HEADACHE AFTER SPINAL ANAESTHESIA

Since the introduction of spinal anaesthesia by Bier in 1899, headache has remained a well recognized complication but was, initially at least, considered to be a small price to pay for the excellent anaesthesia produced by the spinal block. However, postdural puncture headache (PDPH) may be incapacitating and associated with a substantial increase in postoperative morbidity. Hospital stay may be prolonged and, in addition to headache, there may be rare neurological sequelae, such as III, IV, VI and VIIIth cranial nerve palsies causing diplopia, tinnitus and bilateral deafness [1, 2]. Death resulting from bilateral subdural haematoma associated with PDPH has been described after dural puncture [3].

Not all patients receiving spinal anaesthesia are equally susceptible to PDPH. In 1956, Vandam and Dripps concluded from a large epidemiological study that spinal anaesthesia was safe, but that PDPH was significantly more common in young, female and quickly ambulant patients, with the highest incidence occurring in obstetric patients. The association of PDPH and larger diameter spinal needles was noted also [1].

The cause of PDPH remains unknown, but laboratory and clinical evidence substantiates the most plausible explanation, that CSF leaks at the time of and subsequent to dural puncture [4, 5]. Sitting or standing when the CSF volume is reduced as a result of the leak encourages drainage of the remaining CSF to the lumbar region. The consequent traction on the brain and cortical meninges produces the characteristic headache, which is relieved most commonly by lying down. Reflex cerebrovascular vasodilatation may also cause pain [6].

Thus the two most important factors influencing the frequency and severity of PDPH are the age of the patient and the size of the dural perforation. The shape and size of the hole in the dura is dependent on the diameter of the needle, on the thickness of the dura at the puncture site [7] and on the position of the needle bevel in relation to the long axis of the dural fibres [8]. However, microscopic examination of fresh cadaver specimens of lumbar dura has shown that the fibres are not uniformly parallel and that their thickness is variable [7, 8]. This variability may explain the conflicting results of clinical and laboratory studies in which the parallel position of the needle bevel in relation to the assumed longitudinal axis of the dural fibres was examined [4, 5, 9–12]. It has been suggested also that a steep angle of penetration of the dura by the needle, in which a longer track is made, may influence the development of PDPH [5].

Classically, PDPH is throbbing in nature, of varying severity and presents most commonly within 48 h of dural puncture. Although usually mild, if severe it may be accompanied by neck stiffness, nausea, vomiting and photophobia. With conservative treatment, spontaneous resolution of the majority of PDPH usually occurs within 1–2 days; occasionally it may last for up to 1 week, but has been reported to persist for 1 year [1, 3, 13, 14]. Conservative treatment includes simple oral and opioid analgesics and a high fluid intake of 1.5–3 litre day⁻¹. Prophylactic 24-h bed rest is ineffective [15], but preliminary reports of the use of i.v. caffeine sodium benzoate 500 mg administered as a 1-litre infusion over 1 h have proved encouraging [6, 16]. The use of an abdominal binder effectively reduces the incidence and severity of headache, but has not proved popular [17, 18].

Severe symptoms may confine the patient to bed and may persist, thereby justifying more invasive methods of treatment. Intermittent injections of physiological saline (60 ml or more) have achieved considerable success in both prophylaxis against and treatment of established PDPH, effectively reducing both its severity and incidence [19, 20]; extradural infusions of Hartmann’s solution are also effective [21]. However, the most effective method of treating moderate to severe PDPH is an autologous extradural “blood patch”, (EBP) in which, under sterile conditions, 10–20 ml of the patient’s blood is withdrawn and injected into the extradural space. First introduced into clinical practice in 1960 [22], use of EBP has now become widespread and the benefit
of blood patching is almost immediate. Studies have confirmed its effectiveness: 89% of PDPH are relieved by the first autologous injection, and a further 8% by a subsequent injection [23]. Long term follow up has confirmed its safety [23, 24]. During the procedure, the patient may complain of paraesthesiae, neckache and backache. After 48 h, back and neckache are common and transient pyrexia may occur [23]. Radicular back pain has been reported, resolving spontaneously [25]. Despite the apparent risk of infection, the procedure appears to be safe, and serious complications are very rare [23, 24, 26].

Postmortem examination of human dura within 48 h of EBP has demonstrated strands of clot attached to the dura [3]. From animal experiments, Di Giovanni, Galbert and Wahle concluded that there was no more tissue reaction after EBP than after simple dural puncture [26]. Although subsequent extradural anaesthesia is usually successful, Rainbird and Pfitzner described restricted extradural spread at repeat Caesarean section with an extradural block which was limited to below L2, 3 years after successful blood patching [27]. Epiarachidural haematoma has been reported after EBP, but the technique responsible was not routine practice [28]. The volume of blood injected has varied, but the larger the volume the greater the efficacy of the EBP; 18–20 ml is the most common injection volume used.

Prophylactic EBP has been shown to prevent PDPH reliably when the puncture has been made with larger needles such as extradural needles, and has been justified because of the high incidence of PDPH (70%) which require blood patching [29, 30]. Routine use of prophylactic EBP results in some patients unnecessarily receiving an EBP.

Although EBP is an effective treatment for PDPH, it is invasive and unpleasant. In an attempt to reduce the incidence of PDPH after spinal anaesthesia, attention has focused recently on the development and use of very fine spinal needles. Ultra fine needles (30-gauge) have proved difficult to use, identification of CSF is elusive and frequently the spinal block has proved inadequate [31]. Such needles have been regarded as unsuitable for routine use in obstetric patients, although they are associated with headache-free lumbar puncture. Twenty-nine-gauge needles have proved easier to use and have been more successful, with a similar failure rate and a lower incidence of PDPH than that observed with use of 26-gauge needles (1.4% and 3.7%, respectively [32]). No severe headaches were recorded and no patient required an EBP. Using a 29-gauge needle, Carrie did not observe significant PDPH in 163 obstetric patients [33], but two of the 18 patients in whom a 29-gauge needle was used by Fitzgibbon developed a PDPH which required an EBP [34].

Recently, interest has been rekindled in the use of "blunt" needles in which there is no cutting point, the dural fibres being parted by the rounded but tapering tip of the needle. The 20-gauge Whitacre needle was associated with a lower incidence of PDPH compared with a similar size of Quincke point needle [35, 36]. Laboratory studies have shown that in vitro CSF leakages caused by a 22-gauge Whitacre and by a 26-gauge Quincke point needle are similar [4, 5]. These findings have been substantiated by clinical studies [37, 38]. More recently, several smaller diameter Sprotte (24-gauge) and Whitacre (25- and 27-gauge) needles have become available and preliminary clinical studies have confirmed their ability to reduce the incidence of PDPH without compromising the ease of administration of spinal anaesthesia [39-41]. In this issue, Lynch and colleagues report on the low incidence of PDPH after use of 25- and 22-gauge Whitacre needles [42]. The incidence of headache was reduced in association with the finer gauge needles, but the difference was not statistically significant.

Clearly, PDPH is an undesirable complication to be avoided if possible. All patients undergoing spinal anaesthesia must be informed of the risks of PDPH and that safe and effective treatment exists, should one develop. No patient should be subjected to PDPH for more than 24 h without the anaesthetist being informed and EBP being considered. PDPH is a confusing entity as there are no universally agreed definitions and different investigators apply different criteria. To confirm the benefits of the use of fine, pencil-point needles, subsequent studies must define the PDPH clearly in terms of duration and severity and be applied to a population at equal risk of headache. Large numbers of patients should be studied because of the expected low incidence of PDPH associated with currently available needles. It may transpire that, in routine clinical practice, pencil-point needles will combine the strength and "feel" of the larger needle with the negligible incidence of
PDPH associated with the fine, 29-gauge Quincke point needle.

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REFERENCES


