Characterization of ccsvi lesions in multiple sclerosis patients

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INTRODUCTION

It has recently been suggested that chronic cerebrospinal venous insufficiency (CCSVI), present in at least 55% of multiple sclerosis (MS) patients, plays a role in the evolution of MS through increased venous pressure favorizing the perivenular inflammation typical of this disease. This hypothesis is supported by preliminary work reporting the improvement of MS symptoms after venous angioplasty in patients with MS associated with CCSVI. The purpose of our study was to characterize the pathological features of CCSVI lesions in MS patients.

MATERIALS and METHODS

We have examined several venous specimens from MS patients in which CCSVI had been diagnosed. Five of these specimens were obtained from patients undergoing jugular vein reconstruction after restenosis following angioplasty and 10 additional specimens were obtained from a patient with MS and CCSVI who died for unrelated causes. Five control specimens were obtained at autopsy of patients who died for non neurological diseases. All specimens have been examined histologically by means of hematoxylin and eosin, Masson trichrome and Sirius red (with and without polarized light) stains and by means of immunohistochemistry, using the following antibodies: α-smooth muscle (SM) actin, typical of SM cells and myofibroblasts, SM myosin heavy chains, typical of SM cells and collagen type I and III.

RESULTS

All specimens from CCSVI veins showed: 1) thickening and sclerosis of the adventitia, 2) a significant difference of birefringence pattern, from a green birefringence to a red birefringence ($P<0.001$), between veins of CCSVI patients and those of controls, suggesting a switch from collagen type I to collagen type III expression; this modulation was confirmed by means of collagen type immunohistochemistry.

CONCLUSIONS

It appears that the changes affecting CCSVI veins in MS patients concern mainly the extracellular matrix, collagen in particular. The switch in collagen type from a prevalence of type I to a prevalence of type III may be implicated in the emodynamic changes obseved in these patients.