Short Report

'Trial of Stiff Guidewire': A Useful Adjunct to Determining Suitability for Endovascular Aneurysm Repair

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A B S T R A C T

Introduction: This study investigated our practice of performing a pre-operative 'trial of stiff guidewire' to assess whether iliac artery tortuosity may be overcome, prior to denying patients endovascular aortic aneurysm repair (EVAR).

Report: During the 58-month study period, 35 'trial of stiff guidewire' procedures were performed, the thirty-one of whom 'passed' were suitable for EVAR. Four patients whose iliac anatomy could not be straightened (failing the trial of stiff guidewire) were offered open surgery only.

Discussion: If the iliac artery can be straightened using the stiff wire, to a bend less acute than 80°, patients may still be offered EVAR.

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Introduction

Endovascular aortic aneurysm repair (EVAR) has become firmly established in clinical practice and currently about 60–70% of patients are anatomically suitable for this procedure. Iliac tortuosity is a contraindication to EVAR but there is no consensus on the degree and severity of iliac tortuosity that precludes iliac access. Consequently, some patients who are suitable for EVAR are turned down because of fears of the hostile iliac anatomy, while others may be wrongly subjected to the procedure which then fails because of difficulties encountered during attempted negotiation of the iliac system.

A number of techniques are employed to manage tortuous arteries. A through-and-through body wire, whereby a guidewire is passed from brachial or subclavian to femoral artery; two stiff guidewires may be passed simultaneously in parallel; external support of elongated iliac arteries by means of retroperitoneal incisions have also been described.

In our EVAR practice, we assess the suitability of these patients with a pre-operative 'Trial of Lunderquist wire' to determine whether difficult iliac access may be overcome.

Methods

All patients referred for aortic aneurysm repair are discussed at a vascular multidisciplinary team meeting. Based on this Unit's experience, if iliac arteries perform a turn of 80° or more, patients are offered a pre-operative 'Trial of Lunderquist wire' as a diagnostic test. This is performed in the angiography suite prior to EVAR planning under local anaesthetic. A standard technique is employed to pass a stiff 180° Lunderquist guidewire in an attempt to straighten out the iliac system via a femoral artery puncture (Figs. 1 and 2). If necessary, the same procedure is repeated on the other side. Straightening of the artery without a significant bend constitutes a ‘pass’ of the Trial of Lunderquist wire. Failure of the trial is deemed if the wire cannot be passed around the iliac artery or if the wire does not straighten the artery to less than an 80° turn.

Between January 2006 and October 2010 a total of 385 EVAR procedures were undertaken. Of these, 35 (9%) 'Trial of Lunderquist wire' procedures were performed. Thirty-one patients had iliac arteries which could be straightened by the stiff wire, and were suitable for EVAR. Three of these, however, became medically unfit (secondary to co-morbidities unrelated to the Trial of Lunderquist wire), leaving 28 who proceeded to EVAR. During a mean follow-up period of 2 years, two patients were found to have asymptomatic type II endoleaks. Four patients who underwent a Trial of Lunderquist wire had iliac anatomy which could not be straightened, therefore were unsuitable for EVAR. Three of these patients proceeded to open AAA repair. One of these patients would have required a fenestrated EVAR, however as he was unsuitable for endovascular repair, no patient-specific stent was manufactured. The fourth patient who failed the Trial of Lunderquist wire declined open surgery.

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Discussion

In our experience, if a stiff guidewire is able to negotiate and straighten the tortuous iliac system to achieve a less than 80° curve, then it is always possible to deliver and deploy an endovascular device. We observed no significant adverse events secondary to the procedure itself, endoleak or migration the devices deployed within hostile anatomy. There is debate as to whether tortuous iliac arteries pre-dispose to limb occlusion: we did not observe this, while employing no special techniques to prevent this phenomenon.

Various stiffer guidewires are used in practice, each with slightly different properties, however, the Lunderquist wire has been shown to be one of the stiffer wires available.1

This simple procedure, which is performed in the angiography suite, aids EVAR decision making and planning. It prevents suitable patients being denied EVAR on the basis of iliac tortuosity. This procedure may help to avoid the bail-out procedure (suitable in patients with uni-iliac tortuosity only) of a hybrid procedure involving a unilateral endografts with femoro-femoral crossover, or abandoning the endovascular repair altogether— which carries a high risk for the patient and high cost for the vascular unit.

Conflict of Interest/Funding

None.

Reference