

# Venous Thromboembolism after the Repair of Abdominal Incisional Hernia with a Pedicled Anterolateral Thigh Flap

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**Summary:** Incisional hernia often complicates kidney transplant. However, there are few reports showing pitfalls after the repair of incisional hernia following living-donor kidney transplant. A 55-year-old man underwent living-donor kidney transplant from his wife at the Department of Urology at the authors' hospital. He noticed abdominal distension 6 months postoperatively and was diagnosed with incisional hernia by computed tomography (CT) imaging. Clinical examination revealed the extensive distension of the right abdomen; noncontrast abdominal CT showed transverse colon, descending colon, and mesenteric prolapse through a hernial orifice measuring 11 × 14 cm, located slightly cranial to the anterior superior iliac spine. Repair was performed under general anesthesia the following day; the right thigh was the donor site. A pedicled anterolateral thigh flap from the donor site was used for abdominal wall reconstruction. He developed fever, and pain and swelling were noted in the right leg on postoperative day 14. Contrast-enhanced thoracic CT confirmed a diagnosis of pulmonary embolism (PE) and deep vein thrombosis. He was quickly started on an oral factor Xa inhibitor (edoxaban) and continuous intravenous heparin; contrast-enhanced thoracic CT on postoperative day 23 showed that PE had disappeared. At 6 months postoperatively, there was no recurrence of the venous thromboembolism or incisional hernia. The authors reported a case of incisional hernia repair after living-donor kidney transplant with a pedicled anterolateral thigh flap, complicated by deep vein thrombosis and PE. Adequate preoperative evaluation was required to determine optimal surgical techniques and preventive measures in cases with myriad thrombogenic risk factors. (*Plast Reconstr Surg Glob Open* 2020;8:e2794; doi: 10.1097/GOX.0000000000002794; Published online 29 April 2020.)

## INTRODUCTION

Incisional hernia is a surgical complication occasionally observed after kidney transplant surgery due to an increase in tissue fragility as a result of uremia or delayed wound healing as a result of immunosuppressant treatment.<sup>1,2</sup> This report documented a rare case of incisional hernia reconstruction after living-donor kidney transplant with a pedicled anterolateral thigh (ALT) flap, which

was complicated by postoperative deep vein thrombosis (DVT) and pulmonary embolism (PE).

## CASE REPORT

The patient was a 55-year-old man whose renal dysfunction gradually progressed, and maintenance hemodialysis treatment was initiated 6 years before being referred to the authors' hospital. In the preceding year, the patient underwent living-donor kidney transplant through extraperitoneal and right lower quadrant incision and claimed abdominal distension 6 months postoperatively. His medical history revealed a previous cholecystectomy, obesity with a body mass index of 33.1 kg/m<sup>2</sup>, and a 30-year history of smoking. He was also taking 3 oral medications: a calcineurin inhibitor, an inosine monophosphate dehydrogenase inhibitor, and a corticosteroid. Initial examination revealed the extensive distension of the right abdominal region, and abdominal computed tomography (CT) showed the prolapses of transverse colon, descending colon, and mesentery through a hernial orifice with a maximum width of 14 cm. Considering his age, body mass index, the expected

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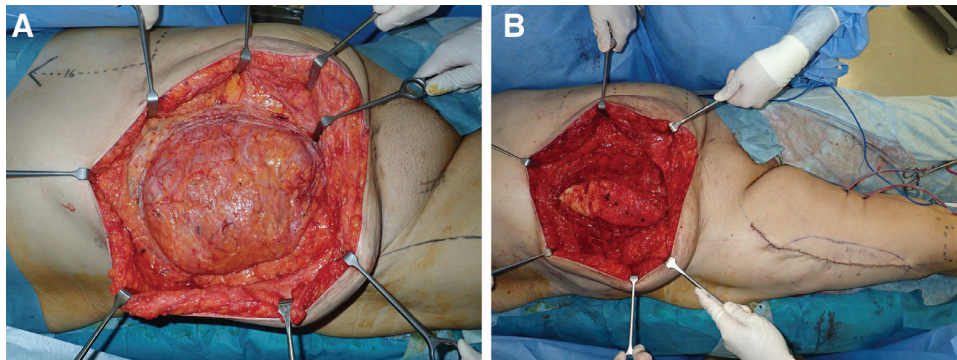
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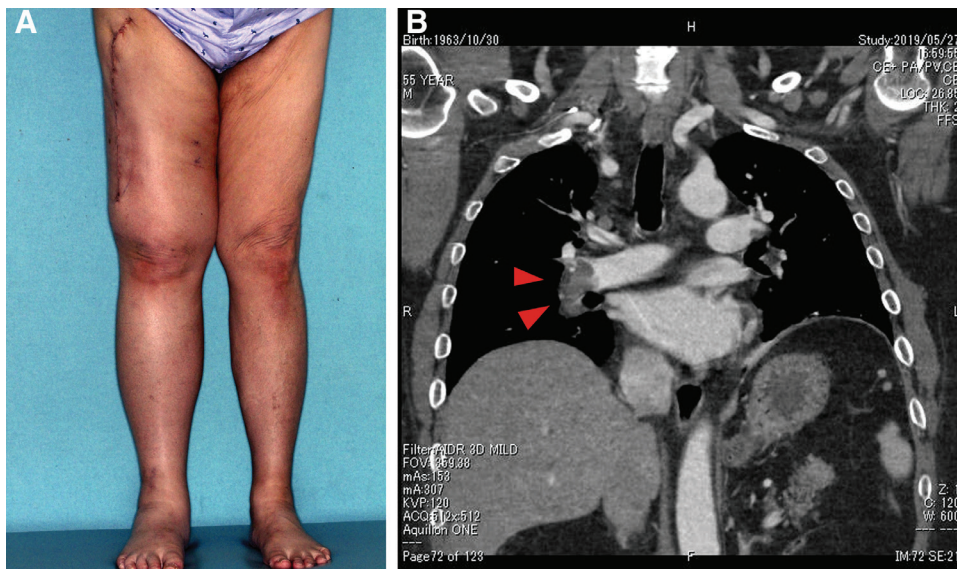
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duration of surgery, and the duration of postoperative bed rest, the patient had a Caprini score of 6 points and was, therefore, classified as high risk. Surgery performed under general anesthesia on the following day, and a pedicled ALT flap from the right thigh was used for abdominal wall reconstruction, because the direct closure of the fascia was disallowed by a very large hernia orifice in this case. The authors exposed the hernia sac and performed circumferential dissection up to the hernial orifice (Fig. 1A). After the size of the hernia sac was confirmed to reduce for returning the sac into the abdominal cavity, a pedicled ALT flap with a size of 20 × 8 cm was harvested to include the extended fascia lata. The vascular pedicle included the intramuscular perforator from the descending branch of the lateral circumflex femoral artery, which was dissected up to the deep femoral artery trunk. The elevated flap was then passed through a subcutaneous tunnel beneath the

rectus femoris and sartorius muscles, and transposed over the hernial orifice. The fascia lata and de-epithelialized skin paddle of ALT flap were sutured to the stable fascia tissue surrounding the hernial orifice, ensuring that adequate tension was applied to the flap's fascia (Fig. 1B). The recipient and donor sites were adequately irrigated, and after hemostasis was achieved, 2 continuous suction drains were placed at both sites, and then the wound was closed. Intermittent pneumatic compression was applied to the entire lower extremity immediately and postoperatively, and no anticoagulant was administered. The patient resumed oral food intake from postoperative day (POD) 2, started ambulation from postoperative week 1, and was discharged to home on POD 12. On POD 14, the patient developed fever and noticed the pain and swelling of the right foot (Fig. 2A). Laboratory tests showed an elevated D-dimer value of 42.7, and thoracic CT scan showed the



**Fig. 1.** Intraoperative findings during the incisional hernia reconstruction. A, Exposure of the incisional hernia sac. B, Findings after simple closure of the donor site on the right thigh and transplantation of the pedicled anterolateral thigh flap to the hernial orifice.



**Fig. 2.** Findings in the lower limb and contrast-enhanced thoracic CT images 14 days after reconstruction. A, Significant edema was observed, and the patient noticed pain in the right leg. B, Thoracic computed tomography scan showed the absence of contrast enhancement from the right pulmonary artery trunk to the interlobar branch, the branches to the right and left upper lobes, and the branches to the left lower lobe (red arrowhead).

absence of contrast enhancement from the right pulmonary artery trunk to the interlobar branch, the branches to the right and left upper lobes, and the branches to the left lower lobe (Fig. 2B). In addition, venography in the lower extremities showed the continuous absence of contrast enhancement from the level of the right external iliac vein to the level of the veins supplying the soleus muscle and the level of the posterior tibial vein. The patient was, therefore, diagnosed as PE and DVT. As a result, he was admitted emergently on the same day. An oral factor Xa inhibitor was administered as anticoagulant therapy, and continuous intravenous heparin administration was initiated. Because contrast-enhanced thoracic CT on POD 23 showed that PE disappeared and DVT was gradually disappearing, the patient was discharged to home on POD 38. At 6 months postoperatively, no recurrence of the venous thromboembolism (VTE) or incisional hernia was observed.

### DISCUSSION

During the treatment course of an incisional hernia after living-donor kidney transplant, there was an extremely high risk of complication by postoperative VTE. First, this was because a pedicled ALT flap was used for abdominal wall reconstruction. Broyles et al.<sup>3</sup> compared the outcomes of abdominal wall reconstruction surgeries with pedicled flaps from the lower limb to those of surgery without the flaps and found a significantly higher incidence of VTE in the cases with the flaps. They also compared the donor side to the unaffected side and reported that the incidence of VTE is significantly higher on the donor side, because the surgical manipulation of the blood vessels, decreased lower extremity venous return due to elevated abdominal wall pressure, long duration of surgery, and long period of postoperative immobility are described to affect the results.<sup>3</sup> This case had a high susceptibility to infections due to multiple oral immunosuppressants after the living-donor kidney transplant. Because infection might give postoperative DVT, a pedicled ALT flap transplantation was performed rather than a nonabsorbable mesh for abdominal wall reconstruction for avoiding surgical site infection. Second, the patient developed adverse reactions to the immunosuppressant agents after the transplant. Previous studies report an increased incidence in VTE in kidney transplant recipients<sup>4</sup> because the majority of cases is reported to consider the appearance of thrombogenesis as an adverse reaction due to immunosuppressant agents such as calcineurin inhibitors.<sup>5,6</sup> Because multiple oral immunosuppressant agents were used for approximately 1 year in this case, these agents were possibly a factor in the onset of VTE. Third, as the high perioperative Caprini score for VTE in this patient, was argued.<sup>7</sup> These patients are also reported to have a DVT incidence of 40%–80% and a lethal PE incidence of 1%–5%.<sup>8</sup> Although indication of catheter therapy for PE could be suitable for a patient who has a persistent unstable hemodynamics despite of various medical treatments,<sup>9</sup> in this case, the catheter therapy was unsuitable.

As discussed above, for performing reconstruction surgery for incisional hernia after living-donor kidney transplant in a high-risk case similar to this case, we believe there were 4 extremely important points: (1) avoiding to use the lower extremity as a donor site for a pedicled flap transplant whenever possible and instead performing reconstruction with a nonabsorbable mesh or component separation technique; (2) providing adequate anticoagulant agents during the perioperative period; (3) ensuring appropriate monitoring for DVT such as postoperative duplex scans; and (4) promoting early ambulation during the postoperative period.

### CONCLUSIONS

This described a case of incisional hernia reconstruction after kidney transplant with a pedicled ALT flap, which was complicated by postoperative DVT and PE. Adequate preoperative evaluation was required for determining the appropriate surgical procedures.

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