Key Points

1. An endoscope is an instrument which allows surgeon to visualize the surgical field through a small incision
2. Using an endoscope should allow for a less invasive surgery, meaning less trauma for the child and a quicker recovery
3. Surgeon from Cleveland Clinic reports on his experience using an endoscope for Chiari surgery in 26 pediatric patients
4. There were no CSF related complications, however one child developed meningitis
5. Overall outcomes were very good with 24 out of 26 patients showing an improvement in symptoms
6. However, the technique was not directly compared with a more traditional approach for factors such as post-op pain, medication use, and length of hospital stay

Definitions

ataxia - uncoordinated, staggered walking

craniectomy - surgical procedure where part of the skull, or cranium, is removed

C1 - refers to the first cervical vertebra

dura - thick, outer covering of the brain and spine

endoscope - surgical instrument comprised of a flexible tube, lens, and light which allows for the visualization of internal structures

hydrocephalus - condition involving the abnormal accumulation of CSF in the brain

PTC - pseudo tumor cerebri; condition where the pressure of CSF in the brain is abnormally high

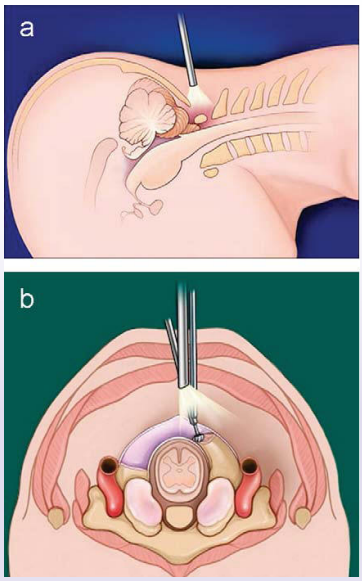
sleep apnea - condition where a person repeatedly stops breathing

Endoscope Used To Minimize Surgery In Children

November 30th, 2009 -- A report from a pediatric neurosurgeon at the Cleveland Clinic (Di) shows promise for a less invasive type of Chiari surgery for children. While there is an ongoing debate in the medical community regarding minimally invasive surgery - meaning, the dura is not opened, the focus of this publication is using an endoscope for visualization, which allows for a less intrusive surgical approach.

An endoscope is a thin flexible tube which can be inserted into the body through a small opening. The endoscope contains a lens and light which allows the surgeon to view internal structures on a monitor and guide the surgery (Figure 1). Endoscopes have been used for various procedures for some time now, but are not commonly used for Chiari surgery. Instead, larger opening are made and then many surgeons use a microscope for work near the spinal cord and brainstem. Thus, in theory, using an endoscope should allow for a less invasive surgery, which in turn would lead to less trauma and a quicker recovery.

Figure 1: How Endoscope Is Used In Chiari Surgery



In this publication, Dr. Di reports on his experience with 26 pediatric, Chiari patients. The group was comprised of 16 boys and 10 girls, ranging in age from 18 months to 16 years. As to be expected, headache and neck pain were the most common presenting symptoms (Table 1), followed by weakness and numbness in the extremities, swallowing and gastrointestinal issues, and developmental delays.

MRIs showed that each child clearly had a Chiari malformation and were candidates for surgery. In addition, 5 children also had syrinxes, 4 had hydrocephalus, and 1 had PTC. The children underwent a similar surgical procedure which involved a 2cm incision, a craniectomy, and a C1 laminectomy.

There were no CSF related complications, however one child did develop meningitis which was effectively treated. With no complications, most of the children only spent 1 or 2 nights at the hospital. In terms of outcome, the surgeon reports that 18 of the group had an excellent outcome and an additional 6 were improved (Table 2). Two patients did not improve, and one girl required an additional surgery after suffering a neck trauma at a later time.

While the success and complication rates reported are very good, it is unfortunate that this report did not compare the endoscopic surgery with a more traditional approach. In other words, does it really result in less pain for the children and shorter hospital stays? It is also important to note that a clear definition of the different outcome levels was not provided, so the difference between excellent and improved is not known.

Until this surgical technique is directly compared to others, it is very difficult to evaluate its merits and potential drawbacks. However, the author does note one drawback, namely that it takes a good bit of practice to be able to use the endoscope effectively in this way.

Table 1: Presenting Symptoms of 26 Pediatric Chiari Patients

Symptom	Number With

for a short period of time during sleep

cerebellar tonsils - portion of the cerebellum located at the bottom, so named because of their shape

cerebellum - part of the brain located at the bottom of the skull, near the opening to the spinal area; important for muscle control, movement, and balance

cerebrospinal fluid (CSF) - clear liquid in the brain and spinal cord, acts as a shock absorber

Chiari malformation I - condition where the cerebellar tonsils are displaced out of the skull area into the spinal area, causing compression of brain tissue and disruption of CSF flow

decompression surgery - general term used for any of several surgical techniques employed to create more space around a Chiari malformation and to relieve compression

syringomyelia - condition where a fluid filled cyst forms in the spinal cord

Source

Endoscopic suboccipital decompression on pediatric Chiari type I. Di X. Minim Invasive Neurosurg. 2009 Jun;52(3):119-25.

Headache, neck pain	11
Weakness, numbness in limbs	8
Swallowing problems, nausea, vomiting	7
Developmental delays	6
Ataxia	5
Sleep apnea	2

Table 2: Surgical Outcome of 26 Pediatric Chiari Patients

Outcome	Number
Excellent	18
Improved	6
No Change	2

Notes: *Outcome levels were not clearly defined in publication*

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