

## How artificial intelligence will affect brain surgery

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Brain surgery is getting smarter. The journal [Nature Medicine](#) recently published a study that found a new imaging technique that allows pathologists to diagnose brain tumors faster and more accurately than ever before.

The study focused on Invenio Imaging technology's use of artificial intelligence (AI) in making accurate diagnoses. So, will computers replace doctors? That's unlikely. Treating the human brain requires a human approach. But AI is poised to become an invaluable tool in improving a physician's ability to make an accurate diagnosis, predict future issues, and come up with minimally invasive surgical plans.

Because different types of tissue scatter light in distinctive ways, a computer can process the light and generate an image that is clear and precise. Plus, the laser technique processes the image in 90 seconds, compared to the 30 minutes it takes to freeze, stain, and assess the tissue in the lab through the traditional method.

This gives surgeons a more complete pathology report in real-time, allowing us to make the critical decision about what to remove and how much. This speeds surgical procedures, decreasing anesthesia time for the patient, can have important implications for survival, and lower costs.

In other areas of the body, surgeons remove "margins," healthy tissue that surrounds the tumor, to provide some assurance that the entire tumor has been removed because they do not have access to real-time tissue sampling in the OR. But in brain surgery, we can't do that. We don't want to remove a person's memory of their children or their ability to speak French just to make sure enough margin has been removed and make sure that all the tumor tissue is included. By providing near "real-time" tissue diagnosis, the combination of Simulated Raman Histology with AI allows surgeons to rapidly distinguish between tumor and normal brain as they are operating, a distinction not easily made by the naked eye. This new technology will assure the optimal extent of tumor resection while sparing normal adjacent brain.

AI also has the upper hand in that computer programs don't get distracted or fatigued, and they can pull from millions of records and histories to make predictions. At the same time, AI's predicted outcomes, life expectancy, cancer risks, and recurrence rates do not constitute care. While I am excited for what AI means for medicine, I believe that it requires expert physicians and specialists for AI to make a meaningful difference in patient care.

For patients with brain tumors, it is critical to come to a center that not only has the latest technologies but also has the most skilled specialists trained in how to best use them to ensure the greatest possible outcomes.

AI is making brain surgery smarter and faster. But it is up to skilled and compassionate specialists to make sure that "smarter" means "better" for the patients we are trying to help.

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