SPINAL ANALGESIA AND HEADACHE AT PENANG GENERAL HOSPITAL

K. INBASEGARAM
YONG BOON HUN

SUMMARY

One hundred (100) consecutive patients who underwent spinal analgesia for surgical and orthopaedic operations were studied. Postural headache occurred in 9% of patients, the majority in those cases where large bore (18G to 21G) needless were used. No other neurological complications were encountered. Conservative measures provided some relief of the headache. Epidural blood patch was found to be effective.

INTRODUCTION

Well conducted and skilfully applied spinal analgesia is a safe and satisfactory technique from the points of view of the patient, surgeon and anaesthetist.[1] The most common and troublesome complication is post-spinal headache. This study was conducted to determine the incidence of headache in 100 patients who underwent spinal analgesia. The factors affecting incidence of headache and methods of treatment are reviewed.

K. Inbasegaran, FFARACS
Yong Boon Hun, MBBS
Anaesthetic Unit
General Hospital
Penang, Malaysia

METHODS

100 consecutive patients who underwent intra-dural spinal analgesia during the period January to March 1985, at the Penang General Hospital for elective and emergency surgical and orthopaedic operations were studied. Patients were assessed pre-operatively and consent was obtained after describing the technique. Spinal analgesia was administered by Medical Officers in the Anaesthetic Unit.

Technique

Patients who underwent elective surgery were premedicated with intramuscular pethidine and promethazine. The position of the patient (sitting or horizontal-lateral), size of needle and local anaesthetic used was at the discretion of the attending doctor. Spinal needle (Terumo, Abbott) sizes used were 18G (2 patients), 20G (14), 21G (38), 22G (38), 23G (2) and 25G.[2] Choice of needles was to some extent limited by availability. The local anaesthetic used was either 5% heavy lignocaine 2 ml (100mg) or 0.5% heavy bupivacaine 2 - 3 ml (10 – 15 mg). All patients were preloaded intravenously with at least 1l of crystalloid unless specific contraindications were present. Intravenous atropine 0.5 mg was given where indicated. A mudline approach of lumbar puncture (mid or lower-lumbar) was used in all patients. A note was made if multiple attempts were necessary before obtaining CSF backflow. The

patients were then repositioned and surgery proceeded when satisfactory blockade was established. Sedation with either diazepam or droperidol was given as and when judged necessary. Post-operatively all patients were told to lie in bed till the following day.

They were subsequently interviewed in the wards and asked: if they experienced any headache after the spinal analgesia and if so, the nature, aggravating and relieving factors; whether they experienced any other complaint. In a few instances, patients were discharged early before they could be interviewed. In these cases, the ward-staff were consulted and the case-records checked as to whether they had any complaint related to spinal and analgesia.

RESULTS

The characteristics of patients studied are shown in Table I. Indications for surgery under spinal analgesia were: cystoscopy (17%), perineal surgery (22%), abdominal surgery (9%), lower limb amputations (17%)) and other lower limb surgery (35%). 57% of operations were done electively and 43% were emergencies. Satisfactory analgesia was obtained in all patients. Postural headache aggravated by erect and relieved by supine position occurred in nine patients (9%) (Table II).

Onset of headache was within three days in all patients, with the majority (66%) starting on the first post-operative day. In four patients, headache was associated with giddiness and nausea and was severe enough to keep the patient bedridden for several days. One patient described the pain as spreading down the back of the neck and shoulders. In the others, headache was described as 'mild'. Treatment consisted of bed-rest, simple analgesics and hydration (intravenously or orally). This provided sufficient relief for seven of the patients to be discharged within two to seven days. Two patients in whom headache and giddiness were particularly marked were offered therapeutic epidural blood patches, of whom one accepted. He was given an epidural blood patch using 8 ml of autologous venous blood collected under sterile conditions and given at the same interspace as the dural puncture. This produced immediate relief but headache recurred after one day. A repeat epidural blood patch using the same volume of blood was effective and the patient was discharged on the seventh post-operative day.

TABLE I
CHARACTERISTICS OF 100 PATIENTS STUDIED

	Range	X X	SEM
Age (Yrs.)	15 – 79	46.8	1.64
	Male (%)	Female (%)	
Sex	77	23	
	Malay (%)	Chinese (%)	Indian (%)
Race	28	42	30

Of the nine patients who experienced headache, eight had lumbar puncture done with needles of size 21G or larger, while only one had lumbar puncture done with needle size 22G or smaller (significant difference with X^2 test, $p < 0.05$). There was no significant difference in occurrence of headache whether lumbar puncture was performed in the sitting or horizontal-lateral position.

Five patients complained of mild backache which resolved spontaneously. No other neurological complications were encountered.

DISCUSSION

The first planned spinal analgesia was first introduced in 1898 by Bier,[2] who also wrote the first account of headache after spinal analgesia. Reflecting on his own postural headache the morning after he and his assistant each injected cocaine into the other's theca, he said that "All these symptoms (pressure in the head and dizziness) disappeared as soon as I lay down horizontally, but they returned when I arose."

TABLE II

PATIENTS WHO DEVELOPED POST-SPINAL HEADACHE

Age (Yrs.)	Sex	Needle Size	Position*	Indication	Onset of Headache**	Treatment
31	F	21G	S	Cystoscopy	1	Analgesics and fluids
25	M	21G	S S	Lord's Procedure	1	Analgesics and fluids
29	M	21G	S	Excision of pilonidal sinus	1	Analgesics and fluids
23	M	21G	S	Cystoscopy	2	Epidural blood patch
45	M	18G	H – L	Transtarsal amputation	1	Analgesics and fluids
28	M	20G	H – L	Wound Desloughing	Operative Day	Analgesics and fluids
36	M	22G	H – L	Cystoscopy	1	Analgesics and fluids
79	M	21G	H – L	Eversoin of sac of hydrocoele	1	Analgesics and fluids
35	N	21G	H – L	Fistulectomy	Operative Day	Analgesics and fluids

*during lumbar puncture; **days after operation; S = sitting, H – L = horizontal-lateral.

Features of post-spinal headache are distinctive. Onset of headache may occur several hours after the puncture and usually within the first two days,[3,4] as seen with the present study. The headache is invariably bifrontal or occipital and frequently involves the neck and upper shoulders. The erect position, coughing and sudden movements of the head all typically aggravate the headache whereas lying down produces varying degrees of relief, as was so graphically described by Bier. Associated symptoms include nausea and anorexia. Depression is common. These features were seen, in varying degrees, in all nine patients who developed post-spinal headache.

Estimates of the incidence of headache after lumbar puncture range between 0.5 – 75%.[5] Tourtellotte *et. al.*,[6] in their review of 21,000 lumbar punctures found that the single factor of major importance in developing post-lumbar puncture headache was the diameter of the hole made in the dura. Correlation between the size of the needle and the incidence of headache is convincing. Incidences of 58% with 18G spinal needles[5] and 70% with inadvertant dural taps using 18G Tuohy needles[3,7] have been reported. On the other hand, headache after spinal analgesia occurred in 6%[8] and 15%[4] of obstetric patients with 25G needles. In this small study, headache occurred in one out of the two patients in whom an 18G needle was used, and in none of the eight patients in whom 23G and 25G needles were used. It is noteworthy that occurrence of headache with patients using 22G needles or

smaller was significantly less compared to those in whom an 18G needle was used, and in none of is in agreement with the observations of other workers.[4,7,8]

The pathophysiology of dural puncture headache is thought to be related to CSF leakage into the epidural space.[2,3] Lumbar CSF pressure increases from 5 – 15 cm H_2O in the horizontal position to over 40 cm H_2O on sitting, whereas lumbar epidural pressure is sub-atmospheric.[6] Some escape of fluid therefore inevitably occurs after lumbar puncture and if severe enough the volume of fluid in the cisterns around the base of the brain becomes depleted leading to drag on the pain-sensitive tentorium and vessels, and resulting in headache. Flow through the puncture may be expected to vary with the size of the rent, the pressure differential and the rate of CSF production. The correlation between size of the dural puncture and incidence of headache has been mentioned. The number of dural punctures may be expected to affect the development of headache, but has not been shown. In this study, spinal and analgesia was achieved in all patients who developed headache with a single dural puncture.

Psychogenic factors have also been postulated. Some workers[9] contend that suggestion and expectation were important, and that the patient should not be told to expect a headache. Others[10] have gone further to say that "Post-lumbar puncture headache is a rarity if staff do not ask direct questions about headache and patients rest in bed a few hours ". However, this view has been challenged,[7,11] and it is generally felt that the most effective preventive measure is the use of small gauge (25G or 26G) needles.[7,8,12] In the present study, patients were not told before the procedure to expect a headache but were questioned directly about headache afterwards.

Treatment

This is aimed mainly at reducing the pressure differential and leakage across the rent.

Bed Rest

It might be expected that rate of CSF leakage is decreased with bed rest. The prone position[12,13] and head-down position[14] have also been recommended, presumably because the rent is uppermost, thus decreasing leakage. However, although patients who develop headache undoubtedly find relief with bed rest, the value of bed rest as a preventive measure to development of headache has not been proven. Several studies[15,16] have found no difference in incidence of headache or other complications whether bed rest was imposed or not. Some workers do not routinely impose bed rest.[4,8] Nevertheless, it is still widely advocated after lumbar puncture.[2,17]

Hydration:

A high fluid intake is though to help increase CSF production, and has been advocated by some[2] but not by others.[3] In this series, all patients either had an intravenous infusion or were encouraged to drink fluids liberally. The use of DDAVP (synthetic vasopressin) has also been advocated[18] but has not met with general acceptance.

Analgesics:

This mode of treatment is used almost universally[2,3,17] although it is remarkable by its lack of efficacy.[3]

Epidural Injections/Infusion:

This has been advocated by several authors.[2,3,8,19] Bolus injections of 40 – 60 ml every six hours for 24 hour or an infusion of 1.5 – 2l of saline via an epidural catheter are used. The epidural pressure is thus raised and headache relieved until the hole heals. Epidural injections/infusion was not used in this series.

Epidural Blood Patch:

This was first described by Gormley[20] and recent work[3,19] has supported its use as an effective means of treatment. 8 – 10 ml of blood

was used in the present study, as advocated by one author.[3] Relief is often immediate and dramatic but a repeat patch is often necessary as was the case in this study. Eight patients have been treated with epidural blood patch in the last two years by the first author, using 5 – 10 ml blood. All had effective relief of headache, with one requiring a repeat batch. There is evidence to suggest that upto 20 ml of blood would be more effective[19] with a lower incidence of repeat patches required. No permanent sequelae of therapeutic blood patch has been reported.[3] Back stiffness is usually mild and transient. Radiculitis which resolved after three days has been reported. Fears of infection, arachnoidities and obliteration of the epidural space have not been realised although there is one report of restricted spread of subsequent epidural analgesia following epidural blood patch.[21]

Limitations of this study include the possibility that some patients who developed headache after discharge may have been missed. Patients were not recalled sfter discharge for interview. However, the number of such patients is likely to be small as headache usually develops within the first two days and the majority of patients were kept for three days no longer. The effect of suggestion arising from difect questioning of patients about headache was not determined. However, patients were not told of headache before the porcedure and the features of postural headache seen were classical of that following dural puncture. It wa also not possible to determine if use of conservative measures (bed rest, analgesics, hydration) actually helped hasten the resolution of headache. One author[19] has found that headache would resolve spontaneously within six days evenin the absence of any intervention. Perhaps the value of these measures lies in the assurance to the patient that something is being done for his headache.

CONCLUSION

In this study, 9% of patients who underwent spinal analgesia developed postural headache. Incidence was found to be higher when larger bore needles were used. Conservative measures (bed rest, hydration and analgesics) to treat headache were used although evidence in support of their efficacy is wanting. Therapeutic epidural blood patch was used in one patient and was found to be effective. There is probably a place for wider use of therapeutic epidrual blood patch as evidence mounts in favour of its efficacy and safety. The use of fine gauge needles is probably the best preventive measure although this must be weighed against the difficulty in ascertaining successful dural puncture due to failure to aspirate CSF.[4]

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