Endovascular repair of aortic disease

Clinical and radiological outcomes

AKADEMISK AVHANDLING

som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet
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av

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Legitimerad läkare

Fakultetsopponent:
Professor Lars Lönn
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Avhandlingen baseras på följande delarbeten

I. Sandström C, Roos H, Henrikson O, Fagman E, Johnsson Å, Jeppsson A, Falkenberg M. **Endovascular plugs to occlude proximal entries in chronic aortic dissection** *Interactive CardioVascular and Thoracic Surgery*. 2022 Aug 3;35(3):ivac201.

II. Roos H, Sandström C, Koutouzi G, Jeppsson A, Falkenberg M. **Predisposing Factors for Reinterventions with Additional Iliac Stent Grafts After Endovascular Aortic Repair.** Eur J Vasc Endovasc Surg. 2017 Jan;53(1):89–9.

III. Andersson MB*, Sandström C*, Stackelberg O, Lundqvist R, Nordanstig J, Jonsson M, Roy J, Andersson M, Hultgren R, Roos H **Structured CT analysis can identify the majority of patients at risk of post-EVAR rupture** *first author Editor´s choice - *Eur J Vasc Endovasc Surg.* 2022;64(2):166–174

IV. Sandström C, Andersson MB, Bogdanovic M, Fattahi N, Lundqvist R, Andersson M, Roy J, Hultgren R, Roos H **Aortic Endovascular Aneurysm Repair long-term integrity impaired by stent graft sealing zones failure.** *Submitted manuscript*

SAHLGRENSKA AKADEMIN
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ABSTRACT

Background: Endovascular repair of aortic disease has improved but long-term outcome is questioned. **Aims:** To evaluate radiological and clinical outcome of endovascular aortic repair. Specifically: I. To evaluate if expansion of chronic aortic dissection can be prevented by occluding proximal entries with endovascular plugs. II. To determine underlying causes for additional iliac stent grafting after endovascular aortic repair (EVAR). III. To define precursors for post-EVAR rupture. IV. To investigate frequency and mechanisms for loss of seal in EVAR sealing zones.

Material and methods: All studies were retrospective with review of CT images using structured protocols. Study I, 14 consecutive patients with expanding aneurysms after chronic aortic dissection were treated with plug occlusion of proximal entries. Study II, 24 patients with distal stent graft extensions after EVAR were compared to 420 patients who had not required distal extension. Study III, 1805 patients treated with standard EVAR were assessed regarding post-EVAR rupture, 51 ruptures were analyzed. Study IV, 399 consecutive patients were analyzed using pre- and postoperative CTs and in-depth review of patients' charts.

Results: Study I, occlusion of proximal entries was achieved in 10/14 patients, and they had no further expansion of the descending aorta. Study II, graft migration at distal sealing zone or interconnections were common causes for additional distal stent grafting and associated with large diameters and short sealing lengths. Study III, post-EVAR ruptures were due to type I and III endoleaks and often caused by vessel dilatation in sealing zones. Precursors of failure were noted in routine follow-up in 31% of patients, compared to 84% in structured CT analysis. Study IV, a large proportion of stent grafts had lost the seal in the sealing zones, and this was associated with post-EVAR rupture. The predominant cause was progressing vessel dilatation. Large diameters and short apposition lengths in the sealing zones predisposed for loss of seal.

Conclusion: Occlusion of proximal entries with endovascular plugs may be considered in some patients with chronic aortic dissection. Postoperative surveillance with structured CT analysis detects most precursors of EVAR failure. Sealing zone complications after EVAR are frequent and associated with post-EVAR rupture. Stent graft manufacturers should consider requiring smaller vessel diameters and longer sealing zone lengths in their instructions for use.

Keywords: Aorta, aneurysm, dissection, EVAR, rupture, long-term, sealing

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