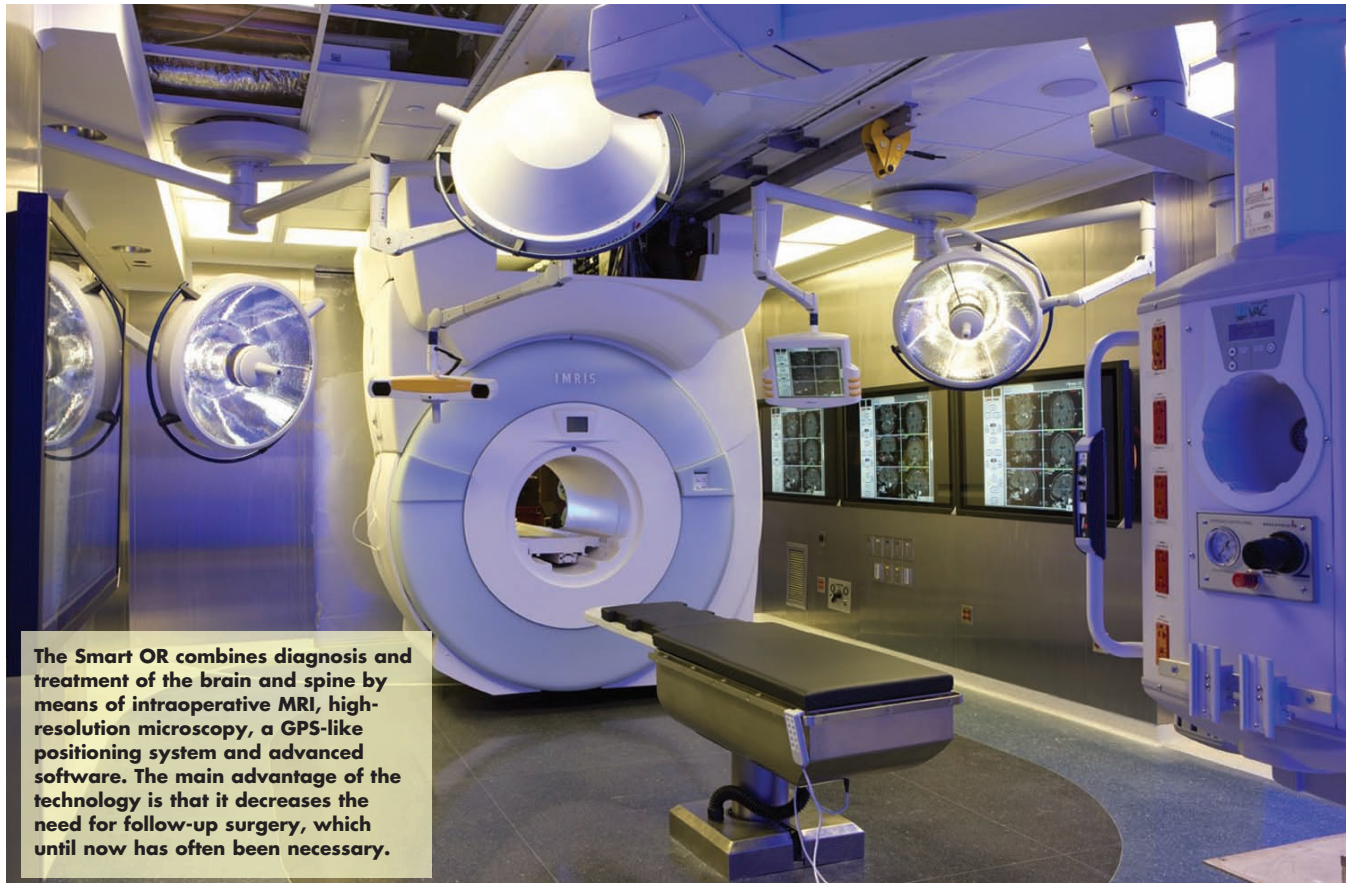


State-of-the-art technology maps the way to brain and spine surgery



The Smart OR combines diagnosis and treatment of the brain and spine by means of intraoperative MRI, high-resolution microscopy, a GPS-like positioning system and advanced software. The main advantage of the technology is that it decreases the need for follow-up surgery, which until now has often been necessary.

EAU CLAIRE, Wis. – Sacred Heart Hospital is one of 17 hospitals in the world equipped with a configuration of state-of-the-art neurosurgical technology called Smart OR. The system is designed for viewing and executing complex brain and spine surgeries, and its capabilities include high-resolution microscopy, integrated mapping, intraoperative MRI and data processing. The technology increases the chances of removing a tumor in its entirety while decreasing the risk of damage to areas surrounding the malignancy. As a result, it helps minimize postoperative trauma, quicken recovery time, shorten hospital stays and reduce the need for multiple surgeries.

A key component of the Smart OR is the iMRI (intraoperative MRI), which provides images of the brain during the operation, not pre- or postsurgery. The iMRI is mobile, eliminating the need to move the

patient. At its core is a Siemens Magnetom Espree, a 1.5-T six-ton magnet.

The VectorVision Sky component, which functions as a global positioning system, combines diagnostic images with those taken during surgery to produce a high-definition, 3-D map of the brain. A Zeiss OPMI Pentero C high-resolution microscope operates in conjunction with the Vector to magnify the field of view and enable surgeons to avoid sensitive areas of the brain.

When there's an "abnormality in the brain, [we] need to be able to get there without injuring important tissue along the way," said Dr. Kamal Thapar, director of the Brain and Spine Institute at Sacred Heart Hospital and a neurosurgeon at Marshfield Clinic in Wisconsin. "Every aspect of the brain has some element of critical function, and damage to those areas would result in functional loss."

Computer technology called BrainSuite

Net gathers, organizes and stores the data much as a search engine does so that the information is available to the surgical team. Any combination of images can be displayed on four 57-in. flat screens called Data Billboards, which the entire team can consult during the operation.

Smart OR a success

Since its debut at Sacred Heart in November, the Smart OR has been a success, Thapar said. About 25 to 30 patients have undergone neurosurgery, and in all cases tumors were completely removed, he said. The surgeons were pleased also to find that, in about one-third of the patients examined, the technology identified unexpected situations – such as blood clots – that changed the management of the case.

The suite is designed not only for removing brain tumors but also for performing brain biopsies and craniotomies, in

Shown is a holographic representation of a tumor (green) that is located between internal carotid arteries (red). The superimposed image was taken using the Zeiss OPMI Pentero C microscope and VectorVision Sky components.

addition to diagnosing and treating cerebrovascular disorders and arteriovenous or cavernous malformations.

According to Thapar, iCT is expected to become available by this summer for incorporation into the Smart OR system. Similar to iMRI, the technology will provide images in real time, and it is expected to differentiate better between soft and hard tissue than traditional CT scans do.

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