Title **Technology Overview: da Vinci Surgical Robotic System**

Agency **ASERNIP-S, Australian Safety and Efficacy Register of New Interventional Procedures – Surgical**

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Aim

To provide information on the use of the da Vinci surgical robotic system for all types of surgery, and to addresses cost and resource use, legal, regulatory, and company issues, surgical training, and other policy issues. The information is intended to help decision makers formulate evidence-based recommendations on the use and uptake of the da Vinci system.

Conclusions and results

Robotic surgery offers benefits over conventional laparoscopic or open surgery. However, a significant learning curve and substantial costs are involved in its purchase, service, and maintenance. Frequent hardware and software updates can be expected. Sixty-seven studies (8 comparative, 59 case series/reports) were included from the following surgical specialties: urology (18), cardiovascular (19), general (19), thoracic (7), gynecology (2), and pediatric (2). The evidence is insufficient to determine the safety or efficacy of robotic surgery compared with conventional open or laparoscopic surgery for any surgical application. Most studies have small samples and short followup. Operative times with the robotic system were generally longer. The length of hospital stay may be shorter, but is influenced by hospital protocols. Complication rates appear to be similar. Case series/reports established the feasibility of robotic surgery in a wide range of procedures and described complications. Most authors were positive, but also reported problems, eg, adjusting to the robotic system, set-up, and technical difficulties. A learning curve (or a volume effect) was evident in many studies. As experience with the robotic system increased, operative times, complications, and conversions tended to decrease.

Recommendations

Potential purchasers of a da Vinci surgical robotic system should consider whether the volume of procedures is sufficient to overcome the learning/volume effect and offset the start-up and fixed costs of the system.

Methods

A systematic search of electronic databases (MEDLINE, EMBASE, PubMed, and Cochrane Library) using Boolean search terms was conducted (1996 to April 2004). Other Internet databases were also searched. We checked reference lists of other health technology assessments of robotic surgery. The searches had no language restrictions. The Intuitive Surgical website was searched for product information and relevant trials. English language studies of any type that reported on the use of the da Vinci system for any surgical application were included.

Further research/reviews required

Given the paucity of studies comparing robotic surgery with conventional surgery, high-quality randomized trials and thorough economic evaluations are required.

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