

Key Points

1. There is strong anecdotal evidence that Chiari patients may suffer from some type of cognitive problems
2. May be due directly to Chiari, due to elevated CSF pressure, or possibly due to chronic pain
3. Study examined the prevalence of cognitive impairment among a large group of patients seeking treatment for chronic pain
4. 1,459 patients were grouped as those suffering from neuropathic pain and those with mixed pain (neuro and regular)
5. Before starting treatment, all patients were evaluated using a cognitive assessment tool
6. The rate of cognitive impairment among neuropathic pain patients was nearly twice as high as those with mixed pain, and much higher than the general population
7. As to be expected CI rates increased with age among both groups
8. Interestingly, the cause of neuropathic pain influenced the prevalence of CI
9. Overall, most patients were considered to have mild impairments

Definitions

cognitive - brain functions related to perception, thinking, and understanding

cognitive impairment (CI) - loss of cognitive ability due to trauma or disease

cross-sectional - a study which looks at a group of people (usually a large group) at a single point in time

gabapentin - drug used to treat neuropathic pain; Neurontin

intracranial pressure (ICP) - the

Neuropathic Pain Can Cause Cognitive Problems

January 31, 2007 -- Cognitive problems associated with Chiari are a frequent topic of discussion in the community. Although there has been virtually no direct research on the potential cognitive effects of Chiari, there is a significant amount of anecdotal and indirect evidence that it is an area worth investigating.

Anecdotally, many Chiari patients report experiencing a type of "brain fog" which affects their memory and ability to think clearly. Problems do not appear to be limited to adults either; according to parents, developmental delays or problems in school are sometimes the early warning signs which lead eventually to a Chiari diagnosis. Often, the children's growth and academic performance improves following decompression surgery.

Indirect evidence which points towards a link between Chiari and cognitive difficulties includes research which has shown that the cerebellum - the central player in Chiari - is involved in many higher order brain functions. The cerebellum was originally thought to control only balance and motor coordination. Now, however, neuroscientists believe the cerebellum is critical to many more cognitive processes, and studies of children with damage to the cerebellum support this notion. Given this, it is reasonable to speculate that the compression of the cerebellum as it is jammed into the spinal area may affect its ability to function and result in cognitive deficits.

In addition to the cerebellum itself, cerebrospinal fluid (CSF) may play a role in the cognitive effects of Chiari. Recall that in Chiari, the natural flow of CSF between the brain and spine is disrupted and in some cases this causes the pressure in the brain to increase. While the effects of disrupting CSF flow on the function of brain and nerve cells is not fully known, there is evidence that sustained, elevated intracranial pressure (ICP) can lead to long lasting cognitive problems.

Finally, pain may play a role in the cognitive functioning of Chiari patients. The effects of living with chronic pain are far-reaching, and it is fairly well established that chronic pain can affect reasoning and especially memory. The application of this notion to the Chiari community recently received a boost from a report in the January issue of the Journal of Pain and Symptom Management which showed that people suffering from neuropathic pain demonstrate an unusually high rate of cognitive impairment (CI).

Neuropathic pain is a particularly troubling type of pain which is caused by nerve damage. As opposed to nociceptive pain - which is the pain you feel when something should hurt like getting your thumb caught in a door; neuropathic pain can arise spontaneously or due to stimulus that should not be painful, such as a light touch. The exact mechanisms underlying neuropathic pain are not fully understood and it can be very difficult to treat. Unfortunately, many syringomyelia patients end up dealing with neuropathic pain due to the damage caused to their spine by their syrinx.

The study in question, which was conducted by a group of doctors and researchers in Spain, looked at more than 1,400 adults seeking treatment for chronic pain at several institutions throughout the country from 2002 - 2003. Although the patients were enrolling in a prospective study to examine the effectiveness of gabapentin in treating neuropathic pain, for this study the patients were evaluated before any treatments were administered.

Demographic information was collected for each person, along with information about their pain, including its cause and its intensity (on a scale from 0-100). Finally, each person was given a cognitive assessment which evaluated functions such as orientation, attention, calculation, recall and language. Scores of 24 or less on the cognitive assessment were considered to be indicative of cognitive impairment. Measures of anxiety, depression and obesity were also taken.

For analysis, the researchers divided the large group of patients into those suffering from neuropathic pain (603 people) and those suffering from a mix of neuropathic and nociceptive pain (856). Demographically and pain wise, the groups were fairly well matched with a similar average age, pain duration, and pain level (see Table 1). The causes of neuropathic pain included, but were not limited to, diabetic neuropathy, trigeminal neuralgia, complex regional pain syndrome, post-stroke central pain, and phantom limb pain. For comparison, nociceptive pain causes included lumbar pain, spinal stenosis, and surgical trauma.

The researchers used statistical techniques to calculate the prevalence of cognitive impairment for each group, and they found that the neuropathic pain group had nearly twice the rate of CI as the mixed pain group. Specifically, they estimated the prevalence of cognitive impairment to be 11.4% in the neuropathic pain group compared to 6.4% in the mixed pain group. The prevalence rates for both groups were well above the rate of the general population in Spain, which is about 1%.

Not surprisingly, the scientists found that for both pain groups, the prevalence of cognitive impairment was higher among the older patients, with more than 30% of the neuropathic pain patients older than 75 suffering

pressure of CSF inside the brain/skull

neuropathic pain - pain due to nerve damage; often difficult to treat and can arise spontaneously

nociceptive pain - pain in response to something that should be painful

pain - an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.

prevalence - the percentage of a group of people who has a specific disease

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

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

Source

Source: Povedano M, Gascon J, Galvez R, Ruiz M, Rejas J. [Cognitive Function Impairment in Patients with Neuropathic Pain Under Standard Conditions of Care.](#) J Pain Symptom Manage. 2007 Jan;33(1):78-89.

from some level of cognitive problems. The data also showed that anxiety, depression, and obesity were linked to cognitive problems (note, these were controlled for statistically when the researchers were looking at the role of pain in CI).

What may be surprising is that the underlying cause of the neuropathic pain seemed to influence the rate of cognitive impairment. Within the neuropathic pain group, trigeminal neuralgia and entrapment syndromes had the lowest rates of CI, while phantom limb pain and post-stroke pain caused the highest.

The good news is that even among the patients who demonstrated cognitive impairment, most of the cases were considered to be mild, and very few were severe.

There are several reasons why Chiari and syringomyelia patients may feel like the diseases are affecting their ability to think, and based upon this research neuropathic pain is definitely one of them. While we still lack direct research on the cognitive effects of Chiari, for those suffering from "brain fog" the evidence is growing that while in one sense it is all in your head, it is probably not just a figment of your imagination.

Table 1
Baseline Characteristics of Subjects, Neuro Pain vs Mixed Pain

	Neuro Pain	Mixed Pain
# of Patients	603	856
Avg Age	58.4	55.1
Pain Duration (yrs)	1.14	1.13
Pain (0-100)	70.6	71.8

Note: Pain was rated using a simple Visual Analog Scale with 100 being the worst pain imaginable

Table 2
Prevalence Of Cognitive Impairment (Neuro, Mixed, and General Population)

Neuro Pain	Mixed Pain	General Population
11.4%	6.4%	~1%

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