An aortic aneurysm is a balloon-like bulge in the wall of the thoracic or abdominal aorta which produces a sac (Fig. 1*). Due to constant tension on the wall from the pressure of blood flow, this sac progressively enlarges until it ruptures. A significant percentage of patients with a ruptured aortic aneurysm die because of blood loss. Conventional repair of aortic aneurysms is open surgery. The dilated segment of the aorta is replaced with a polyester vascular prosthesis. Many patients with aneurysms have co-existent conditions which significantly increase the risks associated with such major surgery both electively and as an emergency procedure. But, until fairly recently, open surgery was the only available treatment for this condition.

LESS COMPLICATIONS, SHORTER RECOVERY

The less invasive nature of endovascular repair of aneurysms has the potential to reduce both the mortality and complication rate of conventional surgery, and may contribute to an overall reduced time in hospital and a shorter convalescence. All of these effects may help to reduce costs both to the patient and to the medical care system.

Endovascular aneurysm repair involves the introduction of a vascular prosthesis through either the femoral or iliac artery and into the aneurysm, where it provides a channel for blood flow to the lower extremities while excluding the aneurysm sac from the circulation. This procedure involves only a small incision in each groin. Sulzer Vascutek has been supplying surgeons with polyester prostheses for conventional vascular surgery since 1982 and now brings that extensive experience of textile technology to the endovascular repair of aortic aneurysms.

DESIGNED FOR ENDOVASCULAR APPLICATION

The concept of Anaconda, the new modular system for endovascular aneurysm repair, came from Prof. Lutz Lauterjung of the Klinikum Grosshadern in Munich (DE). It consists of self-expanding Nitinol, an alloy of nickel and titanium, combined with a new Sulzer Vascutek woven prosthesis which has
been designed specifically for endovascular application (Fig. 2). This innovative graft material is approximately one third thinner than conventional material (Twill-weave) but has similar burst strength and improved porosity. The system is modular and is comprised of straight tubes, bifurcates, iliac legs as well as iliac, aortic and thoracic cuffs (Fig. 3).

All surgical steps are carried out under fluoroscopic (x-ray) control. The crucial areas of the device and delivery system have radiopaque identification markers which allow visualization both during and post deployment.

All components of the system are deployed through a delivery sheath which is introduced over a guide wire in either the iliac or the femoral artery. The prosthesis is then advanced through the artery to the intended delivery site.

**ACCURATE PLACEMENT**

At the top of the graft there is a so-called ring-stent which is comprised of multiple turns of fine Nitinol wire and provides a conformable seal against the vessel wall (Fig. 4). The name Anaconda was chosen because of the similarity between the ring-stent and a snake's mouth. The hoop strength of the ring-stent is significantly greater than that of any of the currently available types of stent, e.g. slotted tube or Z-stent. It is this greater hoop strength which allows the ring-stent to act as both a seal and as an anchor without the need for either hooks or barbs. The ring-stent is connected to the central core of the delivery system by a series of control wires, which allow the device to be re-positioned, even after withdrawal of the introducer sheath (Fig. 5).

This ability to re-position is unique to Anaconda. Because of the design of the ring-stent, extremely accurate placement of the device can be obtained, including supra-renal fixation by aligning the saddle configuration of the ring-stent with the renal ostia. It also allows placement very close to the subclavian artery during thoracic aneurysm repair.

![Diagram showing ring-stent and delivery system](image)

**3** The Anaconda system is fully modular, allowing great flexibility and dimensional compatibility.
**MAGNETS GUIDE BIFURCATE PROSTHESES**

The bifurcate system utilizes a unique method of cannulating the contralateral limb. A non-magnetic guide-wire is positioned in the contralateral stump of the bifurcate prior to insertion. This non-magnetic wire has a small but powerful parylene-coated magnet attached to it on a short "floating" suture. A similar non-magnetic guide-wire with a magnet of opposite polarity fixed to the tip is introduced through the contralateral arteriotomy and advanced until the magnets attach. By advancing the initial guide-wire, the second guide-wire is pulled through the contralateral "trouser leg" providing an access route for the contralateral stent-graft limb (Fig. 6).

Only the bifurcate limbs are fully supported – neither the bifurcate body nor the straight tube graft are fully stented. This reduction in bulk allows the devices to be delivered through smaller introducers than any other commercially available systems.

Because the tubes and bifurcate bodies are not fully stented, the suture breakages as reported with other systems where the stent skeleton is sewn to the graft are eliminated.

The Nitinol wire is processed such that the device relies on the superelastic properties of the metal and not thermal memory; therefore perfusion with cold saline during deployment is unnecessary. The system is fully modular, allowing greater flexibility and dimensional compatibility with varying anatomy.

**FOR MORE DETAILS**

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