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New treatment dissolves blood clots in brain tissue

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A new treatment that treats a subset of stroke patients by combining minimally invasive surgery, an imaging technique likened to "GPS for the brain," and the clot-busting drug t-PA appears to be safe and effective, according to a multicenter clinical trial led by Johns Hopkins researchers.

The novel treatment, detailed for the first time at this week's European Stroke Conference in Hamburg, Germany, was developed for patients with intracerebral hemorrhage (ICH), a bleed in the brain that causes a clot to form within brain tissue. This clot builds up pressure and leaches inflammatory chemicals that can cause irreversible brain damage, often leading to death or extreme disability. The usual treatments for ICH—either general supportive care such as blood pressure control and ventilation, which is considered the current standard of care, or invasive surgeries that involve taking off portions of the skull to remove the clot—have similar mortality rates, ranging from 30 to 80 percent depending on the size of the clot.

Seeking to improve these mortality rates and surviving ICH patients' quality of life, Daniel Hanley, M.D., professor of neurology at the Johns Hopkins University School of Medicine, and his colleagues developed and tested the new treatment on 60 patients at 12 hospitals in the United States, Canada, the United Kingdom and Germany. They compared their results to those of 11 patients who received only supportive care.

After neurologists diagnosed patients in the treatment group with ICH at

these hospitals, surgeons drilled dime-sized holes in patients' skulls close to the clot location. Using high-tech neuro-navigational software that provides detailed brain images, the physicians threaded catheters through the holes and directly into the clots. They used these catheters to drip t-PA into the clot for up to three days at one of two doses, either 0.3 mg or 1 mg, every eight hours.

The researchers found that clot size in patients treated with either dose shrunk by more than half, compared to only 1 percent in patients who received only supportive care. Comparison of daily CT scans showed that patients in the treatment group whose catheters were most accurately placed through the longest part of the clot had the most effective clot size reduction.

Those in the treatment group and the supportive care group had about a 10 percent mortality rate at 30 days after treatment, lower than the typically high mortality rates expected for this condition. After following the patients out for six months, the researchers found that the treated patients scored significantly higher on a test that measures the ability to function in daily life compared to those who received supportive care.

Overall, Hanley says, the new treatment appears to be a viable and promising alternative to the current standard treatments of supportive care or invasive surgery.

"We're confirming that patients do recover better if we remove as much of the clot as we can, but gentle removal appears to be key," he says. "Reducing the clot's size with a minimally invasive method seems to be pivotal for optimizing patient recovery."

Hanley and his colleagues plan to continue investigating the treatment in a larger multicenter trial.

Provided by Johns Hopkins Medical Institutions