

## Post Spinal Headache (PDPH), Spinal Headache, Spinal Needle

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### ABSTRACT

**Aim:** To compare the frequency of postdural puncture headache (PDPH) using 25 and 27 gauge Quincke needles in a population of young patients undergoing caesarian sections under general anesthesia.

**Methods:** It was a prospective interventional study in which ninety patients were divided into two groups. Patient's age, ASA classification, nature of surgery (elective or emergency) and position (sitting or lateral decubitus) during induction of spinal anesthesia were recorded. The patients were interviewed first through third post-operative days about the occurrence of headache and their satisfaction regarding spinal anesthesia.

**Conclusion:** It was found that the proportion of patients with PDPH after 25 gauge Quincke needle was significantly more than those with 27 gauge Quincke.

**Keywords:** Spinal headache, spinal headache, spinal needle

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### INTRODUCTION

Spinal anesthesia is the technique of choice for Caesarean Section as it avoids general anesthetics. If surgery allows spinal anesthesia, it is very useful in patients with severe respiratory diseases e.g. COPD as it avoids complications related to intubation and ventilation. It may also be useful in patients where anatomical abnormalities may make endotracheal intubation very difficult. Common complications of spinal anesthesia are hypotension, spinal shock, postdural puncture headache (PDPH) or post spinal headache and abscess formation<sup>1</sup>. Postdural puncture headache is the most common late complication that should not to be treated lightly as it has potential for considerable morbidity<sup>2</sup> or even death<sup>3,4</sup>.

The first spinal analgesia was administered in 1885 by James Leonard Corning (1855–1923), a neurologist in New York. He was experimenting with cocaine on the spinal nerves of a dog when he accidentally pierced the Dura mater<sup>5</sup>. The first planned spinal anesthesia for surgery in man was

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administered by August Bier (1861–1949) on 16 August 1898, when he injected 3 ml of 0.5% cocaine solution into a 34-year-old labourer. They recommended it for surgeries of legs<sup>6</sup>, but later on gave it up due to the toxicity of cocaine. Carl Koller, an ophthalmologist from Vienna, first described the use of topical cocaine for analgesia of the eye in 1884<sup>7</sup>.

William Halsted and Richard Hall, surgeons at Roosevelt Hospital in New York City, took the idea of local anesthesia a step further by injecting cocaine into human tissues and nerves in order to produce anesthesia for surgery<sup>8</sup>. James Leonard Corning, a neurologist in New York City, described the use of cocaine for spinal anesthesia in 1885<sup>9</sup>. Dural puncture was described by Essex Wynter in 1891 followed shortly by Heinrich Quincke 6 months later<sup>10</sup>. Augustus Karl Gustav Bier, a German surgeon, used cocaine intrathecally on six patients for lower extremity surgery in 1898<sup>11</sup>. Spinal anesthesia became more popular as new developments occurred, including the introduction of saddle block anesthesia by Adriani and Roman-Vega in 1946<sup>12</sup>.

Anesthetists have been active in attempting to reduce the incidence of PDPH. Reducing the size of the spinal needle has made a significant impact on the incidence of PDPH. The incidence is 40% with a 22G needle, 25% with a 25G needle<sup>13</sup>, 2%–12% with a 26G Quincke needle<sup>14</sup>, and <2% with a 29G needle. However, technical difficulties leading to failure of the spinal anesthetic are common with needles of 29G or smaller<sup>15</sup>.

**MATERIAL AND METHODS**

After obtaining informed consent from the patients and written permission from the hospital ethical committee, ninety female patients of 20 to 38 years of age, undergoing caesarian sections were randomly distributed to either 25 or 27 gauge Quincke needle groups. It was a prospective study, carried out at Departments of Anesthesiology H H Sheikh Khalifa Bin Zaid Hospital/ CMH Muzaffarabad AJK and District Headquarter Hospital Mirpur AJK. The patients were divided into two groups. Group I was given spinal anesthesia with 25 gauge Quincke spinal needle and group two through 27 gauge Quincke spinal needle. Patient’s age, ASA classification, nature of surgery (elective or emergency) and position (sitting or lateral decubitus) during administration of spinal anesthesia were recorded. The patients were interviewed first through third post-operative days about the occurrence of headache and their satisfaction regarding spinal anesthesia. The severity of symptoms of PDPH was rated by the patients as mild, moderate and severe. The data was analyzed by using Chi-Square test by utilizing SSPS version 16.

Patients above class III (American Society of Anesthesiologists physical status class) were excluded from the study. Also those patients who required more than one prick were not included in the study.

**RESULTS**

In our study, most of the patients were less than 30 years of age. Mean age, height and weight of the patients and duration of surgery is shown in the table 1.

Table 1: Patient’s demographics and needle distribution

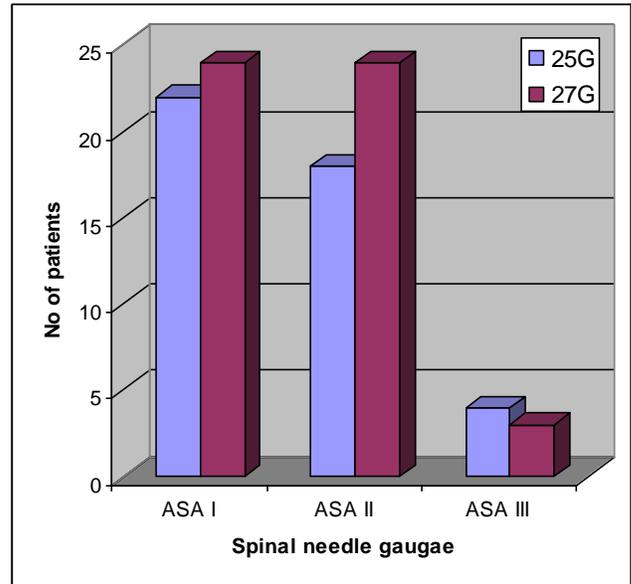
Variables	Group I	Group II
Number of patients	44	43
Age (years)	28±4.5	27±3.1
Height (cm)	158±8.1	164±5.7
Weight (kg)	70.6±8	72.1±2.9
Duration of surgery (minutes)	55.7±3	57.1±5

The ASA Grade of the patients is shown in Table 2. According to our study, maximum number of patients was in ASA I or II. Only 7 patients were in ASA III.

Table 2: ASA Grade of patients

ASA	n
I	46 (52.87%)
II	34 (39.08%)
III	7 (8.04%)
Total	87 (100%)

The categories of ASA grades in which different spinal needles were used are as shown in the bar chart.



Only two patients from group I (25G spinal needle) developed mild postdural puncture headache whereas no headache was reported in group II (27G spinal needle). In 25 G group (group I), 2 out of 44 patients developed PDPH (4.45 %), while no patient in 27 G group (group II) developed PDPH. 40 out of 44 patients in group I (90.90 %) expressed their satisfaction with spinal anesthesia. Among the four patients who were not comfortable with spinal anesthesia, two listed post-spinal headache and one cited intra-operative nausea and vomiting as the reason and one’s discomfort could not be explained. In the group II, all of the 43 patients (100%) expressed their satisfaction over spinal anesthesia.

Table 2: Incidence of post-spinal headache

Variables	Group I	Group II
Incidence	4.45%	zero
Patient’s satisfaction	90.90%	100%

**DISCUSSION**

We conducted this study on patients of younger age group who were going for Caesarian Section under spinal anesthesia. Mean duration of surgery was 57 minutes. Most of the international studies also concluded that it is not the age, duration or type of surgical procedure on which the post spinal headache depends. According to Cook TM and his team from Royal College of Anesthetists, it is a common and incapacitating complication following dura-arachnoid puncture, whether for the purposes of

diagnosis, therapy or spinal anesthesia<sup>16,17</sup>. However, there are studies present in the international literature which proved that age is one of the contributing factors on PDPH, though the effect is not very significant on post spinal headache. Patients at 20-40 years are most susceptible, whereas, the lowest incidence occurs after the fifth decades<sup>18,19</sup>. A greater risk of PDPH in the 31–50 years age range was also found by Wadud et al; In a study that compared patients below and above 50 years of age<sup>20</sup>. Other studies found a higher incidence of PDPH between the ages of 20 and 30 years<sup>21,22</sup>.

Turnbull DK, Shepherd DB mentioned that the incidence is directly proportional to the size of the needle. It is 40% with a 20 GA needle, 25% with a 25 GA needle, 2-10% with a 26 GA needle, and less than 2% with a 29 GA needle<sup>23</sup>. However Lybecker H and his team proved that factors like age, sex, pregnancy, previous history of post spinal headache, needle size, needle tip shape, bevel orientation to the dural fibers, number of lumbar puncture attempts, midline versus lateral lumbar puncture approach, position(sitting/lateral decubitus), type of local anesthetic solution, and clinical experience of the operator does have an effect on PDPH<sup>24,25</sup>. In contrast to this, Choi PT did a meta-analysis from 2010 to 2012 over 1000 patients on factors influencing PDPH. Their study showed that the size of spinal needle had the most significant effect on the incidents of PDPH. Their results did not show strong correlation with the position (sitting/lateral decubitus) of patient at the time of administration of spinal anesthesia<sup>26</sup>.

In our study, 52.87% of patients were generally very healthy and fit into ASA I and II. Only 7 patients (8.04%) were suffering from systemic diseases and belonging to ASA III. Mayer DC and his colleagues concluded that there is no difference in incidence of PDPH regarding emergency or elective operation or even day-case surgery<sup>27</sup>. The study conducted by Cook TM and his team included only ASA I,II patients however factors like diabetes mellitus, hypertension, chronic obstructive lung disease (control status), drug history did not have significant role in PDPH incidence, although in patients with history of anti epileptic drug consumption PDPH were more frequent. The above mentioned factors are mentioned in the literatures as increasing the risk of anesthesia in patients who suffered from coexisting diseases<sup>28-31</sup>.

We could not find any relative report about accompaniment of chronic disease and PDPH in the literature. The principal factor responsible for the development of PDPH is the size of the dural perforation. The other factors such as the shape of

the dural perforation and the orientation of the spinal needle have a less significant role.

Decreasing the gauge (G) of needle applied for spinal anesthesia may be a logical solution to decrease the incidence of PDPH. Therefore, a balance has been struck between the risk of PDPH and technical failure. Most experts agree that 25- 27 G needles probably represent the optimum needle size for spinal anesthesia however, technical difficulties are common when spinal block is attempted with needles of 29 G or smaller<sup>32,33,34</sup>.

## CONCLUSION

The most important factor influencing the incidence of PDPH is the size of dural tear which is related to the gauge of the needle used, therefore the use of 25-27 gauge needles is recommended as these are probably the most optimum sizes for administration for spinal anesthesia, although 29 gauge or even smaller spinal needle promise more satisfactory results but technical difficulties are common with needles smaller than 27 gauge with comparatively less technical difficulties of 29 G needle

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## CORRIGANDUM

The name of third author in an original article title **“Morphological study of reactive follicular hyperplasia lymph node”** published in April June 2014 issue of this journal on page No.398 is wrongly printed as Sadiq; while the exact name is Tanveer Sadiq, assistant professor surgery, Mohtarma Benazir Bhutto Medical College Mirpur AJK. This typographical error is regretted.