

Endovascular Stent Grafts

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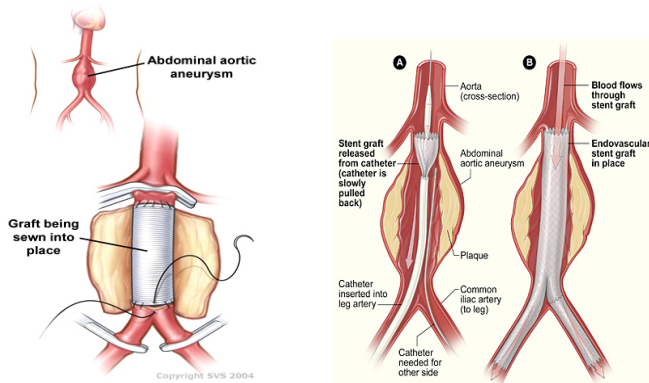
Abstract—A stent graft procedure treats abdominal aortic aneurysms (AAAs). The procedure is conducted to treat a bulging of a weakened area of the abdominal aorta. The tube-shaped device is placed inside a diseased vessel without surgically opening the tissue surrounding the diseased vessel.

I. INTRODUCTION

ENDOVASCULAR stent grafting is a minimally invasive procedure. It is used in place of open surgery to treat an abdominal aortic aneurysm: a bulging or “ballooning” of a weakened area of the abdominal aorta. The wall of the aorta can become weak due to age, disease, or trauma. This may cause the aortic wall to bulge, leading to an AAA. As the bulge grows, the wall of the aorta becomes weaker, causing the aorta to rupture and lead to massive internal bleeding. Aneurysm rupture can cause death and needs immediate medical attention. A stent graft is a woven polyester tube supported by a tubular metal web that is placed inside of a diseased vessel without surgically opening the surrounding tissue. After being placed in the artery, the stent graft expands and relieves the pressure on the aneurysm by providing a new pathway of blood flow.

II. METHODS

There are two primary treatment options for AAA, open surgery, and endovascular stent grafting. During open surgery the doctor repairs the aorta by making a large cut in the abdomen. The aneurysm section of the aorta is removed and replaced with a fabric graft. Open repair is a proven medical procedure.



A stent graft, such as the abdominal stent graft, is placed inside the aneurysm without surgically opening the tissue surrounding it. Fluoroscopy is used to guide the catheter to the AAA. The catheter is a long, thin tube-like device used to place the stent graft in the aorta. The catheter is advanced through the large vessel in the patient’s groin to reach the abdominal aneurysm. The stent graft is slowly released from the catheter into the aorta. As the stent graft is released, it

expands to its proper size so that it snugly fits into the aorta both above and below the aneurysm. The catheter is then removed from the body. The stent graft remains inside the aorta permanently. Imaging procedures are often performed to check whether the stent graft is properly placed.

III. RESULTS

The procedure for endovascular stent grafts was developed because of the noted morbidity of open surgical repair of aortic aneurysms. One study done by the Department of Vascular and Thoracic Surgery at the Arnaud de Villeneuve Hospital was conducted to study the impact of stent-graft development of endovascular repair. The study concluded that enhanced stent-graft conformability and more accurate delivery systems have significantly decreased the morbidity of endovascular repair.

IV. DISCUSSION

As with any endovascular stent graft, the abdominal stent graft comes with risks. Major risks associated with abdominal endovascular stent grafts include but are not limited to endoleaks: leaking of blood around the graft into the aneurysm; stent graft movement, which is movement of the stent graft from its original position over time; device-related issues like breaking sutures or the metal portion of the stent graft; aneurysm rupture; swelling of the groin area; nausea and vomiting; bowel complications; cramping pain and weakness in the legs; formation of blood clots that block the flow of blood to the organs; fever and inflammation; and a hole or a tear of the blood vessels.

There are a number of benefits to having an abdominal stent graft procedure. Some of these benefits include the procedure being minimally invasive; the procedure can be performed under local anesthesia; a lower surgical complication rate; the patient may lose less blood during the procedure; the patient may spend less time in the intensive care unit after the procedure.

Conclusively, an endovascular stent graft provides for a less invasive procedure than open-surgery, allows for a shorter recovery time, and decreases morbidity rates.

REFERENCES

- [1] "Endovascular Aneurysm Repair." *Wikipedia*. Wikimedia Foundation, 11 June 2013. Web. 24 Nov. 2013.
- [2] Canaud, L., F. Joyeux, and JP Berthet. "Impact of Stent-graft Development on Outcome of Endovascular Repair of Acute Traumatic Transection of the Thoracic Aorta." *NCBI* (2011): 485-90. *Pubmed.gov*. Web. 24 Nov. 2013. <<http://www.ncbi.nlm.nih.gov/pubmed/21861734>>
- [3] *Medtronicendovascular.com*. N.p., 2013. Web. 24 Nov. 2013.
- [4] "The Endurant Stent Graft." *Endovascular Today*. N.p., n.d. Web. 24 Nov. 2013.