Minimally Invasive Surgery

David Ramsay, URI Department of Biomedical Engineering, BME 181

What is Minimally Invasive Surgery?

Minimally Invasive Surgery is a surgical procedure in which operations are performed through very small incisions using specially designed surgical instruments and endoscopes. These incisions are generally one centimeter to one inch in length. Minimally Invasive surgery attempts to avoid damaging major muscle groups, tendons and ligaments by using very small incisions and precise surgical instruments.

Endoscopy

An Endoscopy is a surgical operation that uses an endoscope, a small tube-like surgical instrument that has its own light source, a camera and port-access for precise surgical tools. The surgeon begins an endoscopy by making a very small incision, through this incision they feed the endoscope through the body cavity to examine and operate on different bodily systems and organs. An endoscopy may also be performed through natural anatomical openings such as the esophagus, or nasal passageways.

Heart Surgery

Two major coronary bypass procedures are done today, Port-Access Coronary Artery Bypass (PACAB) surgery and Minimally Invasive Coronary Artery Bypass (MIDCAB) surgery. The PACAB is considered an open surgical procedure because they make a large incision in the chest despite using an endoscope. The MIDCAB procedure is minimally invasive due to the very small one inch incisions made.

Atherosclerosis and Angioplasty

Atherosclerosis is a disease caused by plaque build up in the walls of a blood vessel that reduces or cuts off the blood flow through the vessel and throughout portions of the body. Angioplasty is the procedure performed to restore the natural blood flow throughout the affected region of the body. Over time if the Atherosclerosis is not treated decreased levels of oxygen in the body tissues can lead to necrosis (tissue death).

In an Angioplasty procedure a surgeon makes a small incision in the upper thigh or chest of the patient, they then feed an endoscopic catheter through the arteries into the blood vessel that is affected by the Atherosclerosis. Once the endoscope reaches the plaque build up an angioplastic balloon is inflated to break apart and compress the plaque. This also stretches out the blood vessel which in turn triggers the body's natural healing response. A stent is also placed where the plaque buildup was to hold the blood vessel open effectively restoring the natural blood flow.

Da Vinci® Surgical System

The Da Vinci® Surgical System is a robotic system that assists in performing surgical procedures. It was designed to perform extremely precise minimally invasive procedures, and only needs to make three to four one inch incisions to perform its operations.

The system is comprised of four major components, the surgeon's console system through which the surgeon controls the platform. The patient side cart contains the robotic arms that perform the procedure on the patient. The arms can operate in a one cubic foot area. The Cart is also able to pump carbon dioxide into the body cavity to give the arms more room to work in. The surgeon is also able to control how much pressure each arm uses during the procedure. The specialized detachable instruments used by the Da Vinci® system are able to simulate the very precise human hand movements. Each tool has seven degrees of motion and is designed with a specific purpose in mind, for example one tool would be for suturing and another for clamping.

The 3-D imaging system uses a special endoscope equipped with a camera that is capable of taking a video feed and converting it into a magnified real-time 3-Dimensional image. It processes and displays the video at about 1000 frames per second. The video software is also able to filter every single frame and eliminate any background interference to provide the surgeon with crystal clear magnified view of the operating area. The surgeon is also able to switch views by simply pressing a foot pedal in the work station.

Benefits of Minimally Invasive Surgery:

The general benefits of Minimally Invasive surgery are greatly reduced post operation pain for the patient. The patient's recovery time is also significantly faster due to smaller incisions made and less tissue damage to muscles, tendons and ligaments. Due to the small size of the incisions and minimal damage done to muscle groups the post operation scar tissue is significantly reduced. The chance of surgical infection is reduced to an almost zero risk percentage and minimally invasive surgeries can save a patient thousands of dollars due to less time spent in the Intensive Care Unit during their recovery time.

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