Why Venous Balloon Angioplasty Still Has a Role in the Treatment of MS: Patient Selection

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No conflicts of interest

CCSVI
A prospective open-label study of endovascular treatment of chronic cerebrospinal venous insufficiency


CCSVI
Longitudinal Stenosis Left Jugular Vein

CCSVI
Abnormal Transverse Valve Left Jugular

CCSVI
Stenosis of Right Jugular Vein
CCSVI
Post Balloon Angioplasty

THE EDINBURGH STUDY
A Prospective Study of Clinical Effectiveness
340 CCSVI Patients with Multiple Sclerosis
- Registered with Regional Ethical Committee in UK
- World Health Organisation Consent Process
- Data to UK National Institute of Clinical Excellence
- Study overseen by UK Charity (MSRC)

1. Reflux in the internal jugular vein or in the vertebral vein, or both, with the head in any position.
2. Reflux in the deep cerebral veins.
3. High resolution B mode evidence of internal jugular vein stenosis.
4. Flow not detected by Doppler in the internal jugular veins or vertebral veins or both.
5. Reverted postural control of the main cerebral venous outflow pathways.

CCSVI Doppler U/S Criteria
Nicolaides A et al. Funct Neurol 2011, 26, 229

Magnetic Resonance Imaging

THE EDINBURGH STUDY
INDEPENDENT NEUROLOGICAL FUNCTION ASSESSMENT
Before treatment 6 months after treatment
8.45  9.41
P value <0.01

EFFECTIVENESS RESULTS
RESPONDERS  NON RESPONDERS
CHANGE OF MSFC SCORE 6 MONTHS AFTER TREATMENT
MSFC: (Z arm energy + Z leg average + Z cognitive)/3.40

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Efficacy Studies

Venous angioplasty in multiple sclerosis: neurological outcome at two years in a cohort of ongoing remodeling patients.

Clinical improvement after extracranial venoplasty in multiple sclerosis.


Problems

Diagnostic Treatment

What is a hemodynamically significant narrowing?
Ballooning has variable results because of the lesion morphology

Technique:
Double Balloon Technique

Technique:
Balloon and Cutting Wire

Brave-Dreams Trial Analysis:
Restored Blood Flow Prevents MS lesions

Jugular Lesion Type Determines Effectiveness of Treatment

Abnormal Valves
Compression
Hypoplasia

Zamboni P, Zivadinov R Eur J Vasc Endovasc Surg 2018 56, 618-621
Conclusions

Endovascular treatment improves neurological function.

But effectiveness is variable and related to restoration of blood flow.

Need to determine what is a hemodynamically relevant narrowing.

- What types of lesions respond to venoplasty?

Larger trials are necessary.

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