
Preface

Robotic surgery will prove to be the most significant advance in surgery for this generation of surgeons and the next few generations to come. The current platform, the da Vinci system, is the product of an evolution from the US Department of Defense's efforts to produce telerobotic capabilities in order to provide injured frontline soldiers with advanced surgical care from remote locations to commercial efforts to provide enhanced dexterity to facilitate complex surgeries while maintaining minimally invasive techniques. The enhanced dexterity, based on an anthropomorphic model whereby the robotic system is designed to mimic the human hand in its range and freedom of movements, is fairly advanced and has allowed both average surgeons to adopt minimally invasive techniques and skilled surgeons to push the envelope in the complexity of minimally invasive procedures. The robotic approach has permeated essentially every specialty in general surgery.

More importantly, however, the robotic platform has introduced two new dynamics between the patient and the surgeon that will have a far greater impact. First, the system is based on a master–slave relationship in which the surgeon is remote from the patient and performs the operation by controlling a patient cart slave that is docked to the patient. Second, the console represents a digital interface between the surgeon and the patient. In these aspects, we are just starting to scratch the surface of the possibilities.

The master–slave configuration allows for telepresence as was dramatically demonstrated by Professor Marescaux and colleagues in “Operation Lindbergh,” a transatlantic cholecystectomy. This capability will not only have a profound impact on providing sophisticated and complex care to remote locations from a command center but will also dramatically facilitate professional education and collaborative surgery. Experts will be able to have a global presence without having to leave their operating rooms and will be able to demonstrate surgery as well as assist or take over surgeries being performed in remote locations by linking their console to the remote patient cart. Additionally, the master–slave platform will eventually allow for the manipulation of wireless “slave” components that will form the foundation of the future of endoscopy, interventional radiology, and natural orifice interventions.

The digital interface, which allows for the collection and manipulation of data that can be used for diagnostic or interventional purposes, represents an even greater potential. Even in the relatively early stages, imaging technology

is being used to identify structures and provide a road map to the surgical anatomy in real time. The future will see the digital interface between patient and surgeon evolve to facilitate image-guided surgery, computer-aided surgery, as well as pre-performed surgery in simulation models that is reproduced by a computer-driven system on the actual patient.

This textbook, the first comprehensive overview of the role of robotic surgery in general surgery, is intended as a “how-to” reference of robotically performed procedures in general surgery. Additionally, in recognition of the importance of understanding the evolution of robotic surgery thus far, and the impact that it will have on the future of surgery, this book provides a historical perspective of robotic surgery as well as an overview of the emerging technology and future robotic platforms.

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