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SHORT REPORT

Ruptured Acute Type B Dissection Superimposed on the Abdominal Aortic Aneurysmal Wall Wrapping a Prior Graft

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We report a case of a 73-year-old woman with a type B aortic dissection superimposed on the abdominal aneurysmal wall that was wrapped around a bifurcated graft, implanted for a fusiform aneurysm 12 years previously. She was treated conservatively despite evidence of retroperitoneal bleeding because of thrombosis of the entire false lumen at the time of admission. Seven days later she underwent tube grafting on an urgent basis because a new enhanced space appeared around the graft. A small tear at the previous aortic suture line and dissection of the aneurysmal wall that wrapped the prior graft were noted at the time of surgery. The postoperative course was uneventful.

Keywords: Aortic dissection; Abdominal aortic aneurysm; Rupture.

Introduction

With the increasing diagnosis of aortic dissection by computed tomography, the combination of aortic dissection and abdominal aneurysm is becoming more common. This combined patholoy is believed to be a riskier condition than an isolated dissection. Spontaneous dissection involving the site of previous abdominal aortic replacement has a much lower tendency to rupture in the abdominal aorta when compared to an untreated degenerative abdominal aneurysm.[1] We describe a case of an acute type B dissection extending into the abdominal aneurysmal wall wrapping a previously implanted graft and leading to rupture.

Short Report

A seventy-three-year-old woman was urgently referred from a community hospital because of chest and midscapular pain. She had undergone an elective abdominal aortic aneurysm repair with a bifurcated graft 12 years previously. An electrocardiogram showed left ventricular hypertrophy without signs of acute myocardial infarction. Hematologic study disclosed normocytic- normochromic anemia with a hemoglobin concentration of 10.3 g/dl and an elevated leukocyte count. Serum chemical studies showed no increase in cardiac enzyme activity but a slightly elevated C-reactive protein concentration. A computed tomographic (CT) scan taken 3 hours after onset showed type B aortic dissection with complete thrombosis of the false lumen and a thin hematoma around the previous graft with retroperitoneal bleeding (Fig. 1). This was treated conservatively with aggressive antihypertensive treatment and bed rest. The patient kept experiencing nausea and back pain and occasionally vomited from the day of admission until day 4. Although all these symptoms resolved by day 5, a CT scan obtained on day 6 revealed a small ulcer-like projection (ULP) at the terminal aortic arch, a partially enhanced false lumen around the visceral arterial branches and an encased hematoma around the graft, into which blood was streaming (Fig. 2). However, the false lumen was barely visible between the false lumen around the visceral arterial branches and the hematoma around the graft. The patient was thought to be at increased risk

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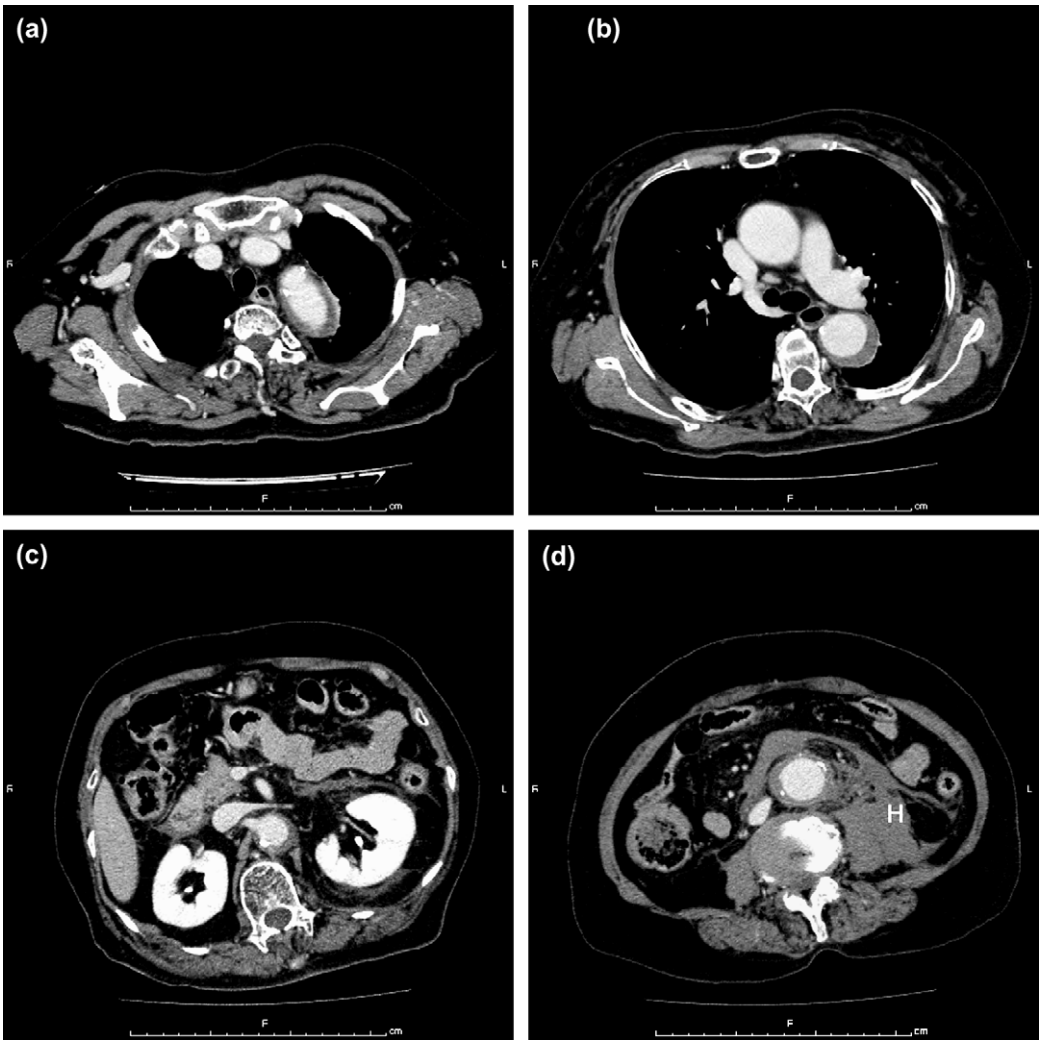

Fig. 1. (a) Computed tomograph on admission at the distal arch level. This documents the absence of ulcer like projections (ULP). (b) Computed tomograph on admission at the carina level. Again, no ULP are present. (c) Computed tomograph on admission at the right renal artery level showing thrombo-occluded false lumen. (d) Computed tomograph on admission around the previous suture line showing a thin hematoma around a previously implanted graft for an infrarenal abdominal aortic aneurysm. There is evidence of retroperitoneal bleeding (H).

of re-rupture and underwent surgery on day 7. Bleeding into and behind the mesentery of the sigmoid colon was confirmed. There was a tiny dimple (possible intimal tear) on the previous proximal suture line. There was also a hematoma between the intima, which adhered tightly to the graft, and the adventitia of the aneurysm wall used for wrapping the graft during the previous operation (Fig. 3). A straight Gelseal 22-mm interposition graft (VASCUTEK Ltd., Renfrewshire, Scotland) was inserted with the proximal anastomosis 5mm proximal to the previous suture line with a continuous suture buttressed with Teflon felt and a distal graft-graft anastomosis. A follow up CT scan 4 months later showed a reduction of the thrombosed false lumen in the thoracic aorta with noticeable encased ULPs in the thoracic aorta and partially opened false lumen around the visceral branches (Fig. 4).

Discussion

Rupture of the aorta occurs in nearly 20% of all patients with acute aortic dissection[2,3] although it generally occurs in the proximal thoracic aorta at the site of the aortic intimal tear.[4,5] Rupture in the abdominal aorta with acute aortic dissection is rare and occurs almost always in the setting of an antecedent degenerative aneurysm.[1] In other words, the combination of degenerative aneurysm and acute dissection increases

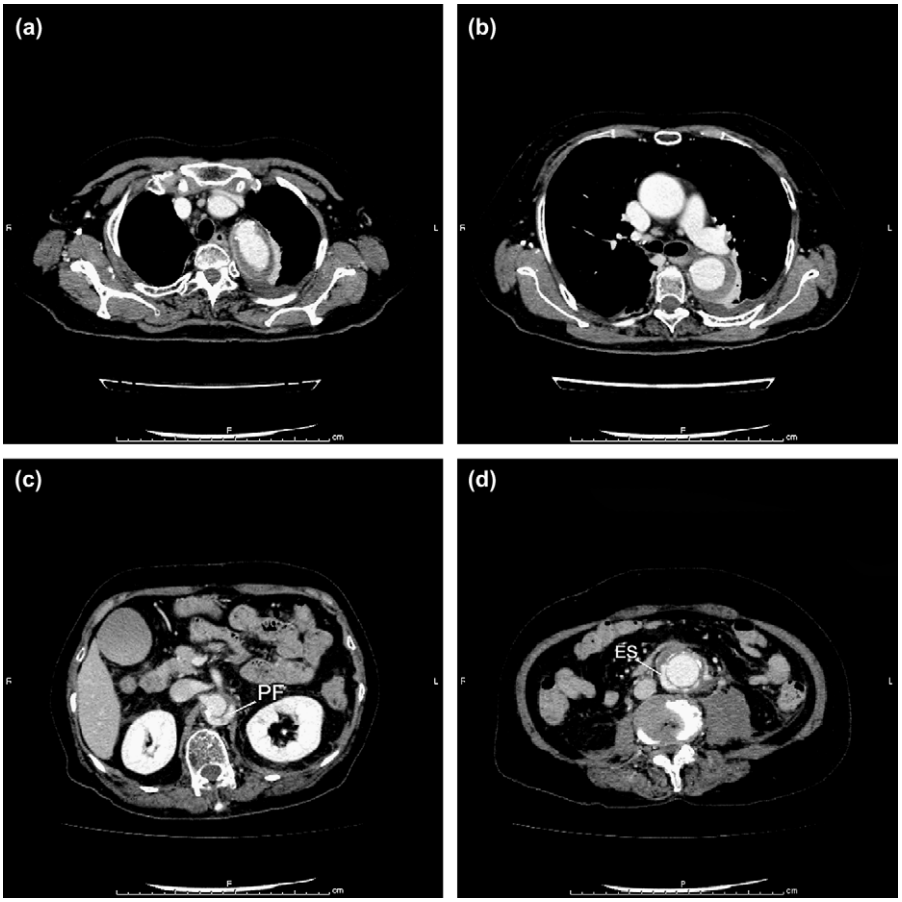

Fig. 2. (a) Computed tomograph on day 6 at the distal arch level. Still no ULP. (b) Computed tomograph on day 6 at the carina level with no ULP. (c) Computed tomography on day 6 at the right renal artery level showing patent false lumen (PF). (d) Computed tomography on day 6 around the previous suture line showing the encased hematoma around the graft, part of which is enhanced by contrast medium (ES).

the risk of abdominal aortic rupture.[6] However, once an abdominal degenerative aneurysm has been replaced previously, rupture rarely occurs in the abdominal aorta.[1] Therefore we did not, at that time, consider the possibility that the dissection was extending distally over the previous suture line, in spite of the facts that the initial CT findings and the symptoms, including abdominal distress, strongly suggested rupture somewhere in the abdominal aorta.

The CT scan obtained just before surgery showed almost complete resolution of the false lumen above the previous proximal anastomosis and a partially enhanced false lumen below it. We found an intimal tear-like dimple during surgery. These findings support the possibility that blood flowed into the aneurysmal wall through the small intimal tear at the previous suture line independent of dissection from the primary entry in the thoracic aorta or from another intimal tear around the visceral branches. The ULP in the terminal arch must be

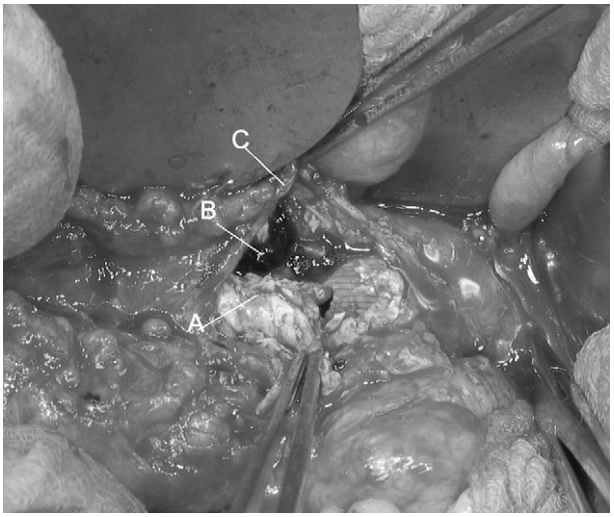

Fig. 3. Intraoperative photograph indicating dissection of the aortic wall wrapping the graft and hematoma. A: the intima adheres to the graft, B: hematoma, C: the adventitia.

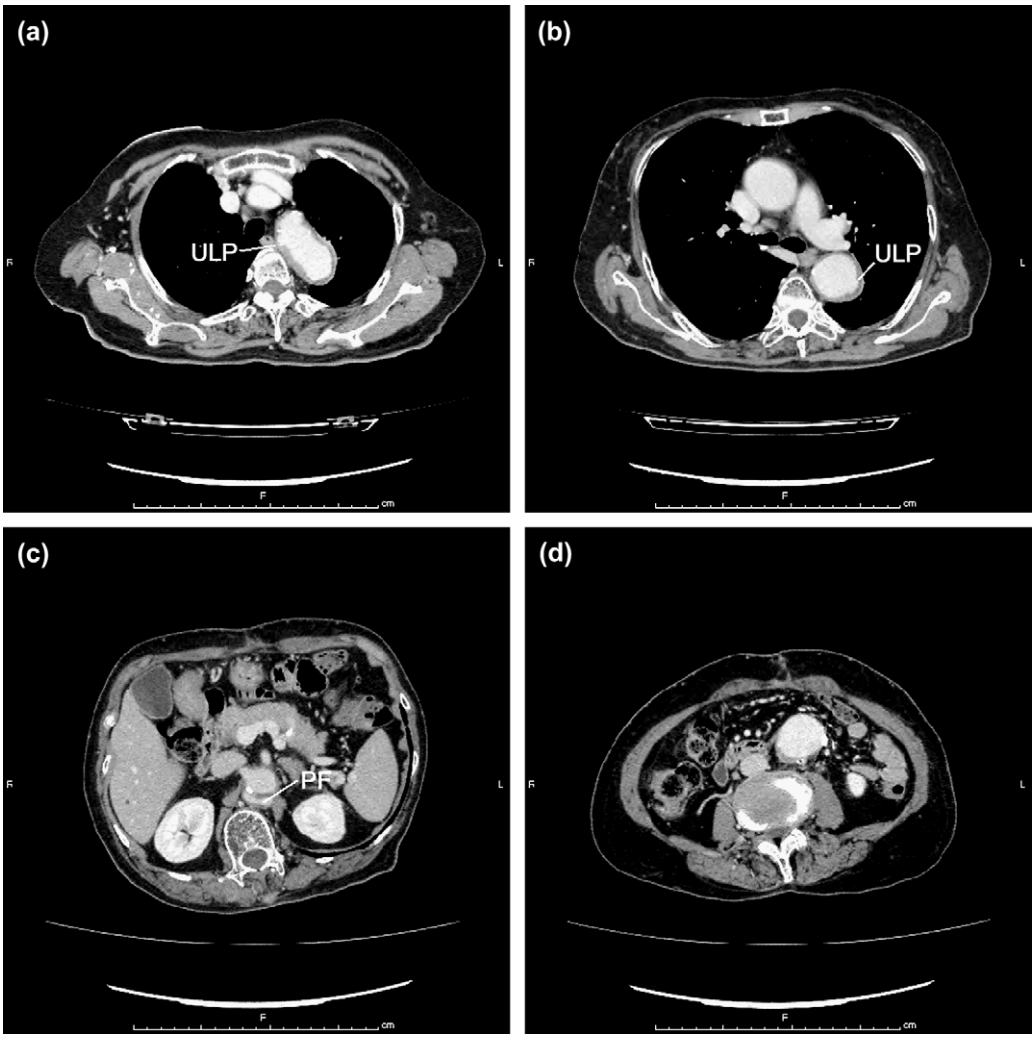

Fig. 4. (a) Computed tomograph 4 months after operation at the distal arch level, now showing a small ULP. (b) Computed tomograph 4 months after operation at the carina level also showing a ULP. (c) Computed tomography 4 months after operation at the right renal artery level. Compared to Fig. 2-c, prior to surgery, this shows a smaller but still patent false lumen (PF). (d) Computed tomography 4 months after operation around the previous suture line showing neither anastomotic aneurysm nor retroperitoneal hematoma.

the primary entry site because it was located at the proximal margin of the dissection and the patient experienced pain between the scapulae. At the onset, the dissection ran down over the primary graft suture line creating an intimal tear and resulting in retroperitoneal bleeding from somewhere on the wrapping aortic wall. Although the dissection space was occluded by thrombus at one point, a few days later the tear on the suture line most likely became the independent window for blood to enter into the old aneurysm wall wrapped around the aortic graft. This is little more than conjecture because we have no specimen from the aortic wall containing the previous suture line.

A penetrating ulcer (PU) can sometimes be misclassified as an aortic dissection on presentation.[7] This present case is distinct from PU because the lesion is extensive, occupying the whole descending aorta, and the entry (or re-entry) appeared at both ends of the lesion eventually. Although the dimple found at surgery looked like PU, both the fact that there was less arteriosclerosis around it and its existence on the previous suture line support the idea that this was a different mechanism.

It has been recommended that the proximal aortic suture line be fenestrated to prevent thoracic aortic rupture at the uncorrected proximal intimal tear.[8,9] The present case does not fit this scenario because the

entire dissecting thoracic aorta had already thrombosed and the dissection had terminated in the aortic wall that was wrapped around the previous graft. We anastomosed the graft to the true lumen without concern for any possible proximal aortic rupture.

Endoluminal repair is sometimes a useful method for aortic dissection of which the entry site is definite. Several reports showed satisfactory early results of it.[10,11] We did not perform endoluminal repair in this case because we could not confirm where the blood originated from.

This case alerts us that the aortic suture line is not a perfect barricade, and that dissection can advance over it leading to rupture.

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