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Optimizing Patient Selection for Epidural Blood Patch in the Management of Suspected Spontaneous Intracranial Hypotension

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Objective

In this study, we evaluate EBPs performed at a single center for the treatment of SIH with the goal of proposing quality improvement measures.

Introduction/Background

Intracranial hypotension is a condition arising from low levels of cerebrospinal fluid (CSF). It can present with symptoms of orthostatic headache, nausea, vomiting, visual changes, and neurological deficits. While intracranial hypotension is most often associated with CSF leak due to iatrogenic causes (e.g., lumbar puncture), it may also occur spontaneously. Spontaneous intracranial hypotension (SIH) is more common in women and individuals with hereditary connective tissue disorders.

Epidural blood patch (EBP) is a minimally invasive treatment option for SIH. The goal of EBP is to replace volume and induce scar formation overlying the dural tear that caused the leak. However, there is no consensus on optimal EBP technique. Variable success rates of EBP for management of SIH have been reported in literature, ranging from 20% to >70%. The effectiveness of EBP declines over time, and patients often require repeat EBPs.

Materials and Methods

- EBPs performed between May 2023 to June 2024 at a single center.
- A total of 154 EBPs on a total of 131 patients.
  - 93 female, 38 male.
  - Mean age of 48.91 years (SD 16.88 years).
  - 15 patients had 2 EBPs performed during the study timeframe and 4 patients had 3 EBPs. Of note, some patients had received multiple EBPs prior to the time frame studied.
- 108 EBPs were performed at a single spinal level (70.12%) and 46 were done at two spinal levels (29.9%).
- An average of 22.18 mL of blood was injected.

Results

- Majority of patients experienced relief following EBP (figure 1).
- However, a significant number of patients did not experience relief or experienced relief that only lasted a short period of time.
- Many experienced initial short-lived improvement following EBP with progressive return of symptoms over time though some patients did experience long-term relief lasting months to years.
- A portion of patients reported indeterminate results (e.g., the patient reported a change in symptoms, was unsure if they experienced improvement, or were lost to follow-up).

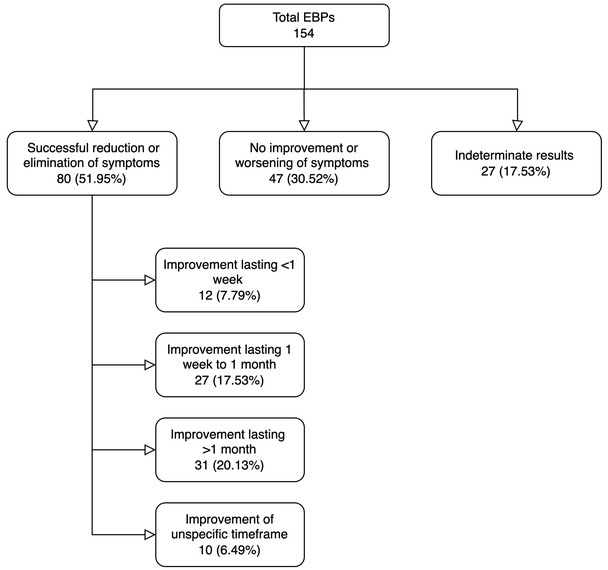

Figure 1. Results of EBP in management of SIH.

Discussion

- Our findings are consistent with current literature demonstrating variable success rates with the use of EBP in the management of SIH.
- A high proportion of responses were indeterminate, which demonstrates a deficiency in the assessment of EBP outcomes.
- There are possible issues with patient selection. Upon review of patients, most patients did not test positive for CSF leak on myelogram though EBP was still performed given that patient had symptoms suggestive of SIH. Performing EBP on patients without intracranial hypotension is unlikely to resolve symptoms and exposes patients to complications (e.g., back pain, headache secondary to increased CSF pressure).

Proposal

- We propose quality improvement projects in the assessment of EBP efficacy as well as optimization of patient selection.
- To better evaluate outcomes following EBP, we recommend development of a standardized questionnaire. This questionnaire should allow patients to objectively rate the degree of improvement they experienced following EBP.
- For patient selection, we recommend offering EBP only to those who adhere to the diagnostic criteria of the International Classification of Headache Disorders, 3rd Ed (ICHD-3):

A. Either or both of the following:
   1. Low cerebrospinal fluid (CSF) pressure (<60 mm CSF)
   2. Evidence of CSF leakage on imaging
B. Absence of a procedure or trauma known to be able to cause CSF leakage
C. Headache has developed in temporal relation to occurrence of low CSF pressure or CSF leakage, or has led to its discovery
D. Not better accounted for by another ICHD-3 diagnosis.

- Guidelines for consideration of repeat EBP should be created to better guide patient management.
- Since EBPs were performed by different proceduralists with different techniques and varying quantities of blood injected, it may be helpful to develop standardized practices for EBP.

Conclusion

EBP is considered a first-line treatment for SIH. We examined EBPs performed at a single center for management of SIH and found that several patients experienced minimal or no symptom relief. Based on these results, we propose quality improvement projects in patient selection and evaluation of EBP effectiveness. Furthermore, we recommend development of guidelines to standardize SIH management and treatment strategies for patients with SIH.

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