

Preface

Robot-assisted surgery or robotic surgery are any types of surgical procedures that are performed using robotic systems. Robotically assisted surgery was developed to try to overcome the limitations of pre-existing minimally-invasive surgical procedures and to enhance the capabilities of surgeons performing open surgery.

In the case of robotically assisted minimally-invasive surgery, instead of the surgeon directly moving the instruments, the surgeon uses one of two methods to perform dissection, hemostasis and resection, using a direct telemanipulator, or through computer control.

A telemanipulator (e.g. the da Vinci Surgical System) is a system of remotely controlled manipulators that allows the surgeon to operate real-time under stereoscopic vision from a control console separate from the operating table. The robot is docked next to the patient, and robotic arms carry out endoscopy-like maneuvers via end-effectors inserted through specially designed trocars. A surgical assistant and a scrub nurse are often still needed scrubbed at the tableside to help switch effector instruments or provide additional suction or temporary tissue retraction using endoscopic grasping instruments.

In computer-controlled systems, the surgeon uses a computer system to relay control data and direct the robotic arms and its end-effectors, though these systems can also still use telemanipulators for their input. One advantage of using the computerized method is that the surgeon does not have to be present on campus to perform the procedure, leading to the possibility for remote surgery and even AI-assisted or automated procedures.ⁱ

In the present book, fourteen typical literatures about Robot-assisted surgery published on international authoritative journals were selected to introduce the worldwide newest progress, which contains reviews or original researches on Robot-assisted surgery. We hope this book can demonstrate advances in Robot-assisted surgery as well as give references to the researchers, students and other related people.

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ⁱ https://en.wikipedia.org/wiki/Robot-assisted_surgery