Prevention and management of post-Dural puncture headache

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ABSTRACT

Background: A typical side effect of an unintentional Dural puncture is post-Dural puncture headache (PDPH). Female sex, youth, pregnancy, vaginal birth, a low body mass index, and not smoking are risk factors. The risk is also impacted by the method employed, needle size, and needle design. Rapid diagnosis and management are essential for PDPH since it may be incapacitating. A postural headache that gets better with laying down and becomes worse with sitting or standing is a defining feature of PDPH. Conservative therapy including bed rest, hydration, and caffeine are often employed as preventative measures and treatments for this illness; however, neither frequent bed rest nor intensive hydration is backed by strong evidence. The best course of therapy for patients whose conservative measures have failed is an epidural blood patch. A number of alternative preventative and therapeutic options have been proposed. The potential advantages of such therapies should be carefully balanced against the hazards, however, since there isn't enough solid data to justify their usage.

Keywords: Epidural blood patch, post-Dural puncture headache, treatment, diagnosis, prevention

Methods: The design for this study will be a narrative review of articles in the medical database of Scopus, PubMed, Web of science, Embase, hand search journals and conferences. Articles for this study will be recruited using the inclusion and exclusion criteria in the various medical database, abstract and also unpublished articles that meet the criteria. Randomized controlled trial articles: Prospective double-blind study, Cross sectional observational studies ,Published and unpublished articles in English. all works published or unpublished prior to 2010, as well as all systematic literature review and works written in other language. Variables: Consequences, predictors, confounding factors in this study are: Prevention, Management , Post Dural puncture, Gender ,Type of surgery, Type of anaesthetic procedure. Data will be collected from the selected articles that best meet the inclusion criteria which will be sum together as our results.

Results: Each of the papers chosen for inclusion has undergone independent evaluation by all authors. A matrix table that

contained the paper title, author, purpose, design, variable, subject, measurement, and findings represented the evaluation of the available evidence. By using "Grading of Recommendations Assessment, Development, and Evaluation (GRADE)" technique, the matrix tables for each article were compared, the areas of dispute were reviewed, and a consensus was reached about the strength of the recommendations and the degree of evidence [26]

Conclusion: due to a lack of conclusive evidence supporting their use, the potential benefits of such interventions should be weighed carefully against the risks. This article reviews the current literature on the diagnosis, risk factors, pathophysiology, prevention, and treatment of PDPH

Introduction

A typical side effect of an unintentional Dural puncture is post-Dural puncture headache (PDPH). Female sex, youth, pregnancy, vaginal birth, a low body mass index, and not smoking are risk factors. The risk is also impacted by the method employed, needle size, and needle design. Prompt diagnosis and treatment are essential since PDPH may be incapacitating [1]. A postural headaches that gets better with laying down and becomes worse with sitting or standing is a defining feature of PDPH. Conservative therapy including hydration, bed rest, and caffeine are often employed as preventative measures and treatments for this illness; nevertheless, neither frequent bed rest nor intensive hydration is backed by strong evidence. The best course of therapy for patients whose conservative measures have failed is an epidural blood patch. A number of alternative preventative and therapeutic options have been proposed. The potential advantages of such therapies should be carefully balanced against the hazards, however, since there isn't enough solid data to justify their usage. This article examines the research on the pathogenesis, risk factors, diagnosis, and therapy of PDPH.

A frontal-occipital distribution of a dull, throbbing ache is the primary PDPH symptom. Usually, standing up or sitting makes the headache worse, and sleeping down makes it go away [1]. In the lack of a postural components to the headaches, the diagnosis must be questioned. When the patient lies down, they should feel at least some alleviation. "The International Classifications of Headaches Disorder" guidelines for diagnosing PDPH state that a headaches must occur within 5 days following a Dural puncture and go away on its own one week later, or up to 2 days following an epidural blood patch. Neck stiffness, hypoacusia, tinnitus, photophobia, and nausea may all accompany the headache [2]. But according to current research, PDPH may develop 72 hours following a Dural puncture [3], and up to 29percent of patient only experience headaches [4]. In rare cases, the headache might linger for years or even months [5]. 39percent of women get postpartum headache, and pregnant women are more likely than non-pregnant women to experience tension and migraine headache. [6]. Therefore, it's crucial to rule out other headaches causes, like functional headache, when diagnosing PDPH in pregnant individuals. Reversible encephalopathy [7], pneumocephalus [8], and subdural hematoma [9–10] are less common side effects of inadvertent Dural puncture. Therefore, significant aetiology like cerebral thrombosis, subdural hematoma, and reversible encephalopathy should be ruled out when neurological symptom or changes in headache features like non-postural headache develop [11]. There will be a leaking of CSF as a result of spinal or cranial Dura puncture. According to neurosurgical experience with Dural perforations, even small holes must be repaired, either manually or by using biological or synthetic Dural graft materials. Failure to seal the Dural hole increases the risk of infection, adhesions, and ongoing CSF leak [12]. The suggested origin of the headaches is lower CSF pressure as a result of CSF loss from the space of epidural via the site of Dural puncture, albeit the exact mechanism of this condition is yet unclear [13]. The cushioning action that

cerebral fluid typically provides is lost owing to reduced CSF pressure. Pain is elicited by the traction applied to intracranial pain-sensitive tissues [14.[

Female sex, young age, and pregnancy are some of the well-known risk factors for PDPH. Because the dura may become less elastic and less prone to gape with age, young adults have a greater chance of acquiring this disorder than older people (7 percent vs. 14percent) [15]. Women are thought to have a higher chance of developing PDPH, especially during pregnancy [16]. Increased oestrogen levels may be to blame for its high occurrence because they affect the tone of the cerebral arteries and cause them to dilate more in response to CSF hypotension [17]. Vaginal delivery is another risk factors for PDPH. Pushing during the 2nd stage might enlarge the Dural hole and cause more CSF leakage. Though, inconsistent findings were found in two retrospective studies that looked at whether 2nd stage pushing affected the frequency and severity of PDPH or the use for an epidural blood patch [19–18.[

Given that study unmistakably shows that greater Dural tears result in a higher frequency of this disorder, the kind and size of needles are also significant determinants in PDPH. As < 85percent of PDPH resolutions with conservative therapy, conservative treatments for the first 24 to 48 hours are considered the initial care plan [20]. Bed rest, caffeine supplements, intravenous hydration, and analgesic drugs are some of these precautions. However, there is no proof that PDPH may be prevented or treated more quickly than with bed rest in the supine posture. Because of the increased CSF pressure brought on by the increased intra-abdominal pressure, the prone posture might sometimes reduce PDPH. While there is no proof that vigorous hydration is helpful in a patients with regular fluid consumption, oral hydration has long been a common treatment for PDPH [21]. Dehydration should be avoided, nevertheless, to prevent it from worsening the severity of PDPH [20]

Material and Method:

The design for this study will be a narrative review of articles in the medical databases of PubMed, Scopus, Web of science, Embase, hand search journals and conferences. Articles for this study will be recruited using the inclusion and exclusion criteria in the various medical databases such as Pubmed, Embase, Web of science, Scopus Google scholar, textbooks, abstract and also unpublished articles that meet the criteria. Randomized controlled trial articles: Prospective double-blind study, Cross sectional observational studies ,Published and unpublished articles in English. all articles published or unpublished before 2010,all systematic review articles and all articles in other languages. Variables: Consequences, predictors, confounding factors in this study are: Prevention, Management , Post Dural puncture, Gender ,Type of surgery, Type of anaesthetic procedure. Data will be collected from the selected articles that best meet the inclusion criteria which will be sum together as our results.

Results: Each of the papers chosen for inclusion has undergone independent evaluation by all authors. A matrix table that contained the paper title, author, purpose, design, variable, subject, measurement, and findings represented the evaluation of the available evidence. By using "Grading of Recommendations Assessment, Development, and Evaluation (GRADE)" technique, the matrix tables for each article were compared, the areas of dispute were reviewed, and a consensus was reached about the strength of the recommendations and the degree of evidence [26]. The GRADE standards were chosen because they provide a clear system for rating the calibre of the evidence and the potency of the corresponding recommendation for patients care.

Eighteen research papers and 6 case studies were included in the final 24 publications that were kept for this review. Only 11 of the 18 research papers were entirely focused on children, and only Two were specifically on paediatric oncology. Regardless of the fact that there are standards

for the treatment and prevention of PDPHs in adults, there are none for PDPHs in children.

There were four papers discovered that discussed PDPH interventions. The use of the antimigraine drug frovatriptan in shortening the length of PDPHs was not shown to be statistically significant in one of these nonrandomized pilot studies[27]. Tramadol, oral and iv hydration, ibuprofen, caffeine, and acetaminophen were all evaluated in three case studies [28]. These therapies were reported to be unsuccessful in one case study, and the patients needed an epidural blood patch to treat the PDPH [29]. The use of these therapies in treating paediatric patients with PDPHs is not supported by statistically significant data. The search for paediatric literature did not turn up any articles on preventive hydration (pre- and post-procedure). As stated in the journal issue's introductory article, recommendations statements have been created from the synthesis evidence and given a strong or weak designation. Independent of the degree of evidence quality, the desired and negative impacts of each suggestion were used to establish its strength [30]. The following suggestions are offered for the treatment and prevention of PDPHs based on the evidence that is currently available.

These suggestions are summarized in This table

Recommendations to Prevent/Manage PDPHs	**Grade of Recommendation**	**Overall Quality of Evidence**
Needle size: smaller size (higher gauge)	Strong	Moderate
Needle design: pencil point	Strong	Moderate
Needle orientation: needle parallel to the long access	Weak	Low
Positioning: extended bed rest is of no benefit for preventing PDPHs	Weak	Low
Interventions: caffeine, hydration, frovatriptan, ibuprofen, and tramadol do not influence duration of PDPHs	Weak	Very low
Epidural blood patch is of benefit in managing PDPHs	Weak	Very low
Reinsertion of the Stylet	Weak	Low
Intrathecal catheter placement	Strong	Moderate
Epidural saline administration	Strong	Moderate
Serotonin type 1-d receptor agonist, vasoconstriction of intracranial blood vessels	Weak	Very low
A structural analogue of gamma-amino-butyric-acid (GABA). Likely increases the concentration of GABA in the brain	Strong	Moderate
Corticosteroid hormone receptor agonist.	Strong	Moderate
Synthetic adrenocorticotropic hormone (ACTH). Stimulates the adrenal gland to increase CSF production and β-endorphin output. Fluid and electrolyte retention.	Strong	Moderate

Table1.Summary of any suggestion about greater auricular block

Discussion and coclusion :

Since PDPH can occur after puncture of the dura mater, the most effective method for decreasing its incidence is to develop techniques that minimize Dural hole formation during spinal block and that prevent inadvertent Dural puncture during epidural block as follows:

1. A rapid physical examination to check for any neurological symptoms is required for all individuals with a confirmed or suspected UDP or PDPH. After a UDP, patients follow-up must take place 24 to 48 hours later.
2. Before beginning a TEBP, conservative symptomatic treatment techniques (such as non-opioid analgesic, opioid for severe breakthrough pain, resting flat, and enough

hydration) are first advised in the first 24-48 hours. A TEBP shouldn't be postponed if the PDPH is severe enough or interferes with mother-child connection.
3. For a moderate PDPH, conservative therapy could be performed. TEBP may be employed as a conclusive kind of therapy.
4. A TEBP is the most effective strategy for chronic or severe PDPH.
5. Patients who have a characteristic clinical history of PDPH and a transitory or partial respond to the first TEBP may need a second TEBP.
6. Additional neurological testing or consultation, including brain imaging, must be sought in pregnant women whose headaches is neither improving or worsening with time.
7. Additional research, such as a neurological consultation, should be taken into account before a third TEBP.
8. All individuals with suspected or confirmed PDPH must get PDPH education on how to following up with a doctor if symptoms appear or become worse.

Acknowledgments:
This article is part of an MSC thesis, approved by the Tehran University of Medical Sciences. The present study was approved by the Research Ethics Committee of the Tehran University of Medical Sciences with the code of ethics (IR.TUMS.SPH.REC.1400.311) We want to thank the Tehran University of Medical Sciences for their support.

Conflict of interest

The authors declare that they have no conflicts of interest

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