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## **Endovascular versus Open Surgical Repair for Isolated Ruptured Descending Thoracic Aorta: A Systematic Review and Meta-Analysis**

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### Objective:

The purpose of this study was to compare clinical outcomes between open and thoracic endovascular aortic repair (TEVAR) in isolated ruptured descending thoracic aorta.

### Methods:

A comprehensive electronic search was undertaken to identify all published data comparing open versus endovascular repair in ruptured descending thoracic aorta. Databases were evaluated to March 2018.

### Results:

A total of 29,133 patients were analysed in 19 articles. Mean age was similar in both group of patients (54.6±12.8 yrs vs 54.6±13.5 yrs, p=0.19). Shorter ICU and total hospital stay in TEVAR (6.9±5.9 vs 9.1±6.6 days, p=0.003 and 16.5±8.9 vs 19.8±10 days, p=0.009 respectively). Paraplegia and stroke were higher in TEVAR with no statistical significance (2.5% vs 1.6%, p=0.47, and 1.7% vs 0.84%, p=0.62 respectively). There was also higher rate of re-intervention at one year in the TEVAR (p=0.001). While, a lower in-hospital mortality noted in TEVAR (6.5% vs 10.2% respectively, p=0.003), but no statistical difference in mortality rates at one and five years (p=0.51 and p=0.33 respectively).

### Conclusion:

TEVAR repair of thoracic aortic aneurysm gives better perioperative outcomes and lower in-hospital mortality, however no difference in mortality at one and five years at the expense of requirement for higher re-intervention rates at one year.

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**Perioperative Bleeding in Patients With Acute Coronary Syndrome Treated With Fondaparinux Versus Low-Molecular-Weight Heparin Before Coronary Artery Bypass Grafting.**

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The perioperative bleeding risk in patients receiving fondaparinux versus low-molecular weight heparin before coronary artery bypass grafting has not been reported. We evaluated perioperative coronary artery bypass grafting-related bleeding in patients with acute coronary syndrome preoperatively treated with fondaparinux or low-molecular weight heparin. All patients with acute coronary syndrome from the prospective, European multicenter registry on coronary artery bypass grafting preoperatively treated with fondaparinux or low-molecular weight heparin undergoing isolated primary CABG were eligible. The primary outcome measure was severe or massive bleeding defined according to the Universal Definition of Perioperative Bleeding stratified by P2Y12 inhibitor discontinuation. Secondary outcome measures included 3 additional definitions of major bleeding used in cardiac surgery trials. Propensity score matching was performed to adjust for differences in pre- and perioperative covariates. 1,525 patients were included, of whom 276 (18.1%) received fondaparinux and 1,249 (81.9%) low-molecular weight heparin preoperatively. In the propensity score-matched cohort (245 pairs), the risk of major bleeding according to the universal definition of perioperative bleeding severe or massive bleeding (11.8 vs 9.0%,  $p = 0.285$ ) and the 3 other major bleeding definitions was similar between the fondaparinux and low-molecular weight heparin cohorts. In conclusion, preoperative treatment with fondaparinux compared with low-molecular weight heparin was associated with similar incidence of perioperative bleeding in patients with acute coronary syndrome who underwent coronary artery bypass grafting.

## Recent five-year experience of total arch replacement with Elephant Trunk procedure in Western Norway

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### Objectives:

The Elephant Trunk (ET) procedure enables reconstruction of complex pathology involving the aortic arch. This study investigated intra- and postoperative outcomes in patients receiving either the classic (Vaskutek® Siena, n=9) or the frozen (Vaskutek® Thoraflex™ Hybrid, n=15) stage 1 ET procedure.

### Material and Methods:

Between January 2014-June 2019, 24 patients (12 female), median age 68 (range 49-77) years, underwent the ET stage 1 procedure at our institution. All patients had pathology involving the aortic arch: 20 aneurisms, two acute type A aortic dissection and two arch reoperations. The surgical protocol included deep hypothermia, cold blood cardioplegia, antegrade cerebral perfusion, cerebral oximetry (Invos®) and total arch replacement with reimplantation of arch branches. A retrospective analysis was performed.

### Results:

Mean length of cardiopulmonary bypass, cardiac arrest and selective antegrade cerebral perfusion was 276±63, 143±33 and 70 ±24 min, respectively. Patients were cooled to a median temperature of 21°C (range 18-23). No intra-operative deaths occurred. Combined (classic+frozen), 2(0+2) patients were reoperated due to bleeding, 5(1+4) had a cerebral event and 1(0+1) temporary paraplegia. 30-day mortality (1+1) was 8.3 %. Mid-term survival was > 80 % (1+3 deceased). To date, 7 patients (3+4) have needed a second-stage transfemoral endovascular stentgraft.

### Conclusions:

Total aortic arch reconstruction with the Elephant Trunk stage 1 technique is an efficient and relatively safe operation enabling treatment of complex aortic pathology. This study demonstrated low 30-day mortality and good mid-term survival for this procedure. Intra-operative events and incidence of postoperative complications are comparable to data presented from high volume centers.

## **Non-infectious Sternal Dehiscence after CABG**

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**Introduction:** Sternal dehiscence is a well known major complication following coronary artery bypass grafting (CABG); the incidence in the literature ranging from 0.4 to 1.0%. We studied the incidence and both short and long-term outcome of these patients in a well defined whole-nation cohort.

**Materials and methods:** A retrospective study that included all CABG operations (n=2060) performed in Iceland 2001-2016. Patients diagnosed with sternal dehiscence (n=17) were compared to a control group (n=2025), including patient demographics, risk factors and survival, where 18 patients with deep sternal infection were excluded.

**Results:** Altogether 17 (0.8%) patients were diagnosed with non-infectious sternal dehiscence during the 16 year study-period: The median time at diagnosis being 12 days (range 4-240). Age, gender-ratio and cardiovascular risk-factors were similar between the groups except that patients in the dehiscence-group had higher BMI (30.9 vs 28.2 kg/m<sup>2</sup>, p<0.05), and were more likely to have chronic obstructive pulmonary disease (29.4% vs 7.1%, p<0,05). All the patients underwent re-wiring, most commonly ad modum Robichek operation but in 2 cases a titanium-plate was used for fixation. One of the 17 patient(5.9%) with sternal dehiscence died within 30 days postoperatively compared to 2.3% in the control group (p=0.34), 5-year survival also being comparable for the groups.

**Conclusions:** The incidence of non-infectious sternal dehiscence was low (0,8%) and in line with other studies. Most of these patients fare well after re-wiring with comparable 30-day and long-term survival to patients without sternal dehiscence.

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### **Anastomotic stenosis after aortic interposition graft in Type A Dissection Repair**

Ruhina Alam, Michael Lewis, Rachel James, Joon Lee

A 56 years old, hypertensive gentleman with no other co-morbidities underwent Type A Dissection Repair with Aortic Interposition Graft and was discharged home 2 weeks later with an uneventful recovery.

He presented to the follow-up clinic after 3 months with symptoms of shortness of breath. A TTE revealed tricuspid aortic valve, no AS/AR and preserved LV function; Increased flow velocities in ascending aorta, up to 3.18 m/s (40.4 mm hg). MRI aorta revealed Normal opacification of the interposition graft with no kink; self-like narrowing at the cranial anastomosis of the interposition graft with the lumen narrowing to 12 mm x 12mm and  $V_{peak} = 4.1$  m/s.

The patient underwent Re-do sternotomy with resection of supra-avalvular stenosis of the distal anastomotic site of previous aortic interposition graft (Aorta opened proximal and distal to the previous distal anastomosis - Internal cuff of Teflon causing anastomotic stenosis with resultant gradient). The patient made an excellent recovery and was discharged home 5 days later.

Follow-up at 3 months revealed a complete resolution of symptoms. TTE revealed a well functioning aortic valve with trace AR & normal aortic root dimensions with no gradient across the ascending aorta (graft). CT angiogram of Aorta revealed the full resolution of previously noted stenosis at the upper end of previous aortic interposition graft with a luminal diameter measuring 31 mm.

We encountered a rare problem where reinforcement of anastomosis with two layers of Teflon strip (inside and outside) In Type A Dissection repair resulted in distal anastomotic stenosis. Teflon strips are usually used for reinforcement of anastomosis to prevent residual dissection and haemorrhage. This case demonstrates a potential pitfall in using double layered Teflon strips as reinforcement of anastomosis in the repair for acute dissection – there is a risk of iatrogenic aortic stenosis at the anastomotic site.

## **Long-Term Results of Concomitant Freestyle Aortic Root Replacement and Reconstruction of the Ascending Aorta**

John Doty, Donald Doty

### Background

Concomitant ascending aortic aneurysm and aortic valve disease is common in bicuspid aortic valve or in older patients with degenerative valve disease and hypertension. Bioprosthetic stentless aortic root replacement can be combined with a traditional ascending graft for concomitant aortic root and ascending aorta reconstruction for simultaneous treatment of all existing pathology.

### Methods

Ninety-four (94) consecutive patients underwent elective concomitant aortic root replacement with a Medtronic Freestyle© bioprosthesis and ascending aorta reconstruction during a 16-year period. Indications for root replacement were dilation of all three aortic sinuses, small aortic root, or failed prior root replacement. Patients were followed prospectively with scheduled clinic evaluation and

transthoracic echocardiography.

### Results

There was no operative mortality and one permanent neurologic complication. Mean cross-clamp, cardiopulmonary bypass, and circulatory arrest times were 125 minutes, 170 minutes, and 11 minutes, respectively. Mean length of follow-up was 4.2 years (range 1 month to 13.6 years). There was no valve-related mortality or death attributable to aortic disease. Freedom from thromboembolism, endocarditis, and reoperation for valvular disease was 100%, 98%, and 95%, respectively. Five patients required valve reintervention at a mean of 6.4 years (range 1 to 11). No patient has developed valve thrombosis or additional aortic pathology.

### Conclusions

Concomitant Freestyle aortic root replacement and ascending aortic reconstruction is a safe and effective approach that eliminates both valvular and aortic pathology, and may subsequently reduce the incidence of reoperation for either disease. We recommend prompt intervention for such patients when appropriate criteria are met for either valvular or aortic indications.

## **ABO blood group does not impact incidence or outcomes of surgery for acute type A aortic dissection**

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**Objectives:** To evaluate the distribution and impact of ABO blood groups on postoperative outcomes in patients undergoing surgery for acute type A aortic dissection (ATAAD).

**Methods:** A total of 1,144 surgical ATAAD patients from eight Nordic centres (NORCAAD) were analysed. Blood group O patients were compared to non-O subjects. The relative frequency of blood groups were assessed with t-distribution, modified for weighted proportions. Multivariable logistic regression was performed to identify independent predictors of 30-day mortality. Cox regression analyses were performed for assessing independent predictors of late mortality.

**Results:** There was no significant difference in the proportions of blood group O between the study populations in the NORCAAD registry and the background population (40.6 (95% CI 37.7-43.4)% vs 39.0 (95% CI 39.0-39.0)%). ABO blood groups were not associated with any significant change in risks of 30-day or late mortality, with the exception of blood group A being an independent predictor of late mortality. Rates of postoperative complications were similar between the ABO blood groups.

**Conclusions:** In this large cohort of Nordic ATAAD patients, there were no associations between ABO blood group and surgical incidence or outcomes, including postoperative complications and survival.