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Endovascular procedures for the treatment of autonomic dysfunction

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Dysautonomias are a heterogeneous group of disorders with pathologic changes confined to the central nervous system, the peripheral nervous system or both, depending on the underlying condition [1–3]. Autonomic dysfunction, including postural tachycardia syndrome (POTS), Parkinson's disease, multiple system atrophy and autonomic neuropathies are major public health problems with a large unmet clinical need [4, 5]. However, advances in therapies that have an immediate impact on quality of life and outcomes in patients with autonomic disorders have been limited.

Due to the limitations of many treatment options, particularly in disorders such as POTS, novel treatments have been considered. Into this therapeutic void a therapy for modulation of autonomic function is being advocated as a clinical treatment for autonomic dysfunction of all types. This therapy, described as transvascular autonomic modulation, utilizes an endovascular approach to dilate the thoracic venous system, resulting in mechanical stretching of the autonomic nerves and 'resetting' of the autonomic nervous system.

The scientific rationale for this procedure is not well described, nor does there appear to be any clear evidence supporting the use of this technique in a diverse group of autonomic disorders. This method reports mechanical disruption of baroreceptors in the venous system using transvenous balloon inflation as a method to improve autonomic dysfunction. There are several major scientific concerns with this statement. First, there is no evidence of such venous baroreceptors. Second, patients with Parkinson's disease have progressive autonomic nerve fiber dysfunction due to axon loss. There is no evidence, practical or theoretical, to suggest that inflating a balloon in a vein would halt or reverse the loss of nerve fibers secondary to alpha-synuclein deposition in a progressive neurodegenerative condition [6–8]. Promoting a single therapy to treat a group of diseases such as multiple sclerosis, postural tachycardia syndrome and Parkinson's disease suggests a serious deviation from scientific understanding of disease pathophysiology [9].

We performed an exhaustive review of all available literature describing this procedure through a search of Pubmed and Google Scholar (covering articles published from 1 January 1970 to 9 January 2013). We did not find a single published report describing this procedure. A number of reports have been published describing a similar procedure that has been proposed for the treatment of chronic cerebrospinal venous insufficiency. Originally developed as a possible treatment for multiple sclerosis, this therapeutic approach currently has a negative FDA advisory statement because of complications that include stroke, blood clots, nerve damage and death [10].

We strongly encourage the development of novel approaches and therapeutic interventions for dysautonomia, but only when they are based on scientific rationale and supported by evidence of both safety and efficacy. At this stage, there are no data at all to support the clinical utility of transvascular autonomic modulation and there is no scientific rationale for the procedure. Until randomized blinded trials are completed to ensure adequate understanding of safety and efficacy, we cannot recommend transvascular modulation, or any other unproven surgical procedure, as a treatment for autonomic dysfunction.

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