Ruptured Deep Femoral Artery Aneurysm Confused with an Incarcerated Inguinal Hernia: a Case of an Elderly Patient

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Abstract

Keywords

- rupture
- deep femoral artery aneurysm
- revascularization
- elderly patient
- incarcerated inguinal hernia
- rehabilitation
- femoral artery

Deep femoral artery (DFA) aneurysms are rare. DFA is protected by the adductor canal, which may delay the diagnosis. Then, its early diagnosis may be difficult and it is possible to be misdiagnosis with incarcerated inguinal hernia, which occurs more often in elderly people. We report a very rare case of a treatment of an advanced elderly patient with an isolated ruptured DFA aneurysm that was preoperatively confused with an incarcerated inguinal hernia.

A 97-year-old man was admitted to a neighboring hospital due to a painful mass of the right groin after transient consciousness loss and the patient was diagnosed with right incarcerated inguinal hernia by a nonenhanced computed tomography (CT). Although he was observed for 3 days, he suddenly lost consciousness again with a decrease in blood pressure. Thus, he was referred to our hospital due to the painful pulsatile inguinal mass after resuscitation from shock. As we diagnosed a ruptured DFA aneurysm by an enhanced CT, we emergently performed an excision of the aneurysm with revascularization of the right DFA. The postoperative course was uneventful without ischemic change of the lower leg.

Deep femoral artery (DFA) aneurysms are rare.^{1–4} They account for 0.5% of all peripheral aneurysms¹ and 1 to 2.6% of femoral aneurysms.^{2,3} Moreover, DFA is protected by the adductor canal, which may delay the diagnosis, and may explain the increased incidence of rupture.⁵ Then, its early diagnosis may be difficult and it is possible to be misdiagnosis with an incarcerated inguinal hernia, which occurs more often in elderly people. We report a very rare case of an advanced elderly patient with an isolated ruptured DFA aneurysm that was preoperatively confused with an incarcerated inguinal hernia.

Case Report

A 97-year-old man with a medical history of hypertension and appendectomy was admitted to a neighboring hospital due to a painful mass of the right groin after transient consciousness

loss and the patient was diagnosed with an incarcerated right inguinal hernia by a nonenhanced computed tomography (CT) (► Fig. 1A). Although the patient was observed for 3 days, he suddenly lost consciousness again with a decrease in blood pressure. Thus, the patient was referred to our hospital due to a painful pulsatile right inguinal mass measuring 6 × 6 cm after resuscitation. The patient's height was 163 cm and body weight was 48 kg. Upon arrival, his consciousness was clear, blood pressure was 106/ 53 mm Hg, and pulse was 84/ min, with the administration 3 µg/ kg/min of dopamine. The oxygen saturation was 100% after providing 5-L oxygen via a Y-piece tube. Physical examination showed severe anemic conjunctiva, a weak pulse of the right popliteal artery, and a painful pulsatile right inguinal mass.

Laboratory examination showed: red blood cells, $146 \times 10^4/\mu\text{L}$; hemoglobin, 4.1 g/ dL; hematocrit, 12.1%;

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Fig. 1 (A) Nonenhanced computed tomography (CT) showed a right inguinal mass (solid arrow). (B) Enhanced CT revealed a right deep femoral artery aneurysm measuring 65 × 45 mm and hematoma around the aneurysm: The right superficial femoral artery (solid arrow) and right distal deep femoral artery (dotted arrow).

albumin, 2.22 g/ dL. Enhanced CT revealed a right DFA aneurysm measuring 65 × 45 mm and hematoma around the aneurysm (►Fig. 1B). Thus, we diagnosed him with a ruptured DFA aneurysm. In a supine position, first, the right distal external iliac artery was exposed by a retroperitoneal approach using an oblique suprainguinal incision. Second, the right superficial femoral artery and, then, the common femoral artery were carefully exposed using a longitudinal infrainguinal incision. The saccular DFA aneurysm originated 2 cm from peripheral DFA. As the distal DFA was behind the aneurysm, we could not confirm it. However, fortunately, as we could control the bleeding using the insertion of an 8 Fr. urethral catheter into the distal DFA (►Fig. 2A), the distal DFA could be exposed after the excision of the aneurysm, and

then DFA replacement was performed with a 6-mm expanded polytetrafluoroethylene graft (VASCUTEK, a TERUMO company, Tokyo, Japan) (►Fig. 2B). The operative time was 192 minutes and operative bleeding was 332 mL.

Postoperative CT revealed graft patency as well as the absence of the mass (►Fig. 3). Although the patient could roll over but not sit even for a short time after the surgery, he started rehabilitation to the extent possible on the second postoperative day. The postoperative course was uneventful without ischemic complications of the lower leg. He was referred to a neighboring hospital for further rehabilitation on the 11th postoperative and then, he could walk using a handrail. The patient died 13 months after the surgery due to a cause other than cerebrovascular disease.

Fig. 2 (A) Bleeding was controlled by the insertion of an 8 Fr. urethral catheter into the right distal deep femoral artery (DFA): The right superficial femoral artery (solid arrow) and right distal DFA (dotted arrow). (B) DFA replacement was performed with a 6-mm expanded polytetrafluoroethylene (ePTFE) graft (VASCUTEK, a TERUMO company): The right superficial femoral artery (solid arrow) and ePTFE graft (dotted arrow).

Fig. 3 Postoperative enhanced computed tomography showed graft patency (solid arrow).

Discussion

DFA aneurysms are rare.^{1–4} Pappas et al showed that the percentages of the aneurysm along the femoral artery were as follows: common femoral, 27%; superficial, 26%; iliofemoral, 14%; femoral-popliteal, 13%; and DFA, 1%.² From January 2007 to March 2018, as only the present isolated DFA patient was operated on at Tottori Prefectural Kosei Hospital (Kurayoshi, Tottori), the incidence of DFA was 0.42% in 237 abdominal aortic aneurysms operated on. DFA aneurysms are more common in man than in woman^{4,5} and the average age at presentation of DFA aneurysms is 73.5 years.⁵ The reported etiology of DFA aneurysms has been quite limited. The aneurysm pathology showed as follows: atherosclerotic changes, 82%; changes of medial fibromuscular dysplasia, 6%; and inflammatory changes, 6%.⁴ As he had no history of trauma at the right groin or infection, the etiology is still unclear in the present case. There are no characteristics of DFA aneurysm. Harbuzariu et al reported that a total of 73% of DFA aneurysms are asymptomatic, 13% present as contained rupture with the sudden onset of localized pain, 6% present as right inguinal pain without rupture, and 6% present as acute lower extremity ischemia with thrombosis.⁴ The rupture rate conflicts with the literature, which reports as 44%.⁵ Posner et al suggested that DFA is protected by the adductor canal, which may delay the diagnosis, and may explain the increased incidence of rupture.⁵ In fact, as the present DFA aneurysm had not been found until reaching 97 years old, early diagnosis may be difficult, as indicated by the literature.¹ Actually, the patient was diagnosed with an incarcerated right inguinal hernia; thus, he was observed for 3 days.

Surgical treatment consists of ligation or graft replacement, using a vein or prosthetic material.⁶ Nine (38%) of twenty-four patients treated by ligation showed no ischemic complication, which may be unsurprising if the aneurysm is located in the

distal part of the DFA.¹ Moreover, 14 (78%) of 18 patients who had a ruptured DFA aneurysm were treated by ligation, with only one amputation, which suggests that patients with rupture and an intact distal DFA may safely undergo ligation without revascularization.⁵ We think that most vascular surgeons would agree that the decision to ligate or perform revascularization depends on the ipsilateral patency of the femoral-popliteal outflow and the possibility of repair. Most surgeons probably consider life-saving, preserving adequate blood flow to the thigh, and the absence of ischemic complications to be important goals of the operation, and that the ligation of a DFA aneurysm is acceptable, while revascularization of a DFA aneurysm is favorable. In the present case, as we could not adequately estimate the patency of right superficial femoral artery before the surgery as well as we could control the bleeding, we underwent the revascularization. On the other hand, some case reports using endovascular stent grafting have recently been published.^{7,8} In Japan, an endovascular stent graft (VIABAHN, a GORE company) become covered by health insurance for emergency cases in 2017. In the present case, as the endovascular stent graft may probably have been an effective treatment in retrospect, the number of case reports describing the use of an endovascular stent graft for a ruptured DFA aneurysm may increase in the near future.

Conclusions

We report a very rare case of a treatment of an advanced elderly patient with a ruptured DFA aneurysm that was confused with incarcerated an inguinal hernia. It is worth noting that femoral artery aneurysm is an important consideration in patients with after incarcerated an inguinal hernia, which occurs more often in elderly people.

Conflict of Interest

All authors declare that they have no conflict of interest.

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