

Technologies of Minimally Invasive Neurosurgery

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Description

The minimally invasive neurosurgery is one of the medical procedures involving the introduction of instruments or other objects into the body or body cavities. It is a redefining procedure in the field of surgery which is less invasive than an open surgery used for the same purpose.

In traditional open neurosurgeries, the neurosurgeons need to make large incisions in order to operate and access the area of concern. Using the technology of Minimally Invasive Neurosurgery, the surgeons can make just a few small holes or openings, not more than half inch each, and use highly developed video equipment to perform the operation.

Minimally Invasive Surgery (MIS) procedures have developed from technological innovations such as endoscopy, neuroimaging, stereotaxy and other methods using remote-controlled manipulation of surgical instruments.

Neuroendoscopy is a MIS procedure performed by the neurosurgeons in which the tumor is removed through small holes in the skull or through the mouth or nose without cutting or harming other parts of the skull using an endoscope, a small telescope-like device equipped with a high-resolution video camera and eye piece at the end to allow the neurosurgeon to navigate and access the tumor. The endoscope is also attached with special instruments like forceps and scissors on the end to remove or take a sample of the tumor (Biopsy). Rathke's cleft cysts, Pineal region, Pituitary, Skull base and Ventricular tumors are some of the types of brain tumors that can be treated with neuroendoscopy.

Neuroimaging is relatively a new discipline within medicine, neuroscience, and psychology that studies the structure and function of the nervous system by means of imaging technology, it is also known as brain imaging. It is the use of various techniques either directly or indirectly images the structure, function, or pharmacology of the nervous system. Neuroimaging

follows a neurological examination in which a physician has found cause to more deeply investigate a patient who has or may have a neurological disorder. It also explores series of mechanisms such as cognition, information processing, and changes of brain in the pathological state.

Stereotaxy is a technique that involves creating an illusion of depth to the sense of touch within a flat surface or the process of recording and reproduction of three-dimensional haptic information. The word Stereotaxy is formed from two words stereo meaning "solidity", and tactile meaning "touch". Stereotactic surgery is a minimally invasive surgical procedure that makes use of a three-dimensional coordinate system to locate small targets inside the body and to perform on them some action such as ablation, biopsy, lesion, injection, stimulation, implantation, radiosurgery etc. This procedure can be guided using Magnetic resonance imaging, Plain X-ray images, computed tomography.

As so many patients choose MIS procedures an entire operating room is dedicated to the technology, with this the neurosurgeons observes the surgical procedure from anywhere in the room with the help of high definition endoscopes and ceiling mounted screens arranged in the operation room.

MIS procedure also uses fiber optic cables and tubes etc. to treat the conditions like aneurysms that cause stroke, Arteriovenous malformation, Carotid stenosis, herniated discs, Trigeminal neuralgia and Hydrocephalus.

MIS procedure provides a safer and less distracting alternative to traditional or open surgery. It also enables the neurosurgeons to access the areas of the brain which cannot be reached in traditional surgery. Benefits include less pain, lower risk of infection, less hospital stay, faster recovery, minimal scarring and less damage to surrounding tissue. The main purpose of this technology is to provide superior care to the patient so that he can get back to his living life with in a short period of time safely.