

Study Challenges Need for Fusion Surgery in Children with Complex Chiari

For years, many neurosurgeons have believed that children diagnosed with "complex" Chiari malformation may require more extensive surgery than standard Chiari decompression. Because these patients often have additional abnormalities at the junction of the skull and spine, some experts have advocated combining decompression surgery with occipitocervical fusion, a procedure that stabilizes the head and neck but limits neck mobility.

A new study from Great Ormond Street Hospital in London suggests that, in many cases, this additional surgery may not be necessary. Researchers reviewed outcomes for 41 children with what is known as Complex Chiari I Malformation (CCM), a condition in which Chiari malformation occurs along with other structural abnormalities such as basilar invagination, a retroflexed odontoid, medullary kinking, or craniocervical deformity. Historically, these findings have been viewed as risk factors for poor outcomes following standard Chiari decompression surgery.

All of the children in the study underwent foramen magnum decompression (FMD), the standard surgical treatment for Chiari malformation. None underwent occipitocervical fusion as part of their initial treatment. The researchers then tracked both clinical symptoms and MRI findings for an average of just over two years. The results were encouraging. Headaches, the most common symptom before surgery, were reported by 73% of patients before treatment but by only 7% at follow-up. Other symptoms, including numbness, neck pain, back pain, swallowing difficulties, sleep apnea, and urinary problems, also improved substantially after surgery. Many symptoms resolved completely.

The MRI findings were equally impressive. Among patients with syringomyelia, 87% experienced improvement in their syrinx after decompression surgery. The median syrinx diameter decreased from 7.1 mm to 3.0 mm, and syringobulbia improved in nearly all affected patients. Researchers also documented significant improvements in cerebrospinal fluid flow and reductions in brainstem crowding.

Perhaps the most notable finding was what did not happen. Despite concerns that these children might eventually require fusion surgery, none of the patients developed craniocervical instability or required occipitocervical fusion during the follow-up period. Only one patient required an additional operation, and that was a repeat decompression due to insufficient initial decompression rather than instability.

The authors acknowledge that larger and longer-term studies will be needed to fully answer the question of whether stabilization surgery is required. Nonetheless, the preliminary findings challenge the growing belief that complex Chiari malformation routinely requires fusion surgery in addition to decompression.

Source: Saenz A, Zhu H, Dhaliwal J, et al. Pediatric Complex Chiari I Malformation—How Complex Is It? Child's Nervous System. Published online May 2026.

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