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Robotic surgery will see more international providers, lower prices

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By now, most of us are familiar with the term 'robotic surgery'. Robotic surgical devices enable surgeons to remotely guide and control surgical instruments placed through one or more incisions in a patient's body. The surgeons could be 500 kilometres away or located in the same operating theatre as the patient. The 'robotic' aspect of the surgery involves a computer system and display that serve as the interface between the surgeon and a precision electro-mechanical system close to the patient which is performing a surgical maneuver as directed by a surgeon user.

Benefits of the use of robotics in medical applications include the ability to filter unwanted motions, increased dexterity, high definition vision, increased ergonomics, reduced scarring, reduced blood loss and faster recovery times for patients.

Previous to the introduction of robotics, an historical move to laparoscopic procedures from open surgery resulted in less invasive procedures for patients.

However, that move also introduced certain disadvantages for surgeons, including reduced dexterity and decreased vision of the surgical field.

With high-definition, three-dimensional imaging and surgeon-friendly ergonomic performance, robotic surgery can provide the surgeon with what was lost with the move from open surgery to

laparoscopic surgery, yet with the clinical advantages of laparoscopic surgery.

Although robotic surgery has many advantages, only one company, Intuitive Surgical of Sunnyvale, California has capitalized on the opportunity with its da Vinci Surgical System.

Founded in 1995, Intuitive Surgical has since developed several iterations of its da Vinci system, which was initially cleared by the FDA in 2000 for general laparoscopic surgery. Since that time, da Vinci systems have been used to perform more than 3 million surgical procedures, including urology (prostate, bladder and

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kidney cancer), gynecology (benign and cancerous hysterectomy; myomectomy), general surgery (colorectal; ventral and inguinal hernia repair), thoracic surgery (lobectomy; mediastinal mass) and cardiac surgery (mitral valve repair; pulmonary resections).

To date, Da Vinci procedures have been performed in 64 countries worldwide.

Notwithstanding the success that Intuitive Surgical has experienced, the global surgical robotics market opportunity is largely unpenetrated and is expected to grow substantially from approximately \$3

billion in 2014 to over \$20 billion by 2020. It is anticipated that robotics will remain a norm in the operating room in coming years along with more surgical specialties adopting the use of robotics.

In addition to Intuitive Surgical, several new entrants have emerged in the areas of general, spine, ophthalmic and neurosurgery. Some of these newer companies include Medtech SA of France with its ROSA device for neurological procedures (acquired by Zimmer Biomet), and Toronto-based Titan Medical Inc. Titan is developing the SPORT Surgical System, a single port robotic surgical system, to address the clinical, operational and financial limitations of existing robotic platforms, and the company aims to expand robotic surgery into areas that are currently underserved in general abdominal procedures.

Titan believes that SPORT will allow surgeons to perform minimally invasive procedures with precision in small to medium size surgical spaces.

Other companies in the process of commercializing systems for general abdominal procedures include TransEnterix with its Senhance Surgical Robotic System, Verb Surgical, a joint venture between Johnson & Johnson's Ethicon Endo Surgery division and Alphabet's Verily Life Sciences, and Virtual Incision Corporation.

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