

Sprotte needle for intrathecal anaesthesia for Caesarean section: incidence of postdural puncture headache

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Summary

Caesarean section was performed under spinal anaesthesia in 55 women using a 25-gauge diamond-tipped needle and in a further 55 mothers with a 24-gauge Sprotte needle. Eight patients (14.5%) developed a headache in the former group, five of whom required a blood patch. There were no headaches reported in the Sprotte group.

Key words

Complications; headache.

Equipment; needles.

Spinal anaesthesia remains an up-to-date technique. Due to its ease of use, very low cost and retention of consciousness, it is preferred to general anaesthesia in a number of instances. A new spinal anaesthesia needle, the Sprotte needle (Fig. 1) has recently been marketed and the incidence of postdural puncture headaches in young subjects was reported to have been reduced after its use.¹ The present study was undertaken to evaluate the use of this needle on the frequency of headache after spinal anaesthesia for Caesarean section.

Methods

One hundred and ten women aged between 18 and 40 years underwent Caesarean section with spinal anaesthesia; 89 were elective sections and 21 emergencies. Informed consent was obtained from the patients and the study approved by the local ethics committee. Exclusion criteria were patient unwilling, coagulation abnormalities, foreseeable or patent hypovolaemia (placenta praevia, retroplacental haematoma) and pre-eclampsia because of possible intracranial hypertension.

The patients were randomised into two groups; group 1 ($n = 55$) included 46 scheduled Caesarean sections and nine emergencies in which a 25-gauge diamond-tipped needle was used, with the bevel kept parallel to the dural fibres. Group 2 included 43 scheduled Caesarean sections and 12

The Sprotte needle is manufactured by Pajunk GmbH Medizin Technik, Am Holplatz, 57 D7716 Geisingen, West Germany.

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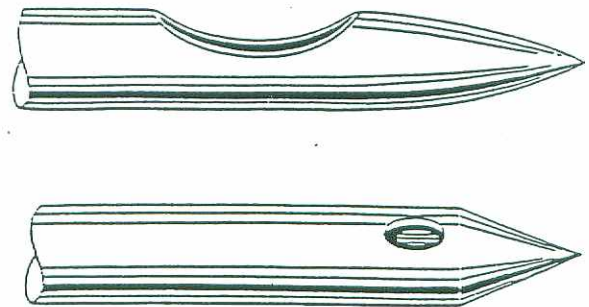


Fig. 1. The Sprotte needle (top) as compared to the Whitacre needle (bottom).

emergencies ($n = 55$) in which the puncture was made with a 24-gauge Sprotte needle. This needle has a blunt, ogival tip; its distal orifice lies laterally and is 1.2 mm long (Fig. 1). In elective cases, the circulation was preloaded with 500 ml of modified fluid gelatin (Plasmion); in emergency cases 30 mg ephedrine was administered in addition to the fluid preload. Thereafter compound sodium lactate was infused at a rate of 10 (ml/kg)/hour.

The lumbar punctures were performed in the midline at the L_{3-4} interspace in the sitting position. The needle was advanced a further 1 to 2 mm after appearance of cerebrospinal fluid (CSF) and a mixture of 0.5% hyperbaric bupivacaine (0.06 mg/cm of patient height) and fentanyl (0.02 μ g/cm of patient height) was injected. The injection was made in approximately 20 seconds in the four quadrants; the needle was rotated during the injection without aspirating

CSF. The patient was lain supine immediately afterwards, with her legs slightly propped up with a cushion under her right side to avoid aortocaval compression. Arterial blood pressure was monitored automatically every 3 minutes. Any decrease in the systolic arterial pressure below 100 mmHg was treated with ephedrine 3 mg intravenously. The patients were monitored in the recovery room for 12 hours once the operation was over.

Regression of the sensory block was evaluated by the patient's perception of cold (ether), and regression of the motor block was evaluated on the Bromage scale.³ The patients were nursed in a semi-sitting position; a daily infusion of 2 litres of 10% glucose containing 4 g of NaCl and 2 g KCl per litre was given for 24 hours. Postoperative analgesia was provided by ketoprofene 150 mg infused over a 20-minute period with a maximum of three infusions per day over 48 hours. Patients were allowed to sit up and get out of bed the day after surgery. Each patient was visited by an anaesthetist, who did not know the type of needle used, daily for 10 days up to her discharge. The incidence of headache which was characteristic of a dural puncture³⁻⁵ was noted i.e.: postural headaches aggravated by standing and jugular vein compression, relieved by lying down. The intensity of these headaches was scaled as follows: slight, but patient able to walk and only occasionally requiring analgesics; moderate, preventing daily activity and requiring analgesic therapy; severe, preventing the patient from getting up, accompanied by nausea.

All results are presented as means (SEM). Comparison of the two groups was carried out using a Chi-squared test for headaches and a Student *t*-test for age.

Results

There was no significant difference between the ages of group 1 (27.9 SEM 0.8 years) and group 2 (29.1 SEM 0.7 years). The dura was successfully punctured in all cases, but analgesia failed to occur in one patient in whom a Sprotte needle was used, in spite of free flow of CSF. Postoperative analgesia was given 259 (24) minutes after puncture (all patients).

Postoperatively, out of the 55 spinal blocks carried out in group 2, no headache occurred. Eight patients (14.5%) complained of headache in group 1, of which three were severe preventing the patients from getting up. These appeared in the first 24 hours and a blood-patch was needed on the third day; five moderate headaches were reported in the 48th hour and lasted 2 days. Two of these patients received paracetamol (3 g/day) and the third dextropropoxyphene (100 mg/day). The difference in the incidence of headache was significant ($p < 0.01$). One patient in each group developed a moderate, nonpostural, continuous headache.

Discussion

Postspinal anaesthesia headaches are related to the size of the dural puncture made by the needle with a consequent CSF leak into the epidural space. Several factors influence the appearance of these headaches. The larger the needle diameter, the larger the hole and the higher is the incidence of headaches. Tourtellote *et al.*⁶ reported a 36% incidence of postoperative headaches with 22-gauge needles and 12% with 26-gauge. Flaatten *et al.*⁷ did not report any headache

with 29-gauge needles. The patient's age also seems very important; headache occurred in only 4% of patients over 60 years old¹ as opposed to 13.8% in patients under 50 years. In a recent study, Flaatten *et al.*⁸ reported a 20.6% incidence of headaches with 25-gauge needles in patients with an average age of 28.5 years. Clarke and Power⁹ using 26-gauge needles reported headaches in 39% of patients under 40 years. Postspinal headache has been reported in one series to be commoner in women, 40% as opposed to 13% in men.⁶ Flaatten and colleagues⁸ noted a similar, although smaller trend: 16% for men and 29.4% for women, but the incidence was maximum in patients under 29 years (22% in men, 60% in women). By keeping a 22-gauge needle's bevel parallel to the dural fibres, the patient's head in hyperextension at the time of puncture and bent forward when the patient is put on her back again, a decrease in headache frequency from 12% to 2.3% in patients around 50 years old has been reported.⁴ Obstetric patients are therefore at a high risk of headache, being female and under 40 years of age.

The 14.5% of headaches in group 1 in our study is similar to Crawford's findings¹⁰ which reported an incidence of 16.3% of headache after spinal anaesthesia using 23- or 25-gauge needles. Several types of cone-tipped needles¹¹ have been used to try and separate the dural fibres instead of cutting them, to minimise the CSF leak. However, Martin *et al.*¹² did not find any significant difference between the 22-gauge conical Whitacre needle and the diamond type 25-gauge needle (15.5% of postoperative headaches) in young subjects. The Sprotte needle¹ used in this study differs from the Whitacre needle¹¹ in several respects; a smaller diameter, 24-gauge instead of 22-gauge, lowers the risk of dural fibre lesions; a longer distal orifice enables more rapid CSF reflux; a blunt ogival tip as opposed to the sharper, conical ('pencil tip' type) Whitacre needle (Fig. 1).

This study was primarily designed to include two groups of 100 patients each, but in view of the high percentage of postdural puncture headaches in group 1, it was decided to limit the study to 110 patients. Since then we have used the Sprotte needle in 216 spinal anaesthetics for Caesarean section; only one slight headache was seen. The low percentage of headache with this needle (0.37%) is comparable to that reported by Sprotte *et al.*¹ in a very large series, namely 0.02% for 7175 lumbar punctures. In addition, the needle's blunt tip is less likely to cause a nerve root lesion in its subarachnoid trajectory.

For some, taking analgesics after operation will prevent the onset of headaches after lumbar puncture, but Flaatten *et al.*⁸ found that 100 mg indomethacin postoperatively had no significant effect on the incidence of headaches after lumbar puncture. Use of ketoprofene should, therefore, not influence the findings of this study; it would be unable to relieve the pain of a severe headache and also the delay in appearance of the postspinal anaesthesia headache is longer than its duration of action.

It is also interesting to note that the lumbar puncture was never difficult with the Sprotte needle, even for anaesthetists unfamiliar with it, which is not always the case with fine needles; Flaatten *et al.*⁷ found a failure rate of 8% with 29-gauge needles. The only analgesic failure, noted at the beginning of this study, was most likely because the needle's distal orifice overlapped the dura mater; the local anaesthetic was injected in to the epidural space. No other

failures have occurred since taking the precaution of advancing the needle a few millimetres after the appearance of CSF.

The Sprotte needle seems to provide a satisfactory solution to the problem of postspinal anaesthesia headaches. The almost complete disappearance of these headaches, associated with the ease of puncture even though no special preventive measures were taken, makes it possible to reassess this type of anaesthesia in young subjects and makes it an ideal obstetric technique.

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