

## Complex endovascular aneurysm repair for juxta-renal or thoraco-abdominal aortic aneurysm

### What is the condition?

An aortic aneurysm is a large dilation of the main aorta that transports blood to vital organs throughout the body. These aortic aneurysms can be divided into several categories based on their location. A juxta-renal aortic aneurysm extends very close to the renal arteries that transports blood to the kidneys, but does not involve these arteries. A thoraco-abdominal aortic aneurysm extends across the thoracic and abdominal sections of the main aorta. Due to the proximity of these type of aneurysms to other arteries connected to vital organs, they are more difficult to treat using standard endovascular techniques. If left untreated, an aneurysm can grow in size and burst, which leads to severe complications and may be fatal.

### What is the technology?

Traditionally, aneurysms have been dealt with by open surgery. However, minimally invasive endovascular techniques have become more common in recent years, in which a tube-like device called a stent graft is inserted in the main aorta of the body through small incisions in the groin. The graft is then positioned in the aneurysmal section of the aorta, thus preserving the blood flow and preventing further pressure to be applied on the aortic walls. Increasingly more complex techniques have been developed to deal with anatomically challenging aneurysms such as juxta-renal or thoraco-abdominal aortic aneurysms. These complex techniques typically use modified versions of stent grafts that may contain fenestrations or additional smaller branches emerging from the main stent graft which preserve the blood flow to vital organs attached to the main aorta.

### What we did

We looked at published evidence concerning how these complex techniques compare to the traditional open surgery repair in terms of efficiently dealing with the aneurysm, improving the patient's prospect for survival without complications, and how much they cost the NHS. We also looked at how these procedures should be delivered at the local level in terms of number of procedures needed to be performed to achieve a good outcome.

### What we found

These surgical techniques seem to offer an efficient way of dealing with aortic aneurysms, but their durability in the longer-term is unclear.

It was not possible to determine whether these techniques offer better prospects for survival and a reduced risk of complications based on the limited evidence available. There was a high

degree of uncertainty surrounding the results and the complex techniques tended to be used in patients considered higher risk (e.g. older, with other diseases, etc.) which made the comparison difficult. It was consistently reported however that these techniques are associated with more re-interventions in the short-term.

In terms of costs, the evidence suggests that these procedures would cost the NHS more than the traditional open surgery repair.

Regarding the method of delivery, it appears that a larger volume of procedures improves the outcomes, potentially due to surgeon's increased experience. Some guideline documents recommend the introduction of these techniques in centres performing in excess of 20-30 procedures each year.

### **What is our advice to NHSScotland?**

Complex endovascular repair (EVAR) of juxta-renal aneurysms or thoraco-abdominal aneurysms offers an alternative to open surgical repair (OSR) and is used particularly for patients with perceived moderate/high operative risk. This is a novel treatment associated with limited and low quality evidence which makes it difficult to establish its advantage over OSR in terms of post-operative mortality and complication rates, or to assess its cost-effectiveness. The long-term durability of complex EVAR is unknown and the limited evidence suggests a higher re-intervention rate than OSR in the short-term.

Across NHS Scotland, patient selection between complex EVAR and OSR appears to be variable owing to a lack of consensus regarding grading of operative risk. NHS Scotland should develop a service configuration model that supports a consistent approach and optimises outcomes for patients being assessed and undergoing this intervention. A National Services Scotland (NSS) review of the national TAAA service is currently underway, and should address some of these issues in relation to the TAAA anatomy.

### **Future work**

Research is needed to establish whether complex endovascular aneurysm repair techniques offer good value for money for NHSScotland.

**This plain language summary has been produced based on SHTG Advice Statement 006/18 May 2018.**