

BrainSUITE

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Today's current methods of brain tumor removal are inefficient. They require multiple MRI's, pre and post op, to identify tumor removal. The problem with this is that the movement of the already traumatized post surgical brain from OR to MRI causes the brain to shift, swell, and move slightly from its original position. This makes the final MRI picture altered from the original, making accurate judgment of how much tumor is still present hard. This is a problem because 98% of tissue has to be removed. Less, the tumor has a relapse, and there is need for repeat surgery. More, and healthy tissue can be removed, resulting in permanent damage to the patient.

The solution to this problem would be a device that identifies how much tumor tissue is left before the operation is over. The system that is capable of doing this is BrainSUITE. BrainSUITE is an integrated neurosurgery system that provides precision and accuracy to the treatment of difficult tumors in various parts of the brain.

There are many vital components to the BrainSUITE system that make it so efficient, and the largest contributor being the iMRI. The iMRI is an intra operative magnetic resonance imaging system. What this means is that the MRI is inside the OR and MRI pictures can be taken during the operation instead of after. Also, the MRI machine has a larger bore opening than the standard MRI. This allows for the patient to be swiveled right into the MRI on the operating table, without re positioning them.

The next innovate item in the lab is the touch screen command station that is integrated to the entire OR. The touch screen monitor allows the surgeon to have complete control at his fingers of everything in the OR, from the lamp brightness to the gas flow. Behind the touch screen monitor, there is a high definition camera that magnifies the operating area and displays it on a large LCD display. This allows the surgeon and nurses to compare the current image to the MRI image, helping determine current progress on the tumor.

An interesting aspect of the camera is that it is linked to a CPU located outside of the OR. This CPU is also linked to the instruments the surgeon is using. The CPU calculates the spatial position of the instruments, compares it

to the picture in real time, and uses this data to improve the accuracy and precision of the



surgeon's movements and progress on the tumor.

The main goal of BrainSUITE is to remove more tumor tissue without damaging healthy tissue, compare, in real time, up to date MRI pictures with high resolution visuals, and eliminate the need of return operations. It does this, effectively, by integrating all the necessary tools a neurosurgeon would need into one easy system. By placing the MRI in the OR, this eliminates the altered pictures due to repositioning the patient, by allowing the surgeon to just rotate the patient right into the MRI without repositioning, this prevents movement of the brain, and swelling caused by agitation.

The system can be used on any type of brain cancer, but has mainly been used on Primary brain tumors, metastases, meningiomas, pituitary tumors, pediatrics, and skull base tumors. It cost 9.2 million dollars to create, and is currently located at the M.D. Anderson Cancer Center, at the University of Texas. Seven more are planned to be installed around the country.

Sources:

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