NEUROSURGEONS GIVE A FARMER ANOTHER CHANCE AT LIFE

By Diana DeCouteau

Over the course of two months, the sight of children at play or the sunset or even the TV news slowly dimmed in the 69-year-old farmer's right eye. Thinking he had a cataract, the farmer had bided his time and was blind in the eye before he saw a doctor. But the diagnosis was not a cataract at all—on an initial CT scan of his sinuses, the area near his right optic nerve appeared opaque, indicating inflammation in the sinuses next to the eye and its nerve that carries sight. He was referred to University of Utah Health Care (UUHC).

"In a way, he was fortunate," says Richard R. Orlandi, MD, FACS. "He came to one of the few hospitals with a team of ENT doctors and neurosurgeons skilled in the surgery ultimately necessary to save his life."

To treat the lesion, surgeons initially opened his ethmoid sinus, located between the nose and eyes, and sphenoid sinus, near the optic nerve, along with a portion of the tunnel that houses the optic nerve. A biopsy proved negative for tumors, bacteria, and fungus. Afterward the farmer showed no improvement in his vision, and doctors continued to monitor his condition with imaging.

The farmer returned home but was plagued with worsening headaches. A follow-up MRI showed that the initial area of inflammation had now extended further into his skull. Surgeons endoscopically explored the area and removed damaged tissue—and this time specimens from the surgery showed infection with the fungus Aspergillus fumigatus.

Aspergillus spores are common in the air we breathe but normally don't cause illness. But some individuals are more susceptible, including those who use steroids, immunosuppressive medications, alcohol, or illicit drugs.

"None of these applied to the farmer—he was the uncommon immunocompetent individual suffering from a fungal infection in the skull," says Dr. Orlandi. "Diagnosis is often delayed due to the rarity of the disease. Although antifungal medications are available, only 40 to 60 percent of patients respond to them."

The farmer was not one of the lucky ones. His infection spread to the orbit, which is the bony cavity containing the eyeball; the cavernous sinus, a drainage pathway for veins from the brain and parts of the face; and the petrous apex, one of the most inaccessible parts of the skull due to its location near the very center.

By now, the farmer's internal carotid artery—which supplies blood to the brain—was also narrowed by 50 percent.

"To determine if the patient can withstand permanent blocking of the carotid artery, we do an occlusion test with a small endovascular balloon," says William Couldwell, MD, PhD, FACS, and department chair of neurosurgery. "We want to determine if there is enough collateral blood circulation to supply the brain without risk of a stroke. In this case, there wasn't: The patient showed progressive left-sided weakness."

At this point, both options were grim. Without surgery, the farmer's chance of survival was almost nonexistent—but the surgery carries high risk as well. The mortality rate for removing the cavernous sinus alone approaches 25 percent, and the farmer required several other complex procedures. But at UUHC, he found hope.

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> **WILLIAM COULDWELL, MD, PhD, FACS**

With years of experience performing delicate skull-base surgeries, Dr. Couldwell led the surgical team. The first procedure was a bypass involving the external carotid artery-middle cerebral artery saphenous vein to ensure adequate blood flow to the brain. Then the team removed the right cavernous sinus and right orbit and harvested abdominal fat to pack the sphenoid sinus and orbit. Finally, an external ventricular drain was placed to relieve fluid pressure in the brain.

After overcoming post-surgery setbacks that required three weeks in the hospital, the patient was able to transfer to a rehabilitation facility. One year later, he remained free of demonstrable disease.

"Our neurosurgery department is gratified to be one of the few anywhere that can offer hope to patients suffering from tumors, infections, and other deadly diseases of the skull," says Dr. Couldwell. The experience, skill, and caring available at UUHC gave a thankful farmer another chance at life.

Top: William Couldwell, MD, PhD, FACS; Bottom: Richard R. Orlandi, MD, FACS;