New Developments for the Treatment of Dural Venous Sinus Thrombosis (DVST)

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Introduction

The diagnosis of dural venous sinus thrombosis refers to an identified cerebral sinus that is obstructed by a blood clot sitting within the venous lumen. This hindrance of venous drainage leads to an increase in venous and capillary back pressure, resulting in an increase in cerebral edema, and subsequently leading to an increase in intracranial pressure and intracerebral hemorrhage.

The incidence DVST has been reported to comprise of about 0.5-2% of all cerebral strokes with the precise incidence remaining unknown. Unique to DVST, younger individuals, less than 50 years of age, are affected and has an average rate of death or dependency of fifteen percent. Women are more commonly diagnosed with DVST than men. The most common sinuses affected are the superior sagittal sinus (SSS), which accounts for approximately 60%, followed by the transverse and the sigmoid sinuses, accounting for approximately 50%. Less commonly, deep cerebral venous occlusions do occur with the internal cerebral vein and the vein of Galen (11%) or the straight sinus (11%), and these patients have greater morbidity.

With this review we seek to address the current state of the literature with particular emphasis to the recent interest in endovascular treatment options and remedy some of the misunderstandings that we see in daily clinical practice as to the optimal way to diagnose and manage DVST using the currently available modalities.

Methods

Standard PRISMA guidelines were followed. The methodological quality of observational studies was assessed using the Newcastle-Ottawa Scale. Data sources included PubMed keywords and phrases, which were also incorporated into a MeSH search to yield articles indexed in Medline over a 5-year period until October 1, 2015. The PICOS strategy was used for describing the inclusion and exclusion criteria of studies. All RCTs, observational cohort studies, and administrative registries comparing or reporting DVST were included. Articles chosen were all full -length and in English.

Statistical Analysis

The primary endpoint was the combined 30-day and in-hospital death rate. If not reported, the 30-day or in-hospital death rate was used instead. For the observational studies, a secondary endpoint was diagnosis of new or progressively increased ICH after intervention.

Results

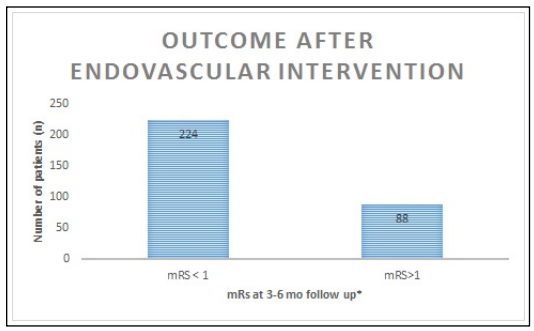
35 articles investigating a summation of 10,285 patients were eligible for data extraction and included in the systematic review of treatment modalities. During data extraction, 10 papers were exluded as they did not meet pre-defined eligibility criteria. Of the remaining twnety-five papers, a total of 312 (age range 4-83) patients were included. Most (15/25; 60%) papers were case reports or case reviews. Systematic reviews were not included. None of the papers were randomized control trials.

Results cont'd

Follow up appointments ranged from 2 weeks to 5 years (most reports had 3-6 month follow ups). When outcome was reported, stated mRS or described mRS was retrieved. A majority of patients who underwent interventional therapy received an mRS$\leq$1 at 3-6 months.

133 (42.6%) patients in 21/25 articles were documented to have a neurologic decline, which prompted endovascular intervention. 3 articles did not report a decline in neurologic exam prior to intervention. A case report (n=1) did not report a neurologic decline prior to intervention.

A total 44 (14%) patients had reported intracranial hemorrhages, new or enlarging, after receiving mechanical thrombectomy or thrombolysis. All patients who had endovascular interventions were those who were started on and failed systemic anticoagulation with declining neurologic status. Four patients, in total, were reported to receive decompressive craniectomies. Three of these patients had reported favorable outcomes.



Conclusions

DVST is a recognized cause of stroke, more common in women, and presents with many diagnostic and therapeutic challenges. It is exceedingly difficult to conduct large randomized trials for a low incidence disease process with large pathophysiological heterogeneity. While efforts such as TO-ACT are underway, it remains to be seen whether the trial is adequately powered and will be able, upon completion, to reach significance should it exist. Moreover, the rapid and recent advancements in perfecting endovascular techniques may render previously published data against intervention obsolete.

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