Visceral Hybrid Procedures
For Complex Aortic Pathologies

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Disclosure

Speaker name:

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I have the following potential conflicts of interest to report:
✓ I do not have any potential conflict of interest
Visceral Hybrid Repair

- First described by Quinones-Baldrich in 1997
- Further described by Watanabe in 2002
- Then Wolfe in 2003 at St Mary’s, Paddington, London
Fig. 2. Schematic representation of the thoracoabdominal aortic aneurysm repair. (A) The pre-operative situation; (B) following repair of the iliac aneurysms and revascularisation of the visceral arteries and renal arteries; (C) the stent deployed through the aneurysmal thoracoabdominal segment through a side arm.
Visceral Hybrid Repair

• Originally described as four vessel visceral (coeliac, SMA, both renals) debranching via bilateral retrograde iliac bypass grafts

• Aortic conduit

• Completion endovascular stent grafting
Complex thoracoabdominal aortic aneurysms: Endovascular exclusion with visceral revascularization

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Objective: We review our ongoing experience with a transabdominal stent repair of complex thoracoabdominal aneurysms (Crawford type I, II, and III) with surgical revascularization of visceral and renal arteries.

Methods: A retrospective review was conducted of prospectively collected data from 29 consecutive patients who underwent an attempted visceral hybrid procedure between January 2002 and April 2005. Twenty-two patients were elective, four were urgent (symptomatic), and three were emergent (true rupture). The median patient age was 74 years (range, 37 to 81 years). The aneurysms were Crawford type I in 3, type II in 18, type III in 7, and type IV in 1. Previous aortic surgery had been performed in 13 (45%) of 29 and included aortic valve and root replacement in 3, TAA repair in 1, type I repair in 1), type IV repair in 3, type B dissection in 2, infrarenal aneurysm in 5, and right common iliac aneurysm in 1. Severe preoperative comorbidity was present in 23 (80%) of 29: chronic renal impairment in 5, severe chronic obstructive pulmonary disease in 6, myocardial disease in 11 at New York Heart Association grade II (6) and grade III (5), and Marfan's syndrome in 6. Twenty-six patients (90%) had a completed procedure. In two patients, myocardial instability prevented completion of the procedure despite extensive preoperative cardiac assessment, and in one, poor flow in the true lumen of a chronic type B dissection prevented anastomosis of the revascularization grafts. Exclusion of the full thoracoabdominal aorta was achieved in all 26 completed procedures and extended to include the iliac arteries in four, with revascularization of coeliac in 26, superior mesenteric artery in 26, left renal artery in 21, and right renal artery in 21).

Results: There was no paraplegia ≤30 days or during inpatient admission, and elective and urgent mortality was 13% (3/23). All of the patients with ruptured thoracoabdominal aneurysms died ≤30 days. Major complications included prolonged respiratory support (>5 days) in 9, inotropic support in 4, renal impairment requiring temporary support in 2 and not requiring support in 2, prolonged ileus in 2, resolved left hemispheric stroke in 1, and resection of an ischemic left colon in 1. Median blood loss was 3.9 liters (range, 1.2 to 13 liters). The median ischemia time was 15 minutes (range, 13 to 27 minutes) for the superior mesenteric and coeliac arteries and 15 minutes for the renal arteries (range, 13 to 21 minutes). The median hospital stay was 27 days (range, 16 to 84 days). Follow-up was a median of 8 months (range, 2 to 31 months), with 92 of 94 grafts patent. Six patients were found to have a type I endoleak. In four, this was a proximal leak, and stent extension in three reduced, but did not cure, the endoleak. One patient with a distal type I endoleak was successfully treated by embolization. Four type II endoleaks resolved without intervention, and one was treated by occlusion coiling of the origin of the left subclavian artery. A single late type III endoleak was found.

Conclusion: Early results of visceral hybrid stent-grafts for types I, II, and III thoracoabdominal aneurysms are encouraging, with no paraplegia in this particularly high-risk group of patients. These results have encouraged us to perform the new procedure, in preference to open surgery, in Crawford type I, II, and III thoracoabdominal aortic aneurysms. (J Vasc Surg 2006;43:1081-9.)
The Visceral Hybrid Repair of Thoraco-abdominal Aortic Aneurysms — A Collaborative Approach


Abstract

Objective: To report the collaborative data of 3 major European Vascular Units using the 'visceral hybrid' procedure for thoraco-abdominal aortic aneurysms and dissections.

Methods: A consecutive series of 107 urgent and elective high-risk patients were included in a prospectively collected database.

Results: All stents involved the entire thoracic and abdominal aorta with left subclavian coverage in 19 and revascularisation in 12. The distal landing zone was in the infra renal aorta in 75% and in the iliac artery in 25%. The 30-day mortality rate was 16/107 (14.95%). 13/107 (12.1%) of the patients suffered spinal cord ischaemia which was complete and permanent in 9/12 (8.4%). 4 patients (3.7%) required long term dialysis and a segment of gut infarction requiring resection occurred in 3 (2.8%). Most patients had visceral bypass grafting and aortic stent-grafting performed in one stage. In 18 patients the stenting was performed later. Three of these patients ruptured before the stenting procedure was undertaken.

Conclusion: These early results of visceral hybrid repair for high-risk patients with complex thoraco-abdominal aortic aneurysms are encouraging, in a group of patients in whom fenestrated/branched stent-grafting is not an option and open surgery hazardous.

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Hybrid Open Endovascular Technique for Aortic Thoracoabdominal Pathologies

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Background—Many authors using a hybrid debranching strategy for the treatment of thoracoabdominal pathologies have reported disappointing results and the initial enthusiasm for the technique has given way to criticism and ambiguity. The aim of the present meta-analysis study was to assess the safety and efficacy of the technique in patients with thoracoabdominal aortic aneurysms or other aortic pathologies.

Methods and Results—A multiple electronic search was performed on all articles describing hybrid open endovascular repair. Separate meta-analyses were conducted for technical success, visceral graft patency, spinal cord ischemia symptoms, renal insufficiency, and other complications as well as 30-day/in-hospital mortality. Nineteen publications with a total of 587 patients were analyzed. The pooled estimates for primary technical success and visceral graft patency were 96.2% (95% CI, 93.5%–98.2%) and 96.5% (95% CI, 95.2%–97.8%) respectively. A pooled rate of 7.5% (95% CI, 5.0%–11.0%) for overall spinal cord ischemia symptoms was observed; whereas for irreversible paraplegia the pooled rate was 4.5% (95% CI, 2.5%–7.0%). The pooled estimate for renal failure was 8.8% (95% CI, 3.9%–15.5%). The pooled 30-day/in-hospital mortality rate was 12.8% (95% CI, 8.6%–17.0%). During the mean follow-up period of 34.5 (95% CI, 31.5–37.5) months, a total of 119 endoleaks were identified in 111 patients (22.7%).

Conclusions—The repair of thoracoabdominal pathologies by means of hybrid procedures in patients who are poor surgical candidates is still associated with significant morbidity and mortality rates. Future studies may substantiate whether the technique is amenable to amelioration and improvement. (Circulation. 2011;124:2670-2680.)
North American Complex Abdominal Aortic Debranching Registry

• Similar results
• Smaller series
• 30-day in hospital mortality 16%
• Spinal cord ischaemia rate 10%
1970 Dodge Challenger
Open Repair
Ferrari 488 GTB
Fenestrated/Branched Endograft
Visceral Hybrid Repair!!!
Benefits?

- Avoidance of:
  - Thoracotomy
  - Single-lung ventilation
  - Aortic cross clamping
  - Prolonged end-organ ischaemia

- Suitable for a larger range of pathological aortic anatomies
- Arguably equally suitable for dissections and aneurysms
Worst of Both Worlds?

• Mid-line laparotomy
• Long operation
• Many of the complications of open surgery
• All the endovascular complications
What role for this ‘spaghetti monster’?
What Relevance in the Endovascular Era?

- The visceral hybrid approach still has a place
- But the indications are limited
- Judicious consideration of all operative options
Indications

• Not fit for open repair

• Anatomically unsuitable for a wholly endovascular approach

• Urgent cases unsuitable for parallel graft techniques
Thank you!

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