Doctors perform brain surgery via eyelid

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When Liane Lefever complained to her doctor about a persistent ear ache, an examination found a much more serious problem: a brain tumor.

For many Americans, that diagnosis could have led to invasive surgery -- including slicing open her skull -- and a long recovery. But with an innovative procedure being pioneered by two doctors from Johns Hopkins Hospital, her tumor was removed through a small incision in her eyelid.

"When you tell people you had brain surgery, the first thing people always do is look for a scar, and that's what's amazing, there isn't one," said Lefever, 47, who lives in Manheim, Pa. "Anyone who needs to go through this should know it's not that big of a deal even if it sounds like it is."

The Hopkins doctors first used the procedure three years ago and it's still relatively rare -- there have been only about 18 patients so far at the hospital. But the doctors, who published last month the first studies on the procedure, hope to add more patients and varieties of the surgery. Eventually, they believe, a quarter of tumors could be removed and many other repairs could be made this way.

The method adds another entry point to the brain for surgeons who also are going through the nose, eyebrow and even leg. And it means many more patients with common brain maladies could avoid traditional surgery -- as well as its complications and costs.

"In surgery in general, we have a goal of doing things in a simpler way so patients recover more quickly and the cost is less," said Dr. Kofi Boahene, a facial plastic and reconstructive surgeon and an assistant professor at the Johns Hopkins University School of Medicine who helped pioneer the eyelid procedure. "This is a new concept in minimally invasive surgery."

Dr. Anand V. Germanwala, an assistant professor at the North Carolina School of Medicine and a spokesman for the American Association of Neurological Surgeons, said such minimally invasive procedures are still only performed at a few, mainly academic facilities around the nation. Traditional surgery is still most commonly used -- and is often the best method because it allows for such a large opening in which to work.

But the quick procedure and the small incision were appealing to Lefever, whose tumor was removed in October.

She had a meningioma, a type of tumor that grows from the protective membranes, called meninges, that surround the brain and spinal cord. After seeking a second opinion, she landed in Boahene's office and in three months, the tumor had doubled in size.

Lefever knew it had to come out.

When the doctors told her they would enter the brain through her eyelid, she was most worried about her vision. But the procedure poses little threat of that, though she did lose some of her sense of smell because of the tumor's location. She was wearing contacts again in three months and back at work at the family french fry business in several weeks.

Eyelids weren't Boahene's first forays into brain surgery. He had worked with Dr. Alfredo Quinones-Hinojosa, a neurosurgeon and associate professor at Hopkins, on the nasal surgery, a procedure pioneered in

Pittsburgh in the late 1990s.

But three years ago, a 14-month-old boy with a tumor needed a biopsy that could not be accessed through his nose. Boahene began thinking about alternatives to the very invasive, traditional method, which involves shaving the patient's hair, peeling back the scalp, sawing into the top half of the skull and moving around sensitive brain tissue.

As a plastic surgeon, Boahene had been cutting into eyelids for years and knew the location might provide access to the middle and front region of the brain. He approached Quinones-Hinojosa. The boy's surgery and the 17 others since then have gone smoothly, with patients recovering significantly faster and with less scarring than traditional surgery, and with less infection than with nasal surgery.

Under the minicraniotomy, the eyelid is cut at a crease, and a quarter-sized piece of bone is removed just above the eyebrow. A computer-guided endoscope fitted with a camera leads surgical instruments to a tumor or a brain fluid leak needing repair. Once the work is done a few hours later, the bone is replaced and a small metal plate is used to hold it in place. A few dissolvable sutures close the eye lid and leave no visible scar.

Indeed, when Jeanne Fogas bats her eyes, there isn't a hint of her surgery to remove a benign brain tumor a little over a year ago. She wasn't even exactly sure where the incision was made.

Behind her right eye she had a 2-centimeter meningioma. It was discovered through a routine MRI. The 59-year-old occupational therapist from Gettysburg, Pa., was referred to the Hopkins doctors.

Her tumor had started to grow and needed to be removed before it affected her vision or caused brain damage, the doctors told her. But the

tumor was near her optic nerve and would be tough to reach through her nose or even through traditional surgery.

She was surprised when doctors told her they planned to go through her eyelid.

"I went home (from surgery) in two days, and it looked like someone punched me in the eye," she said. "When I think of the alternative, more invasive surgery, it was nothing."

She said she has had no pain. For a while she heard the sound of rushing water and kept smelling a strange odor. Occasionally, her eye gets a little puffy. No big deal, she said. She returned to work in less than three months.

Doctors say each patient could have unique side effects depending on the location and type of tumor. Patients could also have complications from anesthesia. But in general the risks are far fewer than traditional surgery.

There aren't accurate statistics on how many minimally invasive brain procedures like these are performed annually, according to the American Association of Neurological Surgeons. But last year, there were an estimated 22,070 new cases of brain and central nervous system tumors diagnosed, according to the American Cancer Society and the National Cancer Institute.

The Hopkins doctors say that in coming years they expect thousands to have the eyelid procedure, formally known as a transpalpebral orbitofrontral craniotomy. They describe the procedure in the June issue of the Journal of Otolaryngology -- Head and Neck Surgery and in the July issue of Skull Base.

Eventually, the doctors say they may use it on car accident victims, those with other injuries, and particularly, those who have had traditional surgery but require another procedure.

"The transpalpebral approach is a very viable and practical option for thousands of surgeries done each year in the United States that involve problems deeply seated behind the eyes or at the front of the brain," said Quinones-Hinojosa.

He and Boahene said doctors at several facilities around the country are pioneering other minimally invasive procedures, involving eyelids, sockets and brows, and are building on each others' work. The success stories, which eventually spread to other facilities, will mean many more options for patients, they said.

Among those adopting new procedures is Germanwala, an assistant professor and chief of the section of cerebrovascular and skull base neurosurgery. After training at the University of Pittsburgh Medical Center and at Hopkins, he frequently operates through the nose and has a few times gone in through the eyebrow and eyelid.

In the next decade, advances in research and collaboration are likely to broaden surgeons' tool boxes, he said. Other up and coming areas are robotics, where surgery is performed via computer, and radiation, for which there are new methods that can help patients avoid surgery.

"We're really at the beginning," Germanwala said. "These are just additional tools in a great bag of tricks we have today. In 15 to 20 years, we'll look back and say, 'Wow, we used to do it that way!' "