

# ROBOTIC SURGERY OF THE AORTA: A DREAM COMES TRUE

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## *Abstract*

In the past few years, robotic telemanipulator systems have entered the clinical arena, mostly for application in the fields of general and cardiac surgery. As development of the latter has been hampered by the limited working space in the mediastinum, the additive effect of the robot in most general surgical applications has been somewhat disappointing relative to conventional endoscopic techniques. Designed to overcome the major burdens of endoscopic surgery such as reduced dexterity and impaired visual control, however, robotic technology may be especially beneficial during technically advanced abdominal procedures such as the creation of vascular anastomoses. To evaluate this presumption, we have compared the efficacy of robot-assisted videoscopic aortic replacement to a standard videoscopic approach in a porcine model. Subsequently, five patients have been treated with robot assisted, totally laparoscopic aortobifemoral bypass grafting.

## **Introduction**

Laparoscopic surgical techniques, in spite of admirable endeavors of a small group of pioneers, to date have not found firm ground within the vascular surgery community. This lack of acceptance is likely due the technical limitations placed on the surgeon by endoscopic techniques, especially with regard to the vascular anastomosis 1-5. Recently, robotic technology has been shown to facilitate endoscopic surgical manipulation by increasing the degrees of motion and facilitating hand-eye coordination and could therefore potentially stimulate acceptance of laparoscopic aortic surgery among vascular surgeons. In this chapter, we will give an overview of the current status of robotics in the field of vascular surgery and subsequently report on a laboratory study comparing robot-assisted versus conventional laparoscopic aortic interposition graft, followed by our early human experience with robot assisted, laparoscopic aortobifemoral bypass grafting for aortoiliac occlusive disease.

Recently, two US companies have obtained European Union clearance for clinical use of their robotic telemanipulation devices (Computer Motion, Goleta, California, USA, the Zeus system®, and Intuitive Surgical, Sunnyvale, California, USA, da Vinci system®). In the summer of 2003, these companies have merged. Detailed descriptions of the two systems