Key Points

1. Eye and balance problems are common among Chiari patients
2. Study reviewed the medical records of Chiari patients to identify those who exhibited certain types of symptoms
3. Of the 12 patients found with oculomotor and/or vestibulo-ocular signs and symptoms, 8 experienced complete resolution of these symptoms after surgery, 1 had partial resolution
4. The average time for the symptoms to resolve was more than 1 year, and in some cases much longer
5. 75% success rate in improving these types of symptoms is in line with the "success" rate of decompression surgery in general
6. Researchers did not look for predictors of who got better after surgery

Definitions

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

cranial nerve - any of the 12 pairs of nerves which originate in the brain rather than the spine

decompression surgery - general term used for any of several surgical techniques employed to create more space

Decompression Surgery Improves Eye Symptoms

September 15, 2005 -- For a Chiari patient about to undergo decompression surgery, one of the most pressing questions they want answered is, which, if any, symptoms will go away. Over the years, researchers have tried to find predictors which could answer this question with very little success.

Some studies have shown that in general, the duration of symptoms before surgery is related to the outcome; meaning that the longer someone has symptoms before intervention, the poorer the outcome tends to be. However, not all research has shown this. In addition, there have been a couple of studies which tracked individual symptoms before and after surgery, but again not enough evidence was found to be able to draw any strong conclusions.

Along these lines, researchers from the UK have published a study in the August, 2005 issue of Acta Neurochirurgica which examined whether specific types of symptoms, namely oculomotor and vestibulo-ocular, improved after Chiari surgery. Dr. Liebenberg and his colleagues, from the Hurstwood Park Neurological Center, studied 12 Chiari patients they had treated and found that 75% experienced either full or partial resolution of these symptoms.

Just what are oculomotor and vestibulo-ocular, and how do they relate to Chiari? Oculomotor refers to the movement of the eye. The nerves which control eye movements, including the eye ball, the pupil, and the eyelid, are actually cranial nerves, meaning they originate in the brain rather than the spine. It is well known that a Chiari malformation can compress cranial nerves, and thus cause oculomotor problems.

Similarly, vestibulo-ocular refers to the connection between the vestibular system in the ear - which helps us orient our position and maintain balance - and the eyes. It is the connection between these two systems which allows us to stay focused on something visually while our head moves. Specifically, there is a reflex which moves the eyes to compensate for head movement and keep whatever we are looking at centered. In other words, if, while you are reading this, you turn your head to the right, your eyes will automatically turn to the left to compensate. If you turn your head to the left, your eyes again will move in the opposite direction. Interestingly, this reflex does not depend at all upon visual input from the eyes and will kick in even when the eyes are shut (note, the reflex can be controlled by voluntary eye movement, so if you are experimenting you have to let the reflex occur). The connection with Chiari is that Chiari is notorious for causing problems with the vestibular system (see *Looking To The Ear For Guidance*), which can then translate to problems with the eyes.

As you can imagine (or have experienced) problems in these areas can be quite troublesome. Unfortunately, they also appear to be fairly common among Chiari patients. While research reports vary, studies have shown that as many as 3/4 of Chiari patients suffer from eye problems, and even more show signs of problems with their vestibular system.

To examine this subset of symptoms, the UK team retrospectively reviewed the medical records of 40 Chiari patients treated between January 1998 and March 2003. Of the forty, the team identified 12 which had either signs (meaning something a physician found) or symptoms (meaning something reported by the patients) involving the areas of interest (see Table 1). The symptoms included:

- oscillopsia - vision which seems to swing back and forth, or wiggle
- blurred vision
- diplopia - double vision

Clinical signs included:

- nystagmus - involuntary, rapid eye movements
- nerve palsy
- increased blind spot
- jerky pursuit

After surgery, eight of the twelve patients experienced complete resolution of these signs and symptoms, while another experienced partial improvement. It is perhaps noteworthy that the improvement rate for these symptoms, 75%, is in the same range as the overall "success" rate of Chiari surgery, around 80%.

It is also interesting that in many cases, the eye problems took a long time to improve after the surgery. The shortest amount of time was 3 months (two patients), while it took 5 people more than a year for their symptoms

around a Chiari malformation and to relieve compression

magnetic resonance imaging (MRI) - diagnostic device which uses a strong magnetic field to create images of the body's internal parts

ocular - having to do with the eye

oculomotor - having to do with movement of the eye

palsy - complete or partial paralysis of a muscle, can result in involuntary tremors

retrospective - type of study which looks back in time; often uses medical records to study patients who have already been treated

sign - an objective, abnormal finding in an exam by a physician, such as a neurological exam/sign

symptom - a subjective, patient reported problem, such as feeling tired

vestibular - having to do with the balance/equilibrium system inside the ear

vestibulo-ocular - having to do with the connection between the vestibular system and the eye

Source

Source: Liebenberg WA, Georges H, Demetriades AK, Hardwidge C. Does posterior fossa decompression improve oculomotor and vestibulo-ocular manifestations in Chiari 1 malformation?
Acta Neurochir (Wien). 2005 Aug 29; [Epub ahead of print]

to go away. As a group, the average time to improvement was well over a year.

Given the lack of understanding regarding the underlying pathology of Chiari, it is not surprising that trying to identify which symptoms will improve with surgery remains a difficult task. It is encouraging, however, for patients suffering from eye problems due to Chiari, that according to this study they have a three out of four chance of seeing clearly after surgery.

Table 1
Post-Surgical Symptom Resolution By Patient (12)

Sex	Sympt	Signs	Resolved	Time(months)
F	Y	Y	N	13
F	N	Y	Partial	49
F	N	Y	N	–
M	N	Y	Y	3
M	N	Y	Y	13
F	Y	Y	Y	4
F	Y	N	N	–
M	Y	N	Y	8
F	Y	Y	Y	71
F	N	Y	Y	15
F	Y	Y	Y	7
F	Y	Y	Y	3

Note: Symptoms refer to patient reported problems, signs refer to findings from a physician exam

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