

Hybrid Procedure in Pseudoaneurysm of The Descending Thoracic Aorta in Hospital Kuala Lumpur

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SUMMARY

Conventional open repair for Thoracoabdominal aortic aneurysm (TAA) is associated with high morbidity and mortality. Spinal cord ischemia (SCI), renal failure, bowel ischemia and mortality are established complications following this procedure. With the advent of endovascular stent technology, various novel approaches have been described to reduce these complications, namely fenestrated stent graft and hybrid procedure. We present a case of hybrid procedure in a pseudoaneurysm of descending thoracic aorta done in Kuala Lumpur Hospital.

CASE PRESENTATION

Mr MNO is a 64 year old man who presented with epigastric pain for two weeks prior to admission. The pain was dull aching and intermittent in nature and radiating to the back. It was sudden in onset and claimed to be related to food. Examination revealed a soft abdomen with tenderness at the epigastric area. No other abnormalities were detected. He was initially treated as acute pancreatitis but Computed Tomography scan (CT scan) showed a saccular lower descending thoracic aneurysm with the distal end just above the coeliac axis measuring 4.5x 4.3cm. A small infrarenal abdominal aortic aneurysm measuring 3.5cm with calcification and narrow iliac vessels were also noted. He was treated with intravenous Ceftriaxone 2g twice daily for his symptomatic pseudoaneurysm of the lower thoracic aorta.

After one week of intravenous Ceftriaxone, he underwent a Stage I hybrid procedure repair, involving a bypass procedure to the coeliac and SMA arteries. However intraoperatively, both of his iliac arteries were noted to be very small and heavily calcified with a small aortic aneurysm. Thus, an aortobifemoral bypass with a 18 x 9mm graft was done as preparation of the access vessel for endovascular repair. Then a bypass from the left limb graft to the coeliac axis with a 9mm graft was done, followed by another bypass from the body of the bypass graft to the Superior Mesenteric Artery. Both the Coeliac axis and SMA were ligated at their aortic root to prevent retrograde flow.

Stage II repair of the hybrid procedure was done 10 days later, once the patient's condition stabilized clinically and biochemically. A right groin crease incision was made and the right graft limb was exposed and secured. The left graft was punctured percutaneously with a 18G needle, followed by insertion of a 5Fr sheath on a 0.035" guide wire. A calibrated pigtail catheter was inserted and an aortogram was performed

to localize the area of deployment. A Valiant Thoracic Stent Graft with a Xcelent delivery system with size of 28x24x150 and 24x24x150 was introduced through the exposed right limb graft and successfully deployed just above the renal arteries with no evidence of a endoleak.

The patient was sent to the Intensive Care Unit (ICU) and was extubated an hour postoperatively. His general condition was stable and feeding was started the next day. However, 32 hours postoperatively, he developed profound paraplegia with a lax anal tone, hence spinal cord ischemia was suspected. A spinal drainage catheter was inserted at the level of L3/L4 and the cerebrospinal fluid (CSF) pressure was noted to be 18mmHg. CSF drainage was done intermittently and the pressure was brought down to the level below 15mmHg.

The paraplegia remained the same and he was discharge back to the general ward on the third day of ICU care. His general condition remained stable and rehabilitation therapy for his paraplegia was commenced. He was discharged after ten days postoperatively.

DISCUSSION

Thoracic aortic aneurysm management poses a great challenge to the vascular surgeon. Spinal cord ischemia, stroke and high mortality rates are recognized complications of descending thoracic (DTA) and thoracoabdominal aortic (TAA) operations¹. Early mortality after thoracoabdominal surgery and spinal cord ischemia post procedure is as high as



Fig. 1: Saccular aneurysm at thoracic aorta just at the level of the diaphragm.

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20% and 28% respectively². Postoperative pain, prolonged postoperative recovery and hospital stays are amongst major concern to the patient.

Since, the first deployment of thoracic endovascular aortic stent (TEVAR) by Dake in 1994, TEVAR's popularity has gained tremendously. Its use extended to various thoracic aortic diseases such as thoracic aortic dissection, aneurysm and traumatic aortic injury. Although it gave very good results with fewer complications in comparison to open surgery, it had its own limitations².

The major limiting issue is the suitability of the landing zone for the deployment of the stent graft. This is the case, in this particular patient. He presented with a symptomatic saccular thoracoabdominal aortic aneurysm, which equals to a type I Crawford classification of TAA. The imaging showed that the lower border of the aneurysm was very near to the origin of coeliac axis and superior mesenteric artery and he also had a small and calcified distal aorta and iliac artery, of which both were not suitable for endovascular treatment.

To overcome the small access vessel problem, we decided to do an aortobifemoral bypass graft. This allows the introduction of the device delivery system, followed by the left femoral limb graft bypass to the Coeliac axis and SMA bypass. This gives the adequate length needed, which is more than 2cm neck for the distal landing zone of the endovascular stent graft³.

With TEVAR, spinal cord ischemia (SCI) has been reported to occur in between 2 – 12% of patients³. The causes of SCI after TEVAR are multifactorial and these include prior abdominal aortic repair, length of aortic coverage, hypogastric artery

interruption, subclavian artery interruption, emergent repair and sustained hypotension. We believe prior aortobifemoral bypass maybe the cause for the spinal ischemia in this patient. Perhaps, by doing a aorto-unifemoral procedure to one femoral artery and using it as access for the delivery of the device might reduce the spinal ischemia in this type of patients.

With regards to the CSF drainage during TEVAR, although peri-operative lumbar spinal drainage has been practised for open repair of thoracoabdominal aortic aneurysms, there is no accepted standard treatment for lumbar spinal drainage for TEVAR⁴. Our initial strategy was to employ CSF drainage selectively for those patients who required long stent coverage and in those patients who develop ischemic symptoms after TEVAR. However, this is not always a good strategy, as proven in this patient. We believe CSF drainage should be employed in all patients undergoing TEVAR as proposed by the Albany group⁵.

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