

# Incidence of Postdural Puncture Headache Following Spinal Anaesthesia for Lower Segment Caesarean Section with the 25 Gauge Polymedic Spinal Needle

Pages with reference to book, From 278 To 281

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## Abstract

The incidence of postdural puncture headache (PDPH) was studied in in-patients after spinal anaesthesia with 25 gauge Polymedic needle (Sprotte-like), for lower segment caesarean section (LSCS). A total of 281 women who underwent LSCS were studied, at the maternity unit of St. Peter's Hospital, Chertsey, Surrey, U.K. Of these, 125 women had a spinal, 93 general and 63 epidural anaesthesia. All the women were questioned about the presence of headache between the second and fourth post-operative day. Its severity was assessed with a visual analogue scale. Women who had an epidural or a general anaesthesia were used as controls. Out of 281 women studied, none complained of PDPH. Four women in the spinal anaesthetic group, complained of headache which did not have the characteristics of PDPH. The 25 gauge Polymedic spinal needle appears to be safe and satisfactory for performing spinal anaesthesia for [SOS (JPMA 46:278, 1996).

## Introduction

Spinal anaesthesia is becoming an increasingly popular technique in obstetric practice. as a safe and reliable alternative to general anaesthesia and lumbar epidural block, for lower segment caesarean section (LSCS). This has followed the introduction of blunt tipped atraumatic spinal needles (Sprotte and Polymedic) and pencil point (Whitacre) needles without the sharp cutting edge of Quinke tip needles, which were previously used. The technique of spinal anaesthesia became popular in the early twentieth century because of simplicity of method, small dose of local anaesthetic, excellent analgesia, profound muscular relaxation, reduced operative blood loss, reduced incidence of deep vein thrombosis and a very low cost. In addition, in the obstetric patient, the mother is awake at the time of delivery ready to receive the newborn infant and the hazards associated with a general anaesthetic are avoided. However, spinal anaesthesia is not without risks and headache has remained a well recognised complication. Postdural puncture headache (PDPH) was at first considered to be a small price to be paid for the excellent anaesthesia produced. However, it can be incapacitating and associated with an increase in post operative morbidity. Hospital stay may be prolonged; there may be associated neurological sequelae such as cranial nerve palsies causing diplopia, tinnitus and deafness. Death from bilateral subdural haematomas has also been reported<sup>1</sup>. Vandam and Dripps<sup>2</sup> concluded from a large epidemiological study, that PDPH is significantly more common in young female and quickly ambulant patients, with the highest incidence occurring in obstetric patients.

Classically PDPH is throbbing in nature, of varying severity, related to posture and presents most commonly within 48 hours of dural puncture. It may be accompanied by neck stiffness, nausea, vomiting and photophobia. Occasionally it may last for one week, but has been reported to persist for one year<sup>1-3</sup>. Treatment includes simple oral analgesics, opioids, a high fluid intake, intravenous caffeine and sodium benzoate infusion<sup>4,5</sup>. An abdominal binder has also been found to be effective, but has not gained popularity<sup>6,7</sup>. Intermittent saline injections have been used in both prophylaxis and treatment of established PDPH<sup>8,9</sup>, However, the most effective method of treatment of moderate to severe PDPH, is

an autologous epidural blood patch (EBP). Nearly 90% of PDPH are relieved by the first autologous injection and a further 8% by a subsequent injection<sup>10</sup>. Long term follow—up has confirmed its safety.

## **Patients and Methods**

A total of 281 women aged between 20 and 41 years, who underwent LSCS, at the Maternity department of St. Peter's Hospital, Chertsey, Surrey (England), were studied, from October 1992 to May 1994. Informed consent was obtained from each patient after discussion about the different options of anaesthesia for LSCS, informing them of the advantages and disadvantages of each method. All patients choosing to have a spinal or epidural anaesthetic were specifically informed of the risk of PDPH and its treatment. Women with pre-existing headache, raised intracranial pressure, coagulation disorders, disease or severe deformity of the vertebral column, active neurological disease, localised or systemic infection, hypovolaemia and those with fetal distress were deemed unsuitable for a spinal or epidural anaesthesia. The technique includes lumbar puncture, with the atraumatic 25 gauge Polymedic needle with a tapering blunt tip and a side hole (Sprotte-like) and a 22 gauge introducer needle. The patient should be on a tilting table or trolley. An intravenous line established with a large bore cannula (16 gauge or 14 gauge), the blood pressure is monitored and resuscitation equipment is checked and at hand.

The midline approach was used in all the 125 spinal anaesthetics performed. The space chosen for lumbar puncture was either between the second and third or between the third and fourth lumbar vertebrae. In a 2 ml syringe, 1% lignocaine was used for infiltration of the skin. The exact volume of 0.5% heavy bupivacaine to be used (usually 2 to 3 mls), was drawn up in a 5 ml syringe to avoid confusion. The 25 gauge needle is very flexible and it is difficult to direct it accurately, if an introducer needle is not used. The introducer needle, also prevents contact of the spinal needle with the skin, therefore, reducing the risk of infection and implantation of the epidermis into deeper tissues. The introducer needle was inserted as far as the dura mater, the fine needle was then used to pierce the dura and the arachnoid. The correct position of the needle was confirmed by a flow of cerebrospinal fluid when the stylet was withdrawn. This takes time with a fine 25 gauge needle and occasionally aspiration is necessary. If no flow was obtained but it was felt that the needle had entered the subarachnoid space, the needle was rotated through 90 degrees or 180 degrees and further attempts made to obtain fluid, if the fluid was blood stained, time was allowed for it to clear, before injecting the bupivacaine. If it did not clear quickly, another puncture was made.

After cerebrospinal fluid was obtained, the syringe containing bupivacaine was attached. A small quantity of cerebrospinal fluid was aspirated before injection, to ensure that the needle was still in the subarachnoid space and bupivacaine injected at the rate of 1 ml per 10 seconds. The needle was then withdrawn and adhesive, plaster or plastic spray dressing applied to the puncture site. Once the local anaesthetic has been injected the block develops very quickly, so the patient was immediately placed in the appropriate position. A mid-thoracic block is required for a LSCS and hyperbaric solutions are preferred. Hypotension is inevitable and therefore, the patient was usually pre-loaded with a litre of Hartmann's solution. Ephedrine 30 mg diluted to 10 ml (10 mg per ml) was drawn up and injected in 1 to 2 ml boluses to treat hypotension. A wedge was placed underneath the patient's hips on the right side to tilt the pelvis and avoid aorto-caval compression. The dura was successfully punctured with the 25 gauge Polymedic needle in all the patients in the spinal anaesthetic needle group. Technical problems occurred in 4 patients and all were those of multiple punctures. The operators ranged from senior house officers to consultants. After the operation, the patients were monitored in the recovery room for an average 4 hours, before being shifted to their rooms. Opiates or Diclofenac 100 mg suppositories were administered for pain relief before the spinal wore off completely. The patients were allowed to mobilise in the evening, if the operation had taken place in the morning of the same day.

Post-operative fluid management was the same as that of LSCS under a general anaesthetic. Each patient was visited on the second or third post-operative day to check for postural headache aggravated by standing or straining and relieved by lying down. Headache severity was gauged by using a visual analogue scale ranging from 0 to 4. Zero being the absence of headache and 4 being the worst headache.

## Results

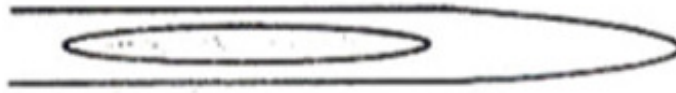
A total of 281 women underwent LSCS between October, 1992 to February, 1994, of these, 125 had a spinal anaesthetic, 93 general anaesthetic and 63 had lumbar epidural block. The women in the spinal anaesthetic group were aged between 22 to 41 years and their parity ranged from zero to four. None of the women in the three groups studied had PDPH, while 4 patients in the spinal anaesthesia group, did complain of headache; none had the characteristics of PDPH. Interestingly, none of the four patients who had multiple punctures, experienced headache.

## Discussion

Headache following a spinal anaesthetic depends on the type of patients, age group, spinal needle size and needle tip design. Vandam and Dripps<sup>2</sup>, studied over 10,000 spinal anaesthetics and found a PDPH rate of 7% in males and 14% in females. Women having a spinal anaesthetic for vaginal delivery had a rate of 22%. The high incidence was probably due to a combination of age and sex factors. Later studies have also confirmed that PDPH is commoner in women (40%), as opposed to (13%) men. There is decreased incidence with advancing age and PDPH is uncommon in those over 60 years. Obstetric patients are therefore, at high risk of headache, being female and under 40 years of age. Increasing needle size is associated with greater PDPH rate, presumed to be due to increased size of the dural hole and the consequent greater cerebrospinal fluid leak into the epidural space. This has been confirmed by many studies and has been reported to be as high as 36% with a 22 gauge needle and as low as 12% with a 26 gauge needle. Frequency of headaches with 29 gauge needles ranged from none to 1.4% and 3.7% with 26 gauge needles<sup>11-13</sup>. In 2 out of 18 patients in whom a 29 gauge needle was used by Fitzgibbon and Gradiner<sup>14</sup> PDPH developed which required a blood patch. However, as needle size decreases, technical difficulties increase. Ultrafine 30 gauge needles are technically difficult to use, identification of cerebrospinal fluid is elusive and frequently the spinal block is inadequate<sup>15</sup>. These needles are regarded unsuitable for routine obstetric use. There is probably little advantage to be gained from needles smaller than 26 gauge. Recently, blunt tipped needles (Sprotte, Whitacre, Polymedic) have become popular. They are alleged to part the dural fibres, as there is no cutting point and give rise to a small or no defect. Bevelled tips (Quinke tip) actually cut a hole in the dura and hence give a larger defect. The Polymedic needle is similar in design to the Sprotte needle, except that its side hole is wider and closer to the tip (Figure).



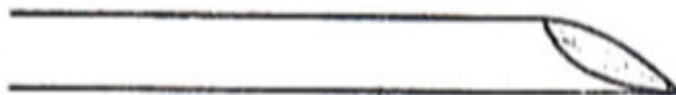
1. Polymedic Atraumatic spinal needle tip.



2. Sprotte needle tip.



3. whitacre needle tip.



4. Quinke needle tip.

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**Figure. Diagram to show the design of the needle tip of different spinal needles.**

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The lower incidence of headache associated with these atraumatic needles has been substantiated by several studies<sup>16-18</sup>. Hart and Whitacre found a lower incidence of headache with the 20 gauge Whitacre needle as compared to a similar size of a Quinke point needle. Recently, several smaller diameter Sprotte (24 gauge) and Whitacre (25-27 gauge) needles have been introduced and clinical studies have confirmed their ability to reduce the incidence of PDPH, without compromising the ease of administration of spinal anaesthesia<sup>19</sup>. Caesarini et al studied two groups of women who underwent LSCS under a spinal anaesthetic. In 55 women a 25 gauge diamond tipped Whitacre needle was used; in the other a 24 gauge Sprotte needle was used. There were no headache reported in the Sprotte group, while 8 patients (14.5%) in the Whitacre needle group developed headache and five of these required a blood patch. They concluded that Sprotte needle makes spinal anaesthesia an ideal obstetric technique, because of the almost complete disappearance of PDPH. This study with the 25 gauge polymedic needle, at St. Peter's Hospital confirms the benefit of the pencil point tip design for spinal anaesthesia. The 25 gauge Polymedic needle appears to be safe and satisfactory for performing spinal anaesthesia in obstetric patients, as in this study none of the women studied experienced a PDPH. The extra cost of the Polymedic and other atraumatic needles (nearly four times the cost of a Quinke tip spinal needle), is worthwhile in the high risk obstetric population, in whom a PDPI-1 could mar the first few days of motherhood. The greater price of these atraumatic needles, still compares very cheaply to the cost of a general anaesthetic for caesarean section.

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