Iliac Fixation Is the Key to Preventing Stent Graft Migration after Endovascular Aneurysm Repair

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Secure fixation of endovascular devices to the proximal aortic neck is known to be an important factor in preventing endograft migration. A variety of proximal fixation mechanisms are available, including infrarenal and suprarenal designs, with or without hooks and barbs. Despite favorable ex vivo and experimental studies indicating that penetrating hooks in proximal fixation mechanisms resist acute displacement forces, clinical migrations of such devices are seen. However, little attention has been paid to the role of iliac fixation in securing in vivo endograft stability. Endovascular devices have a variable degree of longitudinal columnar support and even devices with little intrinsic longitudinal support, may gain effective longitudinal support when contained within the iliac arteries. We sought to determine the relative importance of iliac fixation length in preventing migration of an endovascular device that is known to have considerable longitudinal columnar support.

The clinical results of 173 patients with long-term serial imaging follow-up who were treated using the AneuRx stent graft system were reviewed. Quantitative image analysis was performed to determine proximal aortic and distal iliac fixation length and to determine whether subsequent migration occurred. Patients were grouped according to good (> 15 mm), intermediate, or bad (< 10 mm) aortic fixation and good (< 10 mm from iliac bifurcation), intermediate, or bad (< 15 mm fixation length) iliac fixation. Patients with good iliac and aortic fixation (group I) were compared to those with good iliac and bad/intermediate aortic (group II), bad/intermediate iliac and good aortic (group III), and bad/intermediate iliac and bad/intermediate aortic (group IV) fixation.

Stent graft migration of 10 mm or more was seen in 17 patients (10%) during the 23 ± 19-month follow-up. There were no migrations among patients with good iliac fixation regardless of whether the aortic fixation was good, intermediate, or bad (0 of 63, 0%). Among patients with bad/intermediate iliac and good aortic fixation, there were 5 of 55 migrations (9%). Patients with both bad/intermediate iliac and aortic fixation had the highest migration rate (12 of 52, 23%). Cox proportional hazards regression revealed that the most significant factor predicting migration was bad/intermediate iliac fixation. Iliac extender modules were placed in nine patients with bad iliac fixation and migration with no further migration during a mean follow-up at 12 months. Surgical conversions were successfully performed in four patients, including one patient with rupture; all had bad/intermediate iliac fixation. Patients with good iliac and aortic fixation and no endoleak on the initial postprocedure computed tomography (CT) (n = 43, 25%) had no migrations, secondary procedures, or adverse clinical events over a 2-year follow-up period.

Thus, it appears that migration of AneuRx stent grafts is primarily related to insufficient iliac fixation. Extension of the iliac limbs to the level of the iliac bifurcation appears to prevent stent graft migration. Patients with good proximal and distal fixation and no evidence of endoleak on postprocedure CT are unlikely to experience migration or adverse events or require a secondary procedure over a 2-year follow-up period.