

# Laparoscopic Adjuncts in Endovascular Repair of Infrarenal Abdominal Aortic Aneurysms with Difficult Neck Morphology

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## Objectives

Laparoscopic remodeling of abdominal aortic aneurysm (AAA) after endovascular aneurysm repair (EVAR) could eliminate endoleak, endotension, device migration, and reduce the incidence of renal insufficiency in complicated aortic neck morphology. The purpose of our study is to evaluate the results of the hybrid procedure using laparoscopic adjuncts for EVAR of infrarenal AAAs with difficult neck anatomy.

## Methods

Patients underwent the hybrid procedure consisting of EVAR and laparoscopy for the treatment of infrarenal AAAs. All patients were deemed to be high-risk with respect to laparoscopic or conventional open AAA repair. Laparoscopic adjuncts include proximal aortic neck banding and fixation, sacotomy with thrombus evacuation, and clipping of inferior mesenteric and lumbar arteries. Complicated aortic neck morphology is defined as short ( $< 15$  mm), dilated ( $> 28$  mm), angulated ( $> 45^\circ$ ), and thrombus-lined. All patients were followed with duplex ultrasonography every 3 months, and computed tomography scan every 6 months post-discharge.

## Results

Among the 41 patients who had the hybrid procedure with and without proximal aortic neck banding and fixation, 19 patients with complicated aortic neck anatomy underwent EVAR and immediate laparoscopy, including proximal banding and fixation. Self-expandable stent-grafts were used in all patients. Of these 19 patients, the mean age was  $76 \pm 7$  years (range,  $61 \pm 83$ ). Mean preoperative aneurysm diameter was  $63 \pm 6$  mm and post-operative diameter  $40 \pm 10$  mm. Mean follow-up period was  $9 \pm 5$  months. There were three complications (transient renal insufficiency, pneumonia, and device migration), but no mortality. The amount of contrast dye used was  $68 \pm 15$  mL. The operative time was  $213 \pm 27$  minutes. There were no type I or II endoleaks, or secondary intervention.

## Conclusions

From our data on the hybrid procedure, it appears that laparoscopic adjuncts can effectively eliminate type II endoleaks, downsize the aneurysm sac, and decrease the amount of contrast used during the procedure. Laparoscopic adjuncts must include banding and fixation of the proximal aortic neck to increase the sealing zones, and potentially reduce the late development of proximal endoleak or migration. We hope that the hybrid technique could improve the long-term success of EVAR, especially for large AAAs with short neck, or as an alternative to fenestrated or branched endografts, for the treatment of infrarenal AAAs with difficult neck morphology.