Negative results - Vascular thoracic

Acute onset of paraplegia after repair of abdominal aortic aneurysm in a patient with acute type B aortic dissection

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Abstract

We report a rare complication of acute onset paraplegia after repair of an abdominal aortic aneurysm in a patient with acute type B aortic dissection. A 53-year-old man, suffering from abdominal aortic aneurysm (AAA), was admitted to our hospital with type IIIB acute aortic dissection. Ten days after admission, emergency Y-grafting was performed for impending rupture of the AAA. Twenty hours after Y-grafting, weakness of his lower extremities developed and progressed to paraplegia. Enhanced computed tomography scan revealed expansion of a thrombosed false lumen at the thoracoabdominal aorta, resulting in complete obstruction of the true lumen below the infra-renal aorta. Immediate axillobifemoral bypass was performed to prevent lower limb ischemia. Voluntary movement recovered gradually in both legs and eventually the patient could walk independently.

Keywords: Acute type B aortic dissection; Paraplegia; Impending rupture

1. Introduction

Although the literature supports acute aortic dissection as a risk factor for increased mortality after thoracic aortic aneurysm repair [1], few reports exist regarding the risk to patients in the setting of a previous dissection before abdominal aortic aneurysm (AAA) repair. The complications, such as aortic rupture or acute renal failure, have been reported in cases following repair of the aneurysm in acute dissection [2]. However, post-operative paraplegia in cases after aneurysm repair in acute dissection has rarely been reported. We report a rare complication of acute onset paraplegia after repair of AAA in a patient with acute type B aortic dissection.

2. Case report

The patient was a 53-year-old man with acute back pain and was thought to have an infra-renal type AAA (6×6 cm) and a right internal iliac artery aneurysm (3×3 cm). On admission, enhanced computed tomography (CT) showed acute Stanford type B aortic dissection extending from the distal arch to the proximal neck of the AAA. A false lumen was patent at the descending aorta extending from the subclavian artery to the diaphragm and thrombosed at the thoracoabdominal aorta extending from the diaphragm to the proximal neck of the AAA (Fig. 1a,b). Visceral arteries, except the right renal artery, originated from the true lumen and the occluded right renal artery originated from the thrombosed false lumen. Since the true lumen was not severely compressed by the false lumen at the descending and thoracoabdominal aorta (Fig. 1c,d), his leg ischemia did not present with normal ankle brachial pressure index. We could not detect the Adamkiewicz artery with enhanced CT. Ten days after admission, despite well-controlled blood pressure, the patient became suddenly pale and complained of acute abdominal pain with a suspected complication, i.e. ruptured AAA or dissection. Immediate enhanced CT showed that the dissected aorta and AAA were not remarkably changed compared with the previous CT. We suspected this condition was due to impending rupture of the AAA and decided to perform emergency surgery.

The transabdominal approach was used and intraoperative inspection revealed a true aneurysm of AAA. In the abdominal aorta, just distal to renal arteries, it appeared that the dissected false lumen was thrombo-obiterated, so a proximal blood control clamp was applied to this site. After opening the aneurysm, the proximal anastomotic site was not complicated with dissection. An end-to-end anastomosis, with full thickness bites through felt and all layers of the aortic wall, was performed using a prosthetic Y-graft, with care taken for blood pressure control. The right internal iliac artery aneurysm was closed using a felt strip. Pathological examination of the aneurysm wall revealed a true atherosclerotic aneurysm with no evidence of aortitis. Twenty hours after surgery, weakness of the patient’s lower extremities developed and progressed to paraplegia and we could not palpate his bilateral femoral arterial pulse. Immediate enhanced CT revealed that acute, total occlusion of the true lumen was caused by compression of the
expanding thrombosed false lumen at the thoracoabdominal aorta (Fig. 2a,e). The true lumen at the proximal descending aorta was patent and severely compressed by the false lumen (Fig. 2b,c). In the false lumen, partial thrombosis was observed below the diaphragm (Fig. 2d). Emergency axillobifemoral bypass was performed to relieve ischemia of the lower extremities. Postoperative enhanced CT showed slight recovery from compression by the false lumen with the area of re-dissection in the false lumen reduced and the axillobifemoral bypass patent. After surgery, the patient recovered well from paraplegia within two days and was discharged 48 days after surgery.

3. Discussion

Cambria et al. reported that acute dissections occur in 5% of patients with coexistent or previously operated degenerative aneurysmal disease [3]. They also pointed out that coexistence of atherosclerotic aneurysm and aortic dissection appears to increase the risk of aortic rupture, in both the proximal and distal aorta. If such patients experience pain from the latter, careful blood pressure monitoring and subsequent emergency imaging studies help determine whether the pain is from expansion of the AAA or an acute aortic dissection. If the blood pressure becomes well controlled and the patient still has persistent or increasing abdominal pain, operative interventions should be considered immediately [2].

Anand et al. reported that the operative mortality rate for elective AAA repair is not increased by the presence of a previous or concurrent thoracic or thoracoabdominal aortic dissection, whether dissections were acute or chronic [4]. However, they reported three cases of acute dissections occurring in the aorta with coexistent AAA, and that these three cases were clinically challenging in both diagnosis and operative indication. The complications such as aortic rupture or acute renal failure have been reported in cases after aneurysmal repair in acute dissection [2]. De Bakey et al. have reported that the operative mortality rate for thoracoabdominal aortic aneurysmectomy, in the setting of an acute aortic dissection, was almost double that of chronic dissection [5]. To date, there have been few reported complications of paraplegia caused by obstruction of abdominal aorta after abdominal aneurysmal repair in patients with acute aortic dissections. Fourteen cases with coexistence of atherosclerotic aneurysm and aortic dissection reported by Anand were not complicated with paraplegia after aneurysmal repair [4]. They reported that postoperative paraplegia may possibly occur after abdominal repair due to decreased blood flow to the Adamkiewicz artery [4].

In our case, paraplegia was caused due to the collapse of the true lumen by compression of the thrombosed false lumen. Furthermore, ischemia of the lower extremities was aggravated by an expanded patent false lumen and compressed true lumen at the proximal descending aorta, resulting in malperfusion. The reason why expansion of the thrombosed false lumen occurred might be due to clamp injury in the fragile intima of the dissected aorta. We should carefully clamp the proximal site of the dissected aorta, especially in patients with acute aortic dissection.

Therapy has recently been directed at less invasive methods, such as stent-graft procedures. Tefera et al. reported the feasibility of endograft repair of infra-renal AAA with a modular stent-graft in the presence of acute aortic dissection extending below the renal arteries [6]. Although we could not use stent-graft treatment because of an emergency situation, we considered that endovascular treat-
ment was a preferred procedure in this situation. If endovascular treatment is impossible in an emergency, aneurysmectomy with extra-anatomical bypass, grafting might be one of the treatments for AAA patients with fragile proximal clamping sites to prevent clamping injury. We report a rare complication of acute onset paraplegia in a patient with acute type B aortic dissection after repair of AAA. As shown in this case, surgical treatment of AAA in a patient with acute type B aortic dissection considered to be clinically challenging and should be carefully performed.

References


eComment: Re: Acute onset of paraplegia after repair of abdominal aortic aneurysm in a patient with acute type B aortic dissection
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The authors describe a complicated clinical case with positive outcome achieved due to active and well-considered treatment [1]. Several crucial issues of the surgical approach in patients with aortic dissection are pointed out. However, despite the positive outcome the issue requires thorough discussion. We agree that type B aortic dissection does not indicate surgical treatment when it occurs without aortic expansion, significant compression of true lumen and ischemia of kidney, lower limbs and visceral organs. We also suppose that authors made an absolutely right and opportune decision to perform emergency surgery for progressive true infrarenal abdominal aortic aneurysm (AAA). The crucial point is: whether clinical symptoms described in the article (appearance of abdominal pain, skin paleness) may be considered as a reliable evidence of infrarenal aortic aneurysm progression if CT data do not reveal any signs of complicated aneurysm (expansion, thrombosis or rupture). These symptoms could be caused by progression of dissection or thrombosis of the false lumen.

Another question under discussion concerns the method of infra renal aneurysm repair. Perhaps such clinical case with acute aortic dissection without malperfusion and with progressive true infrarenal aortic aneurysm may be considered as an indication for endovascular grafting [2]. A retrospective analysis of reported cases showed that endovascular AAA repair could at least prevent serious complications resulting from surgery.

The most dramatic and nevertheless interesting (as positive outcome has been finally achieved) part of the article is the report of paraplegia developed via true lumen thrombosis with total regression after extra-anatomic surgery had been performed. The indubitable cause of that discouraging complication was a thrombosis of the radiculomedullaris magna artery, which probably originated from the true lumen (preoperative CT angiography did not make it possible to visualize the pattern of spinal cord blood supply). After extra-anatomic surgery, total regression of neurological symptoms was observed.

We want to emphasize the unexpectedness of this positive result as surgery was not aimed at the direct restoration of the spinal cord blood supply. Probably there was no significant ischemic spinal cord injury caused by thrombosis of the radiculomedullaris magna artery, and collateral spinal cord circulation was well developed; so these two conditions made it possible for the paraplegia to regress totally.

In conclusion we would like to congratulate the authors for this interesting report describing the positive outcome achieved following a nonstandard approach for the treatment in a patient with type B (III) aortic dissection.

References