artery (CIA) and external iliac artery (EIA; Fig, A and B). Also, the median sacral artery reconstituted the left internal iliac artery, and the left internal iliac artery supplied most of the flow to the left femoral artery (FA; Fig, C). Moreover, the area of stenosis in the left popliteal artery was >50%. The left anterior tibial artery and peroneal artery were less visible than those on the right, and a collateral vessel from the left superficial FA to posterior tibial artery was well developed (Fig, C and D). The abdominal organs were normal. The patient had no ischemic symptoms; thus, we decided to perform follow-up examinations based on the symptoms. During a 6-year observation period, the ABI and TBI remained stable, and no ischemic symptoms were noted.

DISCUSSION

In the early embryo, the CIAs result from the fifth lumbar arteries at the level of the fourth lumbar vertebra. Next, the EIA arises from the CIA and bifurcates into the inferior epigastric artery and FA. The FA annexes the foot plexus of the sciatic artery and its origin, and the distal parts of the sciatic stem are appropriated by the FA near its origin from the EIA, giving rise to the anterior tibial artery, which connects with the planter arch distally.3 When considering this developmental process of the lower extremity arteries, it is reasonable that a persistent sciatic artery (PSA) often provides the blood supply to the lower extremity as a collateral vessel in such cases of the congenital absence of the CIA or EIA.

A search found only 12 cases of congenital CIA absence reported from 1964 to 2021 (Table).1-14 The congenital absence of the CIA had been diagnosed incidentally for nearly all those patients, and many had had no history of limb ischemic symptoms. This was probably because the collateral vessels develop well in the embryo and

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provide the blood supply to the lower extremity in cases of congenital iliofemoral atresia. Therefore, most of the patients were followed up without intervention, although one patient had undergone bypass surgery because of progressively worsening intermittent claudication (Table).\(^5\) Two cases of common iliac atresia with a genitourinary malformation have also been reported (Table). The development of the kidneys begins in the pelvis, after which the organs migrate cranially to their final position on the posterior abdominal wall. The pelvic kidneys derive their arterial blood supply from the iliac system, and complex genitourinary malformations have been associated with iliofemoral anomalies.\(^5\)

Congenital malformations of the EIA can be classified into three types: anomalies related to the origin or course of the artery; hypoplasia or atresia with compensation by a PSA; and isolated hypoplasia or atresia, which will result in chronic ischemia of the lower limb.\(^15\) In cases with a PSA congenital malformation, the prevalence of aneurysms and arteriosclerosis has been high.\(^15,16\) In EIA aplasia or hypoplasia cases, limb ischemia or claudication will often occur; thus, care must be taken regarding their possible presence.

When an iliofemoral anomaly is observed, it is essential to inform the patient and also to confirm whether other organ anomalies are present. Ischemic symptoms are likely to appear if the collateral circulation is damaged; thus, a careful preoperative assessment is required before performing surgery or a catheter-based intervention. Moreover, when limb ischemia occurs or if ischemic symptoms become progressively worse, surgical intervention such as a bypass procedure should be considered.

CONCLUSIONS

A CIA or EIA anomaly is often associated with limb ischemia or genitourinary malformations; thus, care must be taken in such cases.
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Table. Common iliac atresia cases reported

| Investigator                        | Age, years; gender | Laterality | Other arterial anomalies | Ischemic symptoms | Other organ anomalies | Treatment | Diagnostic modality |
|-------------------------------------|--------------------|------------|--------------------------|-------------------|----------------------|-----------|-------------------|
| Mansfield et al., 1964              | Unknown            | B          | Unknown                  | Unknown           | Unknown              | Unknown   | Unknown           |
| Dumanian et al., 1965               | 44; M              | L          | L EIA, IIA, CFA atresia  | Yes               | No                   | Ao-FA bypass | Survey for intermittent claudication |
| Oduro et al., 1992                  | Unknown            | L          | L EIA arose from L      | Yes               | No                   | No        | Survey for intermittent claudication |
| Llauger et al., 1995                | 32; M              | R          | No                       | No                | No                   | No        | Found incidentally |
| Donnette et al., 2015               | 21; F              | R          | No                       | No                | No                   | No        | Found incidentally |
| Patel et al., 2013                  | Neonate; M         | L          | L EIA atresia            | Yes               | No                   | No        | Survey for limb ischemic symptoms |
| Christopher et al., 2015            | 25; F              | B          | L IIA atresia            | Yes               | No                   | No        | Found incidentally |
| Clifton et al., 2015                | 24; M              | R          | R EIA atresia            | No                | VUR                  | No        | Preoperative scan  |
| Radhakrishnan et al., 2015          | 34; M              | R          | R EIA, IIA atresia       | No                | No                   | No        | During surgery     |
| Palkhi et al., 2015                 | 28; F              | L          | L IIA atresia            | No                | VUR                  | No        | During surgery     |
| Pham et al., 2021                   | 65; M              | B          | No                       | No                | No                   | No        | Preoperative scan  |
| George et al., 2021                 | 2016; M            | B          | No                       | Yes               | No                   | No        | Preoperative scan  |
| Present patient, 2021               | 44; F              | L          | No                       | No                | No                   | No        | Found incidentally |

Ao, Aorta; B, bilateral; CFA, common femoral artery; EIA, external iliac artery; F, female; FA, femoral artery; IIA, internal iliac artery; L, left; M, male; R, right; RA, renal artery; VUR, vesicoureteral reflux.

*A search found only 12 cases of congenital common iliac atresia reported from 1964 to 2021, nearly all of which had been found incidentally. One patient had undergone bypass surgery to treat progressively worsening intermittent claudication. Two cases were associated with genitourinary malformations.*