EFFECTIVENESS OF AUTOLOGOUS EPIDURAL BLOOD PATCH TO RELIEVE POST DURAL PUNCTURE HEADACHE

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ABSTRACT

Background: Post-dural puncture headache (PDPH) is a common problem in anaesthesia practice especially in obstetric anaesthesia. Autologous epidural blood patch (AEBP) is the main stay of treatment of PDPH when it is not relieved with conservative management.

Objective: To describe the efficacy of AEBP in treatment of PDPH.

Study Design: Prospective descriptive study.

Setting and Duration: The study was conducted at departments of Anaesthesia and Intensive Care, Military Hospital, Rawalpindi and Combined Military Hospital, Malir, from July 2008 to July 2011.

Methodology: All patients who received AEBP during study period secondary to PDPH were included. Up to 20 ml of autologous blood was injected in epidural space. Effectiveness of AEBP was judged by relief of symptom; any complications associated with AEBP i.e. backache and paresthesia were also noted. Data was interpreted as mean and percentages.

Results: A total of 30 AEBP were performed during the study period in predominantly female patients (n=27) with mean age of 27.8 years. AEBP was performed after a mean 3.83 days of lumbar puncture. Complete relief was observed in 29 (96%) patients; one patient required a second patch. During the follow-up, 7 (23%) patients complained of backache and 2(6%) of paresthesias.

Conclusion: AEBP is an effective way of providing relief from PDPH.

Keywords: Post-dural puncture headache; epidural blood patch; autologous epidural blood patch; lumbar puncture; cerebrospinal fluid leak

INTRODUCTION

Lumbar puncture is performed as a diagnostic as well as therapeutic procedure in anaesthesia practice to perform spinal anaesthesia or it may occur accidentally while performing epidural analgesia. In obstetric anaesthesia practice spinal, epidural and combined spinal-epidural techniques have gained widespread acceptance because of relative lack of complications as compared to general anaesthesia[1]. One of the complications of lumbar puncture is post dural puncture headache (PDPH). This is a common complication of spinal anaesthesia with a reported incidence as high as 25% in some studies[1]. Incidence of PDPH is more common in young female patients undergoing caesarean section[2-4] and in patients with previous history of PDPH with subsequent spinal anaesthesia[5]. The headache is characteristically mild or absent when the patient is supine, but head elevation rapidly leads to a severe fronto-occipital headache, which improves on returning to the supine position. Occasionally, cranial nerve symptoms (e.g., diplopia, tinnitus) and nausea and vomiting are also present. The headache is believed to result from the loss of cerebrospinal fluid (CSF) through the meningeal needle hole, resulting in decreased buoyant support for the brain. In the upright position the brain sags in the cranial vault, putting traction on pain-sensitive structures. Traction on cranial nerves is believed to cause the cranial nerve palsies that are seen occasionally.

The incidence of PDPH decreases with increasing age[6] and with the use of small-diameter spinal needles with non-cutting tips[7-9] and inserting cutting needles with the bevel

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aligned parallel to the long axis of the meninges[9,10]. PDPH usually resolves spontaneously in a few days to a week for most patients. However, there are reports of PDPH persisting for months following meningeal puncture[11]. Initial treatment is appropriately conservative if this meets the patient's needs. Bed rest, hydration with intravenous/oral fluids and analgesics are the mainstay of conservative treatment. Caffeine has also been shown to produce short-term symptomatic relief[12].

Patients who are unable or unwilling to await spontaneous resolution due to the nature of their job, mothers of newborns who have to take care of their children or patients of PDPH who do not respond to conservative treatment should be offered autologous epidural blood patch (AEBP) as it is considered gold standard treatment of PDPH[13]. It was first reported by Gormley in 1960[14]. AEBP is believed to form a clot over the meningeal hole, thereby preventing further CSF leak while the meningeal rent heals. Ten to 20 milliliters of autologous blood is aseptically injected into epidural space at or near the intervertebral space at which the meningeal puncture occurred. It offers complete relief of headache in a large proportion of patients while in remaining patients it decreases severity of headache to a considerable level[15]. The most common side effects of blood patch are backache and radicular pain, although transient bradycardia and cranial nerve palsies have also been reported[1].

The aim of this study is to assess the effectiveness of therapeutic AEBP in cases of PDPH and its associated complications. Study was conducted to find out facts on special population.

METHODOLOGY

This prospective descriptive study was carried out at departments of Anesthesiology and Intensive Care Military Hospital Rawalpindi and Combined Military Hospital Malir from July 2008 to July 2011. All patients with incapacitating PDPH, who failed to resolve with conservative treatment, were referred to us for management and who consented for AEBP were included in this study. Permission to carry out this study was duly received from the ethical committee of the hospital prior to commencement of the study.

Diagnostic criteria of severe PDPH was essentially a clinical one with history of dural puncture associated with severe postural symptoms in patients who were disabled in their daily activities and needed to stay in bed for most part of the day. Contraindications to AEBP were determined by interrogation, examination, and blood-sample analysis (blood cell count, prothrombin time, partial thromboplastin time,). Initially spinal anaesthesia was given to patients who had normal coagulation profile and had no infection at site of spinal anaesthesia but if any of them developed defective hemostasis or infection after spinal anaesthesia were planned to be treated with this technique only once they recovered, to avoid complications such as epidural haematoma leading to paraplegia and transmission of infection into the meninges of brain and spinal cord. Patients with severe immunocompromised states were excluded from the study. Epidural blood patch was conducted by experienced staff anesthesiologists, using strict aseptic technique, on a patient in a sitting position with the legs dependent as it is easier to perform and takes less procedural time in sitting position. However patient was well supported, assured and monitored during the procedure. The lumbar epidural space was located using 18-gauge (Portex, Braun) Tuohy needle after infiltrating skin with local anaesthetic, using the loss-of-resistance technique. The chosen epidural space was as close as possible to the dural puncture site.

When the epidural space had been localized, autologous venous blood was drawn (by a second operator) from an antecubital vein using strict aseptic technique. This blood was slowly injected into the epidural space through the Tuohy needle. The injection was always to be stopped and procedure abandoned in case of appearance of pain in the back, buttocks, or legs.

In absence of any pain, the injected volume chosen by the operator was at least 20 ml. However, none of the patients developed pain during the injection, so every patient was injected with 20 ml of autologous blood. The needle was then removed and the patient was asked to stay lying for 1 hour in dorsal decubitus position, after which the effectiveness was evaluated by asking the patient to stand up and walk. Treatment effectiveness was again assessed at day 1 by the attending physician for presence of PDPH and complications of EBP through a standard interview. The results of the AEBP treatment on clinical signs were then divided into relief of symptom using numerical rating scale for pain evaluation (Table-3). Complete relief was defined as disappearance of headache after the AEBP when patient had pain rating at 0 according to numerical rating scale. Failure included all patients with persistence of severe PDPH who were restricted in their daily physical activities and had to stay in bed part of the day. In cases of failure, a second AEBP was offered to the patient. For each AEBP, the following data was recorded after obtainining patient's informed consent:

Age and sex of the patient, circumstances of the dural puncture, relief from headache using numerical rating scale for evaluation of pain, complications of AEBP i.e. backache, or any abnormal sensations in the lower limbs.

Data analysis

Data had been analyzed using SPSS version 15. Descriptive statistics were used to describe the data i.e. mean and standard deviation (SD) for quantitative variables while frequency and percentages for qualitative variables.

RESULTS

A total 30 AEBP were performed with predominantly female patients (90% versus 10%) with a mean age of 27.8 years. Predominantly obstetric patients undergoing lower segment caesarian section were included in the study (table-1). Mean time of performing AEBP was 3.83 days after lumbar puncture. Complete relief was observed in 96%, while one patient required a second patch after which her headache was also completely relieved. Complications are summarized in table-2.

Table-1: Circumstances of lumbar puncture.

	n (%)
Lower segment caesarian section	25 (83.3)
Diagnostic lumbar puncture	03 (10)
Appendicectomy	01 (3.3)
Vaginal hysterectomy	01(3.3)

Table-2: Complications of epidural blood patch.

	n (%)
Backache	7 (23)
Paresthesias in lower limbs	2 (6)
Dural puncture during procedure	1 (3)

Table-3: The numerical rating scale for pain level.

Rating	Pain Level
0	No pain
1 – 3	Mild pain (interfering little with activities of daily living)
4 – 6	Moderate pain (interfering significantly with activities of daily living)
7 – 10	Severe pain (disabling; unable to perform activities of daily living)

Table-4: Results of study using pain scale.

n	Pain level before AEBP	Pain level after Ist AEBP	Pain level after IInd AEBP
10	10	0	-
08	09	0	-
08	08	0	-
03	07	0	-
01	10	07	0

AEBP: Autologous epidural blood patch

DISCUSSION

During the three year study period a total of 7100 spinal blocks were performed but only 30 of these patients developed PDPH which could not

be relieved by using all the available conservative modes of treatment. AEBP was found to be effective in relief of PDPH in majority (96%) with only one of the patient requiring second blood patch in these patients. Pain relief evaluated using numerical rating scale showed marked relief from severe pain to no pain in majority (96%) of the patients while one patient showed decrease in severity of headache from severe to mild pain which persisted and second blood patch relieved the pain to the level of no pain. This finding is consistent with the studies done earlier. Abouleish[16] reported complete relief of headache in 89% (105/118) of young patients in which AEBP was performed, he used < 15 ml of blood patch while we used up to 20 ml of blood in our study. Tisseront[17] et al in a study having higher number of patients had reported 75% (377/504) complete relief with first epidural patch. The difference in relief may be due to the fact that AEBP was performed on a number of patients having inadvertent dural puncture performing epidural analgesia, this results in bigger size of cerebrospinal fluid leak. In our study most of the patients received spinal anaesthesia with small gauge needles. Failure of AEBP is associated with PDPH secondary to bigger epidural needles. He also divided patients into complete relief, partial relief and failure. In his study 7% of the patients required second blood patch which is comparable to our study. Paech[18] also reported 73% of patients having complete relief while using 20 ml blood patch.

Backache after AEBP is described with 77% reported by Tisseront et al and 18% by Abouleish and 23% by us. The higher rate with Tisseront may be due to the fact that he reported pain while during the procedure while we studied backache after the procedure. Paresthesias which relieved spontaneously were 2% in Abouleish while we had reported 6%. Though occasional nerve damage is described in literature, these paresthesias were proved to be transient in nature. Other forms of patching are coming up in literature including fibrin glue but it requires further studies to confirm its efficacy in treatment of PDPH[1].

In our experience, patients who failed to respond to conservative management of PDPH showed marked relief in headache with AEBP with minimum or no side effects, as side effects were very minior and self limiting which never needed any treatment, furthermore the procedure was performed in patients who failed to respond to medical treatment, therefore ascertaining the efficacy of AEBP.

CONCLUSION

Autologous epidural blood patch is a useful treatment of post dural puncture headache. Though an invasive procedure it gives complete relief to the patients. Its common complications are self limiting backache and paresthesias.

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