

Hypogastric Artery Transposition to Restore the Arterial Flow after Resection of the External Iliac Artery

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Tumors in the pelvic cavity frequently involve the iliac vessels. Common and external iliac arteries should be reconstructed to restore the flow to the lower extremity if the tumor directly invades these arteries. We report herein a 58-year-old female patient with a 10×11 cm, recurred uterine leiomyosarcoma. We performed en bloc resection of the tumor mass including the sigmoid colon, left ureter and 5 cm of the left external iliac artery. After complete resection, restoration of arterial flow to the lower extremity was made with a novel strategy of hypogastric artery transposition. There was no evidence of tumor recurrence or vascular insufficiency at 12 months after surgery.

Key Words: Transposition, Hypogastric artery, Reconstruction, Leiomyosarcoma

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INTRODUCTION

Tumors in the pelvic cavity including rectal, uterine, and cystic cancers as well as retroperitoneal sarcomas frequently involve the adjacent vessels [1,2]. A hypogastric artery and vein can be excised safely during the operation for these tumor if the tumor mass involves directly these vessels. The common or external iliac vein also can be excised with minimal postoperative morbidity. However, the common and external iliac artery (EIA) should be reconstructed to restore the flow to the lower extremity if these arteries are directly involved with tumor mass [3]. Here we reported a novel restoration of arterial flow to the lower extremity with hypogastric artery transposition in a patient following complete resection of a recurrent leiomyosarcoma with involvement of the left EIA.

CASE

A 58-year-old female patient presented with severe constipation, abdominal pain and hematuria. Four years ago, she underwent radical hysterectomy and bilateral salpingo-oophorectomy due to uterine leiomyosarcoma. She also had three sessions of postoperative adjuvant chemotherapy.

Physical examination revealed a large palpable, nontender, lower abdominal mass on admission. There was no lymphadenopathy or other associated findings. Abdominopelvic computed tomography (CT) scan showed a round shaped, large mass measuring 10×11 cm in the pelvic cavity (Fig. 1A). The tumor mass was heterogeneous, with areas of central necrosis. This mass involved the sigmoid colon and left distal ureter. Due to the mass effect, the left ureter and renal calyces were dilated. No tissue plane was identified between the mass and the sigmoid colon, left ureter and

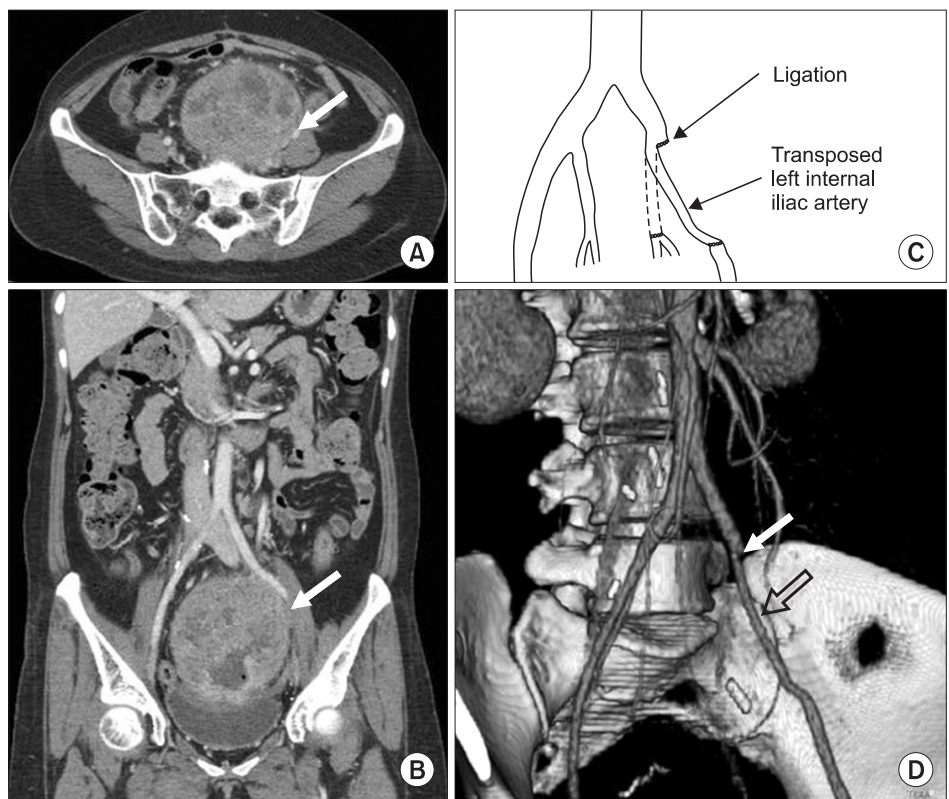


Fig. 1. Transposition of the hypogastric artery to preserve the arterial flow of the lower extremity. (A) Axial view and (B) coronal view of computed tomography (CT) scan show the direct invasion of the left external iliac artery by the tumor mass (arrow). (C) Diagram of the operative strategy. After removal of the tumor mass including the left external iliac artery, the left hypogastric artery was transposed to the external iliac artery. (D) Postoperative CT scan shows the ligated stump of the left proximal external iliac artery (arrow) and transposed left internal iliac artery (open arrow).

left EIA (Fig. 1B). It did not appear to involve the aorta, vena cava or right kidney. Because the radiographic findings were highly suggestive of recurrent leiomyosarcoma and showed signs of sigmoid colon obstruction, we decided to proceed directly to surgery.

At laparotomy, a huge round mass was found in the pelvic cavity. The mass directly invaded the sigmoid colon, left ureter, and left EIA. No tissue plane could be created between the mass and these structures. We performed an en bloc resection including the sigmoid colon, left ureter and 5 cm of left EIA. Although the patient had received mechanical and antibiotic preoperative bowel preparation, we were reluctant to perform vascular reconstruction with prosthetic graft in a potentially contaminated wound. Although an autogenous vein graft could be considered, another preparation and skin incision would be needed. Therefore, we decided to reconstruct the left EIA with left hypogastric artery transposition. After mobilizing the left hypogastric artery and ligating multiple branches, we transected it distally and rotated it anteriorly to the distal EIA (Fig. 1C). A beveled end-to-end anastomosis was performed with running 5-0 polypropylene sutures. After restoring perfusion to the left leg, femoral and distal pulses were present. After arterial reconstruction, end sigmoidostomy was made in the left lower paramedian portion. The patient recovered uneventfully and was

discharged from the hospital 1 week after surgery. On the follow up visit, CT scan showed a patent arterial reconstruction (Fig. 1D).

DISCUSSION

The most common procedure to restore the circulation is bypass surgery. After removal of the tumor mass, the proximal stump of the iliac artery and distal portion may be connected with a vascular conduit. An artificial conduit such as a polytetrafluoroethylene or Dacron graft may be used frequently. However, if bowel resection is included for curative resection of the tumor, an artificial graft should not be used due to a relatively high risk of graft infection. It is known that artificial graft infections may occur hematogenously or per continuum from surrounding tissues [4]. One of the possible theories suggests that micro-organisms may dwell on the graft from the time of graft implantation and multiply when the condition of the patient deteriorates.

Therefore, an autologous conduit is commonly used in these circumstances because of the relatively low risk of conduit infection [5]. The frequently used autologous conduits are great saphenous veins, small saphenous veins, and arm veins. There are two drawbacks to the use of these veins. Firstly another skin incision should be made to

harvest the vein. Secondly these veins are relatively small in caliber to replace the iliac artery.

Hypogastric artery transposition, not a bypass surgery, is a reasonable option in these circumstances. Here we reported a novel strategy for restoring the blood flow to the lower extremity by hypogastric artery transposition. With this simple technique, we could avoid the use of an artificial graft as well as separate skin incisions for vein harvesting. The hypogastric artery has been used as a bypass conduit in the treatment of fibrodysplastic renovascular disease in pediatric patients and in renal artery stenosis in adults with excellent results [6]. There have been several reports of EIA reconstruction with hypogastric artery transposition [3,7]. All of the cases in these reports involved iatrogenic

EIA injury. We could identify one article of hypogastric artery transposition after removal of the EIA due to direct invasion of malignancy [2]. However, in that case, a 2cm defect of the EIA was replaced with hypogastric artery transposition. In our case, 5 cm of EIA was removed for complete resection of malignancy. It required the ligation of multiple hypogastric artery branches and the distal end of hypogastric artery was beveled to make a complete end-to-end anastomosis.

Restoration of the arterial flow to the lower extremity with hypogastric artery transposition in patients with complete resection of the EIA due to cancer invasion may be a rational option.

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