CASE REPORT

Snare Guiding Technique in Bifurcated Endovascular Repair of Abdominal Aortic Aneurysm with Severely Tortuous Iliac Artery Access: A Case Report

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ABSTRACT

Endovascular aneurysm repair (EVAR) has gained acceptance as a viable alternative to open surgical treatment for abdominal aortic aneurysm (AAA). We report the use of snare guiding wire in bifurcated EVAR case with severely tortuous femoral access. A 63-year-old man referred to the hospital from another facility with complaints of pulsating mass in right iliac and umbilical region for the last 2 years. He was then admitted to the cardiac catheterization lab for EVAR under general anaesthetic. Endovascular aneurysm repair (EVAR), also known as an endoprosthesis, is a stent-graft device-guided therapy for a AAA. This procedure is a safer choice for individuals who are elderly or have pulmonary, cardiac, or renal problems. Tortuous iliac arteries might obstruct device delivery during EVAR. The Snare Guiding Wire approach might be an alternate method for EVAR to treat AAA if conventional cannulation is difficult or impossible in individuals with highly tortuous iliac access.

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INTRODUCTION

Abdominal aortic aneurysm (AAA) is abnormal enlargement of aorta at the level of abdomen, bearing a significant risk of rupture. Endovascular aneurysm repair (EVAR) has gained acceptance as a viable alternative to open surgical treatment for abdominal aortic aneurysm (AAA). Endovascular aneurysm repair (EVAR), also known as an endoprosthesis, is a stentgraft device-guided therapy for a AAA. The stent graft is implanted inside the native abdominal aorta through the femoral artery and secured proximally and distally to the sick aneurysmal part of the aorta under radiological guidance, generating a new blood flow conduit (1). Abnormal vascular anatomy like tortuous iliac arteries might obstruct device delivery during EVAR. Buddy wires, large bore intra-arterial sheaths, tensioning the arterial tree by brachio-femoral pull through wires, or manual iliac support via extraperitoneal access are all methods for straightening such arteries (2). We report the use of snare guiding wire in bifurcated EVAR case with severely tortuous femoral access.

CASE REPORT

A 63-year-old man referred to the hospital from another facility with complaints of pulsating mass in right iliac and umbilical region for the last 2 years. The patient stated he had been experiencing pain sensation sometimes. The past medical history of patient shows that one month ago, the patient underwent nephrostomy for right renal. Then, nephrostomy tube was placed in right renal and double-J stent in left renal. He had no documented history of hypertension, chemotherapy, and hemodialysis.

His vital signs were within normal limits and physical exam showed pulsating mass without abdominal pain and no other abnormalities. His electrocardiogram showed sinus rhythm. The results of laboratory test were mild anemia with a haemoglobin of 10.2 g/dl, erythrocyte 3.45 million/microliter, haematocrit 29%, and nonspecific leucocytosis.

He was then admitted to the cardiac catheterization

lab for EVAR under general anaesthetic (Figure 1). The abdominal aortic aneurysm was accessed via a right and left common femoral artery (Figure 2). After the incision in the groin, wires and catheters were inserted into the bilateral femoral arteries. The size of landing zone and aortic length were confirmed by angiography. The left femoral artery was used to provide a 5 F sheath over the guidewire and main body stent and left iliac graft was deployed below lower renal artery. Generally, the guidewire is inserted into the main body of the stent graft's contralateral short limb from the contralateral femoral artery. In our case, the tortuous right femoral artery prevented this guidewire from being cannulated from the contralateral (right) limb to the main body. (Figure 2).



Figure 1: 3D Angiography before EVAR



Figure 2: (A) Right iliac artery access (B) Left iliac artery access (C) Cannulation difficult to be achieved due to tortuous right femoral artery

After several hour we try to insert wire to main body to deploy right iliac stent graft, we decide to use access from left brachial artery to insert guiding wire to the Main Body stent so wire can pass through right graft extension and then the snare was inserted from right femoral artery to grasp the guidewire from brachial artery (Figure 3). With help from snared guiding wire, the deployment of right iliac stent graft can be achieved (Figure 3). The patient underwent EVAR successfully after. Angiography confirmed complete EVAR process (Figure 4). The procedure time was 6 hours.

DISCUSSION

Endovascular aneurysm repair (EVAR), also known as an endoprosthesis, is a stent-graft device-guided therapy for a AAA. The stent graft is implanted inside the native abdominal aorta through the femoral artery and secured proximally and distally to the sick aneurysmal part of the aorta under radiological guidance, generating a new



Figure 3: (A) Snare guiding wire (B) Right iliac stent Graft inserted to the main body



Figure 4: Post EVAR process

blood flow conduit. The criteria for EVAR are similar to open surgery, but the contraindications are based on the vascular anatomy. This procedure is a safer choice for individuals who are elderly or have pulmonary, cardiac, or renal problems. The effectiveness of the EVAR depends on patient's vascular anatomy, particularly neck morphology, as well as the knowledge with the method and procedure-specific problems (1).

Tortuous iliac arteries might obstruct device delivery during EVAR (2). Some researchers have linked arterial tortuosity to aging, atherosclerosis, and hypertension, although the specific process is unknown. They also mentioned about Arterial Tortuosity Syndrome (ATS), the condition that causes elongation, tortuosity, and aneurysms in the major and middle-sized arteries. SLC2A10 gene mutations were recently discovered to be the cause of ATS and this gene inhibits GLUT10 action which causes TGF- β signalling to become overactive (up-regulated) through an unknown mechanism. This condition induce artery elongation, which leads to tortuosity (3).

According to Anatomy Severity Score Grading Scale,

an iliac artery tortuosity index of more than 1.6 is considered severe and score less than 1.25 is considered optimal. The score is calculated by dividing the distance along the central lumen line from aortic bifurcation to the common femoral artery (L1) by the straight line distance from aortic bifurcation to the common femoral artery (1). Buddy wires, large bore intraarterial sheaths, and tensioning the arterial tree can be used to straighten iliac tortuosity (2).

Vascular anatomical difficulties might be the indication for contralateral wire cannulation (4). Cannulation of the contralateral gate is most commonly done using an angled catheter and wire in bifurcated modular grafts that necessitate insertion of a contralateral limb (5). If this approach fails, a cross-over technique or extra access through the left brachial artery with a contralateral femoral snare catheter may be employed. Navigation of a catheter through the thoracoabdominal aorta, and body of the stent-graft may also be challenging and associated with longer procedural and fluoroscopy time (4). In our case, we found anatomical difficulties while performing contralateral cannulation in right femoral artery, so we decided to perform antegrade cannulation from extra access in left brachial artery. We preferred brachial artery for several reasons such as patient was old, the brachial artery pulse more palpable, and the access was easy to achieve. Fortunately, there wasn't any symptom related complication.

Patients who undergo EVAR are at risk of a variety of graft-related problems. Limb thrombosis, endoleak, graft migration, enlargement of the aneurysm sac, and rupture can occur as a common complication (1). An antegrade cannulation that performed using extra access

in the right or left brachial artery may induced puncture related complications (4). In our case, there wasn't any complications in antegrade cannulation procedure.

CONCLUSION

The Snare Guiding Wire approach might be an alternate method for EVAR to treat AAA if conventional cannulation is difficult or impossible in individuals with highly tortuous iliac access.

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