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RESEARCH ARTICLE

EPIDURAL BLOOD PATCH VIA IN SITU EPIDURAL CATHETER FOR POST DURAL PUNCTURE HEADACHE

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Abstract

Post Dural Puncture Headache (PDPH) is a known complication of epidural procedures during labor analgesia and cesarean sections. In this study, we investigated the efficacy of managing PDPH using an Epidural Blood Patch (EBP) via an in-situ epidural catheter within 48 hours of accidental Dural puncture (ADP). Out of 1688 epidurals, 65 resulted in ADP (3.85%) with 43 cases developing PDPH (2.85% of total epidurals). Patients with ADP were managed by redirecting the needle and placing the catheter carefully, and those developing symptoms were monitored post-delivery and taken up for EBP if needed. EBP success was observed in 41 out of 43 patients, with two requiring a second patch. Additionally, two patients who initially went home symptom-free returned with PDPH after 7 days and were treated successfully with a single shot EBP. Discussion highlights PDPH's nature, conservative therapies, and the success of EBP in treating moderate to severe cases. Contradicting common practice, we performed EBP within 48 hours to avoid a second puncture, reduce hospital resources, and increase patient satisfaction. The procedure was well-tolerated, providing relief and allowing for early discharge with the baby. Injecting 10-15 ml of blood via epidural catheter effectively spreads blood at low pressure, reducing pressure symptoms and enhancing patient comfort. Careful consideration of contraindications, administration timing, and potential complications is crucial for successful EBP via in-situ catheters, offering a safe and effective treatment option for PDPH within 48 hours of ADP.

Introduction:-

Post Dural Puncture Headache (PDPH) is a common complication of epidural for labor analgesia and cesarean section [1, 2] In our study, we managed PDPH with an Epidural Blood Patch (EBP) [3, 4] via epidural catheter. As defined by the " International Headache Society" (IHS), Post Dural Puncture Headache (PDPH) is a type of headache that occurs within 5 days of a lumbar puncture, caused by the leakage of cerebrospinal fluid (CSF) through the Dural puncture that had been performed. It tends to be accompanied by neck stiffness, frontal headache, and/or subjective hearing symptoms. PDPH is believed to ideally spontaneously remit within 2 weeks. However, if the remission does not take place; sealing of the leak with an autologous epidural lumbar patch is performed to attempt to relieve the pain [5, 6]. An epidural blood patch is a procedure in which a small volume(10-20ml) of autologous blood is injected into a patient's epidural space to stop a leak of cerebrospinal fluid (CSF) [7].

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Objectives:-

Efficacy of epidural blood patch for PDPH via an in-situ epidural catheter for labor analgesia and cesarean section within 48 hours of witnessed 'accidental Dural puncture' (ADP).

Methods:-

Randomized study of patients during the last 4 years, who developed PDPH. Out of 1688 epidurals for labor analgesia and c-sections, 65 had ADP (3.85%), and 43 (2.85% of total epidurals) (66.15%of total ADP) of total developed PDPH. 22 patients who did not develop any symptoms were sent home.

In the case of ADP, while performing an epidural, the needle is redirected in the same or one space above, and the catheter is placed 3 cm inside the epidural space.

If accidental migration of the catheter happens intrathecally, the catheter is retained in the same position and the dose is adjusted according to spinal analgesia. These cases are excluded from the study.

Post-delivery, the catheter is retained in situ for the next 48 hours, adequate analgesia, fluids, and rest in the supine position for 24 hours is advocated, the patient is informed about Dural tap, and monitoring for PDPH is continued. Patients mobilized after 24 hours and all those who develop PDPH within 48 hours are taken up for EBP after consent. For those free of symptoms, the epidural catheter is removed and discharged with follow-up if they develop a headache in the next 7 days.

EBP is given via catheter with 10 or 15 ml (n=23 10ml, n=20 15ml) of autologous blood under aseptic precautions, in a lateral position and 15 degrees head up. The catheter is removed, and the patient is kept supine for the next 2 to 3 hours and then mobilized.

The procedure was withheld if the patient complained of pressure symptoms in the back or legs and resumed if symptoms resolved. It takes around a few minutes to inject blood through an epidural catheter because of its small diameter.

The patients were advised that they should remain in the supine position for two hours following an EBP. Following the procedure, patients must avoid vigorous exercise, Valsalva maneuvers, and long and strenuous travels for about seven days. They must use laxatives to prevent constipation as well. The measures are taken primarily to prevent clot dislodgement as well as any other pains that the patient may face.

Once the catheter is in place, post-delivery; we have to take into consideration that the catheter has not migrated, or dislodged (accidental removal or displacement of dressing); or if the introducing site has any signs of infection.

Results:-

Out of 43 patients who received EBP, 41 had complete relief, in two, symptoms persisted and were taken up for a second blood patch.

2 out of 22 patients who went home symptom-free, came back after 7 days with symptoms of PDPH. They were treated independently with a single-shot epidural blood patch.

Discussion:-

Post-dural puncture headache (PDPH), also known as post-lumbar puncture (LP) headache, is a common complication of diagnostic LP. It can also occur following spinal anesthesia or, more commonly, inadvertent Dural puncture during attempted epidural catheter placement. The headache is usually positional, frontal (worse when upright, better when lying flat), and is often accompanied by neck stiffness, photophobia, nausea, or subjective hearing symptoms [8].

There are several accepted conservative therapies, such as bed rest, fluids, and abdominal binders. However, there wasn't enough data to support the use of bed rest, abdominal binders, and hydration in the management of obstetric PDPH [9]. Patients who can perform activities of daily living and can tolerate being upright are considered to have a mild PDPH. Conversely, patients who are unable to mobilize or are unable to perform activities of daily living are

considered to have moderate to severe PDPH. EBP has been the preferred treatment or in other words; treatment of choice for moderate to severe PDPH. It offers a complete resolution of symptoms in a large proportion of patients. In the remaining patients, it reduces headache severity and allows them to return to their everyday activities [9]. Up to 95% of patients will exhibit immediate short-term relief, with up to 70% headache-free several days later. However, up to 28% of parturients undergoing therapeutic EBP after ADP with a large bore epidural needle require more than one patch. [9].

Epidural blood patch (EBP) is currently the gold standard for PDPH treatment, with a success rate ranging from 90% to 99% [10, 11]. Since conservative treatment resolves over 85% of headaches caused by low CSF pressure, it is recommended as the initial course of treatment for these headaches within the first 24 to 48 hours. Bed rest, intravenous hydration, caffeine supplements, and analgesics are examples of conservative therapy methods. When conservative therapy is ineffective for moderate-to-severe headaches caused by low CSF pressure, EBP is typically taken into consideration [12].

In 1993, a prospective study carried out in Helsinki revealed that EBP was beneficial for 88-96% of the patients in the different study groups. According to the results of one double-blind, randomized study on the therapeutic efficacy of EBP, PDPH can be effectively treated with it. For many people, it completely relieves their symptoms. For the remaining patients, it allows them to return to their regular activities and lowers the intensity of their headaches.
In 2016, 13 patients came for a follow-up visit to the clinic at Queen Elizabeth University Hospital in Glasgow, UK. Six reported no change, four reported improvements in frequency or severity, and three claimed total resolution of their headaches. Eight people completed the questionnaire; five reported less pain, and the average headache severity decreased from 9 to 3 [5].

Persistent headache, persistent back pain, cranial subdural hematoma, cerebral venous sinus thrombosis, and cranial nerve palsy (CN 6 and 7) are the complications of continuous CSF leak if EBP is not done, seizures, and, more rarely, death [12, 5].
EBP contraindications include anticoagulation/coagulopathy, injection site infection, and patient refusal or lack of participation. Gross anatomical malformation, acquired immune deficiency syndrome, and leukemia are all considered relative contraindications. Several investigations revealed that EBP was safe when the platelet count exceeded 75,000/mm2. However, the author does not propose EBP for platelet counts below 100,000/mm2 [12, 13].

In an international, prospective, observational cohort research, it was discovered that epidural blood patch failure occurred in 28.3% of patients with post-dural puncture headache, with the remainder being partially or fully successful. A history of migraine and a higher lumbar level of accidental dural puncture were associated with a greater risk of failure of the epidural blood patch. A lower incidence of epidural blood patch failure was seen when the epidural blood patch was performed 48 hours after accidental dural puncture [14]. EBP is considered ineffective or inadequately performed if symptoms do not subside within 2 days of its administration [12]. If there has been some symptom improvement following the first EBP, but the headache still recurs, another EBP may be worth trying. Nonetheless, alternative headache reasons need to be taken into consideration, and consulting with other specialists is advised in situations when the initial EBP is ineffective or fails to alleviate the symptoms [12].

In rare situations where EBP does not resolve the discomfort, headache, backache, neck discomfort, radicular irritation from blood byproducts, and moderate pyretic response are common side effects of EBP [12]. Usually, these are minor and transient. According to reports, back pain after EBP occurs about 80% of the time and usually goes away in 4 weeks. It is believed to be the result of elevated spinal canal pressure brought on by the blood injection. There have also been reports of delayed radicular complaints, which could be linked to hemolytic byproducts of the injected blood irritating the nerve roots [12]. Arachnoiditis has also been reported as a complication of epidural blood patch procedures [15]. It must also be noted that any invasive procedure is bound to risk infections for the patient.

Despite the majority of data available that prompts us to perform EBP after 48 hours, we have conducted the procedure within 48 hours because of the advantage that we avoid a second puncture, avoid re-admission, prolong symptoms for the patient as well as consumption of hospital time and resources. Since we are not performing a second puncture, we are using the catheter retained in situ previously inserted for Epi-Dural analgesia. This makes it not just easier for the EBP to be performed but also has shown more satisfaction among patients.

To encourage clot formation at the suspected site of a dural tear, patients should remain in the supine position for two hours following an EBP. Following surgery, patients should refrain from vigorous exercise, Valsalva maneuvers, and lengthy travel for about seven days. They ought to use laxatives to prevent constipation as well. By taking these steps, the chance of the blood clot covering the dural tear getting dislodged is decreased [12].

Conclusions:-

EBP via retained catheter is a safe and effective way of treating PDPH within 48 hours, in contradiction to after 48 hours as suggested commonly/officially; because of acceptance levels of patients being high in case of EBP performed early, symptom-free discharge from the hospital with the baby, avoiding second puncture for blood patch.

Injecting 10 -15 ml of blood via epidural catheter for PDPH; is effective in evenly spreading the blood into the epidural space at low pressure, thus decreasing the development of pressure symptoms and increasing patient satisfaction.
High pressure is required to plunge the sterile autologous blood into the catheter via the small diameter of the catheter. However, since the catheter in situ (3cm tip) consists of multiple pores for the output of the blood into the epidural space, the pressure at the time of spread is significantly reduced.

EBP via in situ catheter consequently relieves the patient of symptoms of PDPH if performed cautiously keeping contraindications, time of administration from the onset of symptoms, and; possible complications in mind.

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