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Acute Type B Dissection Causing Collapse of EVAR Endograft and Iliac Limb Occlusion

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Abstract

We describe a rare case of acute type B dissection causing collapse of a previously placed infrarenal stent-graft, resulting in acute limb ischemia due to left iliac limb thrombosis in a 59-year-old male. The patient presented with acute back and abdominal discomfort radiating to his back, bilateral buttock stabbing discomfort, and left > right thigh and calf rest pain. CTA showed a spiral type B dissection with collapse of the proximal portion of the EVAR device and left limb occlusion. Urgent treatment with TEVAR distal to the left subclavian covered the entry tear and redirected the majority of the flow to the true lumen leading to near immediate expansion of the proximal portion of the EVAR device. After surgical femoral control, balloon embolectomy of the occluded iliac limb was performed and the limb re-lined. His lower extremity ischemic symptoms resolved and his abdominal and back pain dissipated. At latest 6 month follow-up, CT-A shows an intact TEVAR stent-graft and a widely patent EVAR stent-graft and the patient has no further abdominal, back, or leg symptoms. Acute type B dissection causing proximal abdominal EVAR collapse is an extremely rare presentation of false lumen pressurization and can be treated similarly to complicated type B dissection with the goal of restoring true lumen patency.

1. Introduction

Acute aortic dissections are rare, occurring in 5-30 patients per million people per year, with approximately one-third due to acute type B dissections (ATBD).¹⁻² In ATBDs an aortic tear can extend from the proximal descending thoracic aorta past the iliac arteries and may lead to lower extremity malperfusion in up to 40% of complicated presentations.³ We describe a rare case of ATBD causing collapse of a previously placed infrarenal stent-graft, resulting in acute limb ischemia due to left iliac limb thrombosis.

2. Case Description

A 59-year-old male with prior Gore Excluder (Flagstaff, AZ) infrarenal device presented with acute abdominal discomfort radiating to his back, bilateral buttock stabbing discomfort, and left > right thigh and calf rest pain. His previous EVAR four years prior treated a 4cm right common iliac aneurysm and included hypogastric embolization; a left renal stent was

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also placed during the repair. His symptoms prompted CT-A evaluation which revealed a spiral type B dissection with collapse of the proximal portion of the EVAR device and left limb occlusion (Figure 1 A-D). His visceral arteries were patent with the right renal artery perfused off the false lumen and the remaining vessels perfused from the true lumen. His abdominal discomfort and lower extremity symptoms improved at the time of transfer after impulse control and heparin was initiated. He had a palpable right femoral pulse, Doppler signals to his left femoral pulse, but no Doppler signals to his left foot. He had pain and paresthesia noted on his left side, but no motor weakness in his lower extremities.

He underwent urgent treatment of his ATBD using a thoracic endograft to cover the entry tear just distal to the left subclavian artery. Prior to TEVAR there was minimal flow in the true lumen. Covering the proximal entry tear redirected the majority of blood flow to the true lumen leading to near immediate expansion of the proximal portion of the EVAR device. No further balloon molding or proximal endograft extension was performed. To treat his left lower extremity malperfusion we obtained surgical control of the left femoral artery. An additional puncture was made in the left femoral artery and a 10 mm × 2 cm balloon was inflated in the proximal left hypogastric artery. With an aortic occlusion balloon inflated in the right iliac limb, Fogarty balloon thromboembolectomy of the occluded left iliac limb was performed followed by relining of the limb (See Figure 2).

His lower extremity ischemic symptoms resolved and his along with his abdominal discomfort and back pain after the procedure. He had palpable pulses in his bilateral feet upon discharge on post-operative day 3 with improved blood pressure control. At latest 6 month follow-up, CT-A shows an intact TEVAR stent-graft and a widely patent EVAR stent-graft and the patient has no further abdominal, back, or lower extremity symptoms (Figure 1 E-F). He has returned to an active lifestyle hiking three miles regularly. He is continued to be monitored with serial CT scans to evaluate false lumen aortic expansion.

3. Discussion

Our repair highlights that proximal endograft collapse caused by false lumen pressurization can be treated in the same fashion as ATBD with TEVAR.⁴ The proximal tear created a large false lumen channel and the previous endograft in the infrarenal aorta blocked distal re-entry sites further pressurizing the false lumen. In this case, coverage of the proximal entry tear with TEVAR resulted in redirection of flow into the true lumen, and near immediate re-expansion of the previously implanted endograft where no further balloon molding or proximal extension was required. Previous reports of IVUS have demonstrated utility during endovascular repair for complex acute dissections.⁵ Given the expansion of the proximal endograft and brisk flow on completion angiogram we did not elect for further imaging.

This report also demonstrates the importance of protecting the left hypogastric artery during thromboembolectomy. Given the patient had a previous hypogastric exclusion on the right side four years prior it was imperative to minimize the risk of thromboembolism to the left hypogastric artery. Surgical femoral control was obtained at the onset of the case in anticipation of manual clot removal.

Review of the literature shows only a handful of similar cases of ATBD causing proximal endograft collapse (see Table). In these reports the presence of proximal fixation on the original endograft did not prevent endograft collapse demonstrating the high pressure in the false lumen overcoming the radial force of the endografts. In the case where a surgical approach was taken with an extra-anatomic bypass proximal clot extension was observed above the endograft leading to further complications highlighting the need to redirect flow into the true lumen.

Although ATBD in the setting of a previous EVAR repair is rare both aneurysmal disease and aortic dissections share similar risk factors such as hypertension and smoking history.¹⁰ As EVAR usage continues to increase similar presentations may be encountered with more frequency in the future.

Conclusions

This case illustrates a rare case of Type B dissection causing deformation and collapse of a previously placed infrarenal stent graft, leading to acute limb thrombosis and resultant acute limb ischemia. Urgent treatment of the entry tear with TEVAR coverage led to immediate redirection of flow to the true lumen, depressurization of the false lumen, and expansion of the previously collapsed endograft. In this way this rare presentation can be treated with endovascular techniques using TEVAR with the goal of redirecting flow into the true lumen.

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Figure 1.

CTA demonstrating acute type B dissection causing proximal collapse of previous placed infra-renal stent graft. Coronal views of spiral dissection originating in the proximal descending thoracic aorta (A) with left iliac limb occlusion (B). Corresponding axial views showing collapse of the proximal endograft and occluded left iliac limb (C) with patent right iliac limb (D). Follow-up CTA at 6 months showing seal of proximal entry tear (E) and patent proximal abdominal endograft and iliac systems (F).

Figure 2.

Intra-operative fluoroscopy demonstrating right iliac limb and left hypogastric artery protection during balloon embolectomy of the occluded left iliac limb. Note, endograft limbs were initially deployed in a crossed fashion during the initial repair. An aortic occlusion balloon is inflated in the right iliac limb (A), as an over the wire Fogarty embolectomy device is used from the left groin cutdown (B) and pulled in the caudal direction (arrow) while the left hypogastric artery is protected with a balloon (C).

Table

Patient	Symptoms	Previous Endograft	Outcome	Reference
69 M	Abdominal pain, lower limb ischemia	Endurant II	TEVAR, relined EVAR → symptoms resolved	6
75 M	Back, abdominal pain; and lower limb ischemia	Gore Excluder	Ax-bi-fem → progression of proximal aortic occlusion → Death	7
77 M	Back, abdominal pain; and b/l lower limb ischemia	Zenith Flex	TEVAR, Fogarty embolectomy → symptoms resolved	8
53 F	Bilateral lower limb ischemia	Gore Excluder	Death prior to intervention	9