



## Is Early Mobilization a Risk Factor for Postdural Puncture Headache (PDPH)?

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### Abstract

*Postdural puncture headache (PDPH) is a common but debilitating complication following dural puncture from spinal/ epidural anaesthesia or from procedures involving dural puncture. Several risk factors have been implicated in its causation. In environments where the economy of anaesthetic practice is important in considering the type of anaesthesia and the limitations in accessing the ideal devices for the maximum comfort of the patient, it is imperative to define any identified risk factor that may contribute to the causation of PDPH. In this study, we indirectly randomized the patients undergoing spinal anaesthesia for cervical cerclage using low doses of heavy bupivacaine and advised all the parturients to remain in bed after the procedure. 62 parturients who had single shot spinal anaesthesia for elective cervical cerclage at a fertility Centre were involved in the study. 29 (46.8%) of the parturients mobilized within four hours of instituting spinal anaesthesia and 33 (53.2%) parturients remained in bed for over 12 hours post spinal. For the parturients who mobilized early (within 4 hours), 16 (55.2%) developed PDPH while among those that remained in bed beyond 12 hours, only 7(21%) developed PDPH ( $P = 0.006$ ). The parturients all shared similar risk factors. This observation adds to the debate of the possibility of the link between early mobilization and the development of PDPH.*

### Introduction

There are several risk factors that are associated with PDPH and these include but not limited to the spinal needle type, number of punctures, female gender, age, previous incidence of PDPH, obesity<sup>1</sup> etc. The use of spinal analgesia is widely documented for surgical procedures involving the lower half of the body because of the advantages<sup>2</sup> it confers. The debate concerning preventive

measures that limit the onset of PDPH abounds and several assumptions have been published such as the effect of post-operative head down technique<sup>3</sup>, liberal fluid intakes<sup>4</sup>, early to delayed mobilization<sup>5</sup> and the experience of the anaesthetists<sup>6</sup>. The prevalence of PDPH is high with the commonly available Quincke spinal needle<sup>7</sup> which is cheaper and available in resource poor countries. While a prevalence rate of PDPH

of 6.0% was reported with the use of Whitacre needles<sup>8</sup>, the cost implication for the expensive Whitacre spinal needles influences its regular use and availability especially in resource limited places. The debilitating effects of PDPH on parturients have been widely reported<sup>9</sup>, and several interventions have been described to either prevent its occurrence or attenuate its deterioration. The list of medications, procedures and practices to ameliorate the intensity or relief of the headache increases daily.

As efforts are being made to reduce the occurrence of the headache and its debilitating effects, preventive measures may be untenable in some climes where the economics of spinal anaesthesia is a deciding factor in the choice of spinal needles. In our clime, it is almost a universal practice to advise parturients to remain in bed for much longer periods after spinal anaesthesia as an antidote to prevent the onset of Post dural puncture headache.

Ambulatory patients would obviously mobilize early for home readiness and spinal anaesthesia is commonly utilized in this respect. We experienced an incredibly high prevalence of PDPH in women who had single shot low dose spinal anaesthesia for cervical cerclage at a Fertility Center and ambulated early. This raises the question about the possible contribution of early ambulation post spinal anaesthesia to the causation of PDPH.

The aim of this prospective study was to determine if early ambulation after spinal anaesthesia for cervical cerclage was a risk factor for developing PDPH.

### Methodology

Ethical clearance was obtained from the management of a Fertility Centre located in the Niger Delta area of Nigeria where the study was conducted. All parturients, 18 years and above with no obvious contraindication for regional anaesthesia were included in the study while parturients who refused spinal anaesthesia and all those with contraindications to spinal anaesthesia were excluded. Parturient who presented at the

fertility clinic and required an elective cervical cerclage as part of the prophylaxis for premature fetal loss, were recruited and prepared for the procedure. At the fertility centre, cervical cerclage was not ambulatory practice; all parturients were admitted for a day. Pre-anaesthetic assessment was done on the day of the procedure, with detailed discussions about spinal anaesthesia, its side effects including the onset of post-dural puncture headache. This procedure was done using low dose of 0.5% heavy bupivacaine (7mg). The parturients were preloaded with 0.9% normal saline, 300-500mls depending on the level of dehydration after assessing the baseline vital signs. 25G Quincke spinal needles were the only available needles at the facility. The sitting position was adopted, the puncture sites were cleaned with chlorhexidine 1%, methylated spirit and draped for the insertion of spinal needle after local infiltration with 1ml of 1% lidocaine. 7mg (1.4ml) of heavy bupivacaine was administered. For cervical cerclage, the Modified Bromage score of 2-3 was accepted to define an adequate block for the procedure. Parturients with larger than 16weeks of gestation had left uterine displacement to reduce the risk of aorto-caval compression. The parturients were all advised to remain in bed for much longer time since they usually spend 24 hours post procedure to prevent Post dural puncture headache. The offset time of the motor block was expected at about 120minutes and the parturients were advised to remain in bed with little mobilization. Early mobilization was defined by Dagmar O et al<sup>10</sup> as sitting within 4 hours and /or walking within 12 hours post spinal anaesthesia. A single attempt was successful in all the parturients. And the authors were involved in the administration of spinal anaesthesia.

### Results

62 parturients were recruited for the study. Table 1 shows that the Mean age of parturients was 38.8 ±0.68 years. The mean gestational age in weeks was 13.3± 0.14. The mean duration of the surgical procedure was 11.85± 0.84 minutes. The mean

duration of anaesthesia was  $128.08 \pm 1.14$  minutes. The median of the maximal sensory level was T6 (interquartile range of 6-6). Table 2 shows that 29 (46.8%) of the parturients were mobilized within four (4) hours following the wearing off of spinal bupivacaine (Group M) compared to 33 (53.2%) who remained in bed for more than 12 hours (Group DM) ( $p = 0.472$ ). 16 (55.2%) parturients in Group M developed PDPH whereas 7 (21.2%) developed PDPH in Group DM ( $P = 0.006$ ).

**Table 1** Demographic and Anaesthetic data

Mean age of parturients (years)	$38.8 \pm 0.68$
Mean gestational age (weeks)	$13.3 \pm 0.14$
Mean duration of the surgical procedure (minutes)	$11.85 \pm 0.84$
Mean duration of anaesthesia (minutes)	$128.08 \pm 1.14$
Median maximal sensory level (interquartile range)	T6 (6-6)

**Table 2** Incidence of PDPH

	Group M	Group DM	p value
Number of parturient (%)	29 (46.8)	33 (53.2)	0.472
Developed PDPH (%)	16 (55.2)	7 (21.2)	0.006

## Discussions

The regular puncture of the dura for diagnostic and perioperative use makes postdural puncture headache inevitable. Some risk factors for the causation of PDPH are modifiable such as the needle type, experience of the practitioner, number of puncture times, and obesity. The other factors such as age, sex, pregnancy etc will still predispose patients to the debilitating effects of PDPH which occurs irrespective of the type of spinal needle type used; what reduces its prevalence is the association with the atraumatic needles<sup>11</sup>. The loss of cerebrospinal fluid is assumed to be the cause of the pathology from a defect in the dura resulting in intracranial hypotension<sup>11</sup>. The association between the size of the needle tip and the rate of CSF loss has been identified as an independent risk factor for PDPH<sup>8, 11</sup>. In most resource poor settings, the choice of the traumatic Quincke spinal needles which are cheaper, easily accessible with a bevel tip which ensures a greater CSF loss, is reported to be associated with a greater incidence of PDPH<sup>12</sup>.

Ahsan et al<sup>13</sup> reported a zero incidence while utilizing an atraumatic needle.

What is responsible for the discrepancies in the prevalence of PDPH in studies where the patients were all exposed to the same risk factors, same sex, all young, pregnant, not obese, and the same spinal needle type were used for the dura puncture? In the study by Mohammed et al<sup>12</sup>, the prevalence of PDPH was 15.2% whereas Nafiu et al<sup>14</sup> using the same spinal needle type (Quincke), same size and the same population had an incidence of 8.3%. Although this was adduced to the involvement of less experienced practitioners, in the report by Mohammed et al, the number of punctures were not documented to ascertain the exact reason for the high incidence of PDPH. Lubusky et al<sup>15</sup> also reported a high prevalence of 16.3% of PDPH in obstetric patients using Quincke spinal needle. While it is a known fact that PDPH is common in the age group between 18-40 years<sup>16</sup> which falls within the age bracket of our parturients and sex<sup>17</sup>, is there any defined contribution of early ambulation to the causation of PDPH. Vandam and Dripps<sup>5</sup> about six decades ago had reported that early ambulation could cause Post Dural Puncture Headache. Park et al<sup>18</sup> in their recent meta-analysis of the effects of the traditional 24 hour post spinal bed rest to prevent PDPH, did not find any significant benefit to reduce the prevalence of PDPH. In our study, the parturients who ambulated within four hours of spinal anaesthesia had a significant incidence of PDPH over those who rested much longer beyond 12 hours. Cook PT<sup>19</sup> did not report any significant change in the prevalence of PDPH, and Fassoulaki et al<sup>20</sup> observed a much higher incidence in recumbent patients. This raises the question of what could have been responsible for the discrepancies in these studies. Dawit et al<sup>21</sup>, in his magnitude of PDPH and associated factors in obstetric mothers argued that continuous spinal technique, and timing of patient ambulation did not increase the incidence of PDPH. Tajavanijas et al<sup>22</sup> in comparing a six hour supine recumbence following spinal anaesthesia and early ambulation

postulated that early mobilization decreases onset of PDPH. The debate still continues to define whether early mobilization or prolonged recumbence reduces or provokes PDPH.

### Conclusion

Early mobilization immediately the modified Bromage score is zero post recovery from spinal anaesthesia may be a major risk factor for PDPH although other authors have published a contrary view. The debate continues.

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