

CORRELATION BETWEEN CEREBRAL VENOUS SINUS PATHOLOGIES AND IDIOPATHIC CSF RHINORRHEA

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Introduction

Substantial evidence supports the notion that venous outflow abnormalities and obstructions serve as a common underlying mechanism in the pathogenesis and perpetuation of intracranial hypertension, as well as the subsequent development of CSF rhinorrhea. Although both dural venous sinus stenosis (DVS) and spontaneous CSF rhinorrhea have each been independently linked to IIH, there is a paucity of evidence directly linking DVS with spontaneous CSF rhinorrhea. Spontaneous CSF rhinorrhea, characterized by an abnormal communication between the subarachnoid space and the nasal cavity, is increasingly recognized as a variant of IIH. This study investigates the role of DVS in the pathogenesis of these conditions, focusing on its prevalence and correlation with recurrence after endoscopic repair of CSF leaks.

Aim of the work

- 1.Compare the prevalence of DVS in three groups: patients with idiopathic CSF rhinorrhea, patients with IIH, and healthy controls.
- 2.Examine the correlation between DVS and recurrence rates following endoscopic repair of CSF rhinorrhea.

Patients and Methods

•Study Design:

- **Part 1:** Case-control study comparing DVS prevalence across the three groups.
- **Part 2:** Interventional study analyzing recurrence rates after endoscopic repair.

•**Participants:** - The study was conducted in Alexandria University Hospital during the period between 2021-2023. - 42 patients with spontaneous CSF rhinorrhea, 20 with IIH, and 92 controls.

•**Assessments:** - Clinical evaluation, lumbar puncture for CSF opening pressure (OP), fundus examination for papilledema, and imaging (MRI and MRV/CTV) to measure DVS using the Combined Conduit Score for sinovenous stenosis (CCS) which is calculated as follows:

Score 0: discontinuity (flow gap) or aplastic segment.

Score 1: hypoplasia or severe stenosis within a segment of the transverse-sigmoid conduit, where the diameter is estimated to be less than 25% of the reference measurement (i.e. cross-sectional diameter of the distal part of the superior sagittal sinus).

Score 2: moderately stenosed segment (25-50% of the reference measurement).

Score 3: mildly narrowed segment (50-75% of the reference measurement).

Score 4: no significant narrowing (75-100% of the reference measurement).

The highest degree of stenosis (lowest score) in any segment of the conduit was used to determine the score on each side, regardless of the length of the segment. The sum of both the right and left sides provided the CCS, which ranges from 0 to 8. In this study, a CCS of 4 or lower was used as a cutoff value for diagnosing significant sinovenous stenosis.

• **Surgical Intervention:** -Endoscopic repair of CSF leaks with postoperative follow-up for ≥ 36 months.

Results

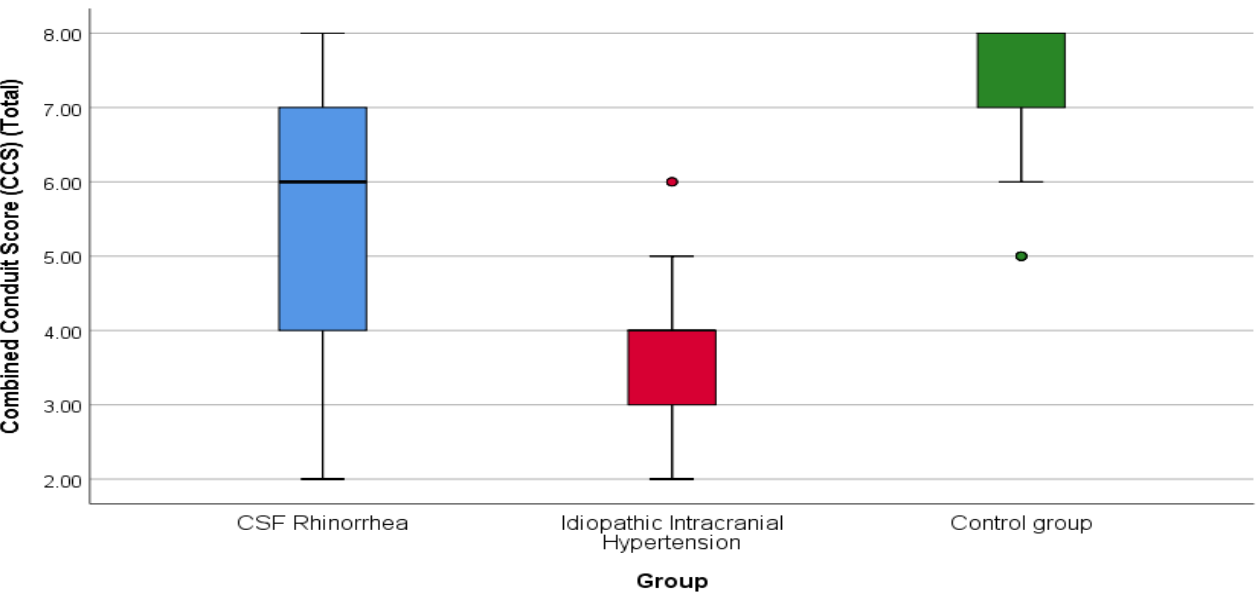


Fig 1: Box and whisker graph of CCS in the studied groups, the thick line in the middle of the box represents the median, the box represents the interquartile range (from 25th to 75th percentiles), the whiskers represent the minimum and maximum after excluding outliers (circles) and extremes (asterisks).

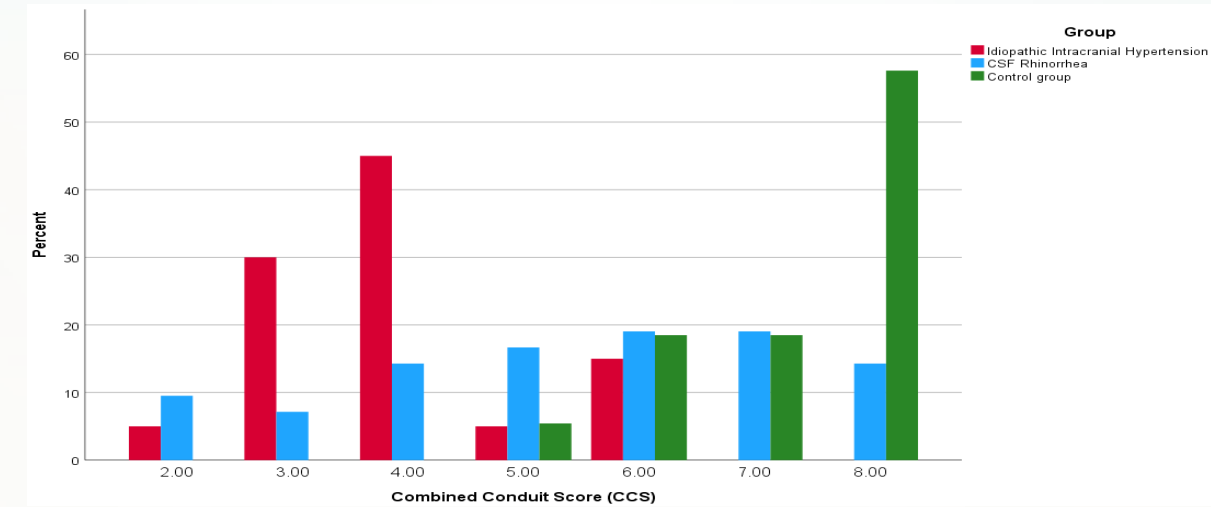


Fig 2 : Bar chart depicting the distribution of scores across the studied groups. A stark contrast is evident between patients with IIH and controls, as all control participants scored above 4, whereas nearly all IIH patients had scores of 4 or lower. Notably, the distribution of scores among patients with CSF leaks was uniform, ranging from 2 to 8.

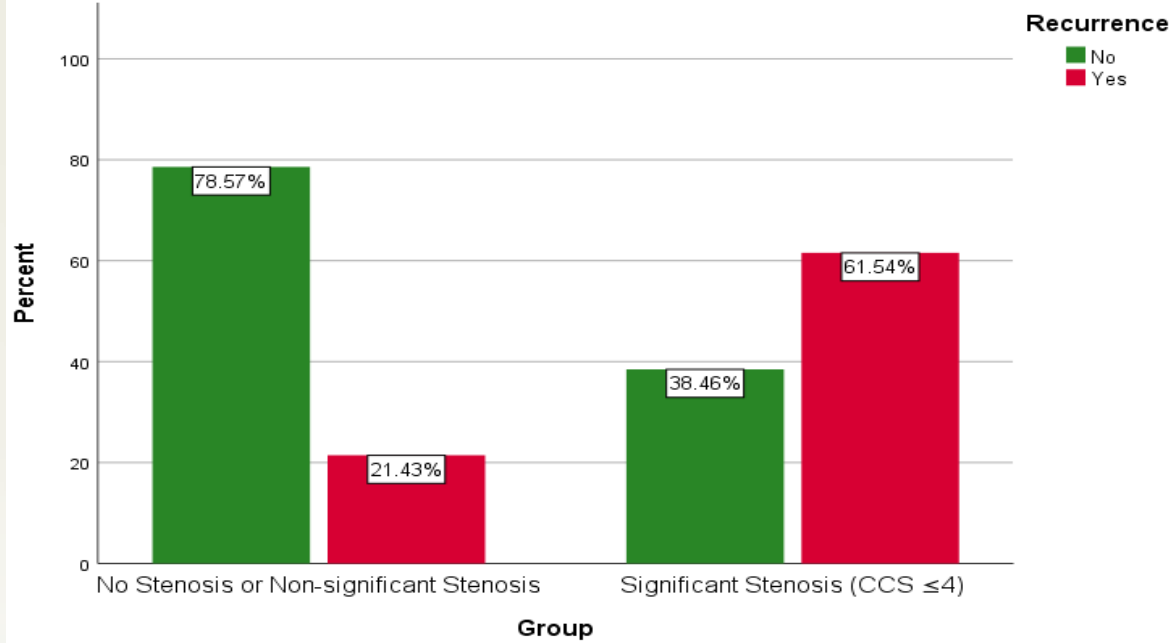


Fig 3 : Bar chart demonstrating the difference in success and recurrence (failure) rates in each subgroup of CSF rhinorrhea.

Conclusion

DVS is significantly more prevalent in patients with CSF rhinorrhea and IIH than in controls, supporting its role in intracranial pressure dysregulation. The CCS is a reliable prognostic tool; a score of ≤ 4 predicts a higher risk of recurrence post-repair. Consequently, preoperative MRV or CTV is essential for assessing DVS and guiding treatment planning. Furthermore, postoperative management of intracranial hypertension (e.g., with acetazolamide, CSF diversion, or venous sinus stenting) is critical for reducing recurrence, especially in patients with significant DVS.