CCSVI – A Huge Breakthrough in MS?

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In August, I received a message asking me what I thought about CCSVI in multiple sclerosis. I had the same reaction most of you did when you read the title of this article – "What the hell is CCSVI?" A Google search told me it stood for "chronic cerebrospinal venous insufficiency" and a PubMed search led me to a handful of papers on CCSVI, all authored by an Italian vascular researcher/surgeon named Paolo Zamboni.

The papers provided solid and mind-expanding evidence that an entirely new disease process was part of MS. It soon became clear that the concept of CCVSI had the potential to completely change how we saw MS and how to treat it.

The Italian researchers discovered that, in persons with multiple sclerosis, the veins which acted as the main drainage pathways for blood flowing from the brain back to the heart were substantially narrowed and even blocked. These included the jugular veins, veins along the spinal column, and other veins I had not heard of before such as the azygous vein.

The researchers had never seen these problems in anyone before. Their equipment allowed them to study the blood flow in the veins and to also take pictures of the veins. They found that all the persons with MS they examined had impaired venous drainage from the brain and that such a problem caused the phenomenon of "reflux". This means the venous blood would flow back toward the brain as it established new pathways around the blocked and narrowed veins. They labeled this compromised venous drainage as CCSVI.

Improper venous drainage is well known in the lower torso of many people (e.g. varicose veins, etc). In some cases, it has been demonstrated that poor venous flow in the lower body can result in iron deposition and associated inflammation. Furthermore, sclerosis and degenerative lesions can occur with the inflammation.

Knowing the problems that poor venous drainage can cause in the lower torso, Zamboni and his co-authors offered the reasonable interpretation that the reflux action of the blood flow into the veins of the brain resulted in iron

deposition and inflammation of the blood-brain barrier (BBB). Notably iron deposits have long been documented in MS lesions and it is well known that every MS lesion forms symmetrically around a vein. Such characteristics of MS lesions have never been satisfactorily explained before the Zamboni discoveries.

In the MS literature, there are two opposing hypotheses for how MS autoimmunity begins. The most popular one is that myelin-sensitive T cells are activated through molecular mimicry by a childhood virus such as EBV. The myelin-sensitive T cells then cross the BBB and lead an autoimmune attack on myelin.

The other hypothesis is that the initial event in the MS disease process is a breech of the BBB and the consequent exposure of the central nervous system to the immune system. This uncovering of previously hidden antigens not seen before by the immune system leads to an autoimmune attack on myelin.

With the work of Dr Zamboni, it now appears that the second hypothesis, the breech of the BBB due to impaired venous drainage, is the best explanation for the initiation of MS autoimmunity. In support of this, the researchers found that, of the 109 persons with MS studied, every last one of them had impaired venous drainage. Furthermore, of the 177 control subjects, a group that included persons with other neurological diseases and healthy people of various ages, not a single one had impaired venous drainage from the brain. Such a 100% separation of persons with MS from controls on the basis of impaired venous drainage leaves little doubt that such a phenomenon is very important in the MS disease process.

Another important observation made by Zamboni's team is that the pattern of reflux, that is, the specific pathway the blood uses to flow back to the brain, showed a strong correlation to the type of MS. Persons with PPMS had a different reflux pattern that those with RRMS and SPMS. Furthermore, the PPMS reflux pattern provided a good explanation why this form of MS is more aggressive and problematic.

The other convincing data that demonstrates that CCSVI is a key part of MS are the results from the use of a treatment which relieves the venous drainage problems. This treatment is called 'the liberation procedure". The problematic veins are first identified by venography. Then, balloon angioplasty is used to open up the problematic veins and, in some cases, stents are inserted in non-

responding sections. The procedure is relatively non-invasive and is done in day hospital under local anesthesia. Access to the veins is through the left femoral vein in the thigh. Total time in the hospital is usually less than 6 hours and the subject has a compression dressing on for 24 hours.

Dr Zamboni has described the results of the use of the liberation procedure on 51 patients with relapsing-remitting MS. Eighteen of the subjects were treated in emergency with an acute attack and all of them had their symptoms completely resolved within a few hours to a few days. The other subjects had a greatly reduced yearly attack rate and, notably, the only ones experiencing an attack following the procedure were those who had a recurrence of the impaired venous drainage problems. The subjects also reported a dramatic improvement in chronic fatigue. In summary, it would appear that the relief of venous drainage problems results in major improvements of MS symptoms. This is further evidence of the major role that CCSVI plays in MS.

Finally the researchers noted that there was no difference in the severity of venous drainage problems between those using an MS drug and those not on a drug.

Given that CCSVI explains why PPMS differs from RRMS, as well as the occurrence of previously inexplicable features of MS lesions (e.g. venocentricity, iron deposits), CCSVI becomes a very compelling explanation for the initiation of CNS autoimmunity which drives MS. Further research is needed to confirm this.

Perhaps the most important question that remains is “what is the ultimate cause of the venous drainage problems?” Zamboni and colleagues did not offer any explanations/speculations on this. Hopefully, this question will be the subject of an intensive research effort. It is worth noting that, given adequate vitamin D in childhood prevents MS in most cases, vitamin D supply must have a substantial effect on the venous drainage system.

This new understanding of the MS disease process makes the use of the recommended nutritional strategies even more imperative. These strategies enhance blood flow, strengthen the BBB, counteract autoimmune reactions and quite possibly improve venous drainage from the brain. Overall, the Zamboni work provides further insight into why nutritional strategies work so well for many people.

In answer to the question in the title of this article, I am convinced that CCSVI is a huge breakthrough for MS. Correction of this problem with a relatively simple procedure may well turn out to be a very effective, long lasting, drug-free treatment for MS at the time of diagnosis. However, a great deal of research and clinical testing will have to happen before CCSVI is widely accepted as a key part of MS and the liberation procedure becomes standard procedure. In the past, non-drug treatments for MS have been marginalized, mainly for financial reasons. I predict it will be a long, hard fight to get the treatment of CCSVI from the laboratory to the clinic.