

## TAKING AMINOPHYLLINE AFTER A CAESAREAN SECTION DOES NOT PREVENT POST-DURAL PUNCTURE HEADACHE

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### Abstract

We aimed to investigate that whether intraoperative intravenous aminophylline is effective for prevention of postdural puncture headache after caesarean section or not. The study included patients over the age of 18 years. Anesthesia conversion to general anesthesia was required if the spinal anesthesia failed. The demographic data of the patients (age, weight, height, and physical status), comorbid diseases, intraoperative intravenous aminophylline use, as well as the number of spinal puncture attempts and presence of postdural puncture headache were collected. There were 75 records in total (40 in the aminophylline group and 35 in the control group) of patients who met the inclusion criteria. 15 percent of the aminophylline group (n=6) and 13 percent of the control group (n=9) developed postdural puncture headache. Postdural puncture headache frequency and number of attempts did not differ between groups ( $p>0.05$ ), nor did age, body weight, height, Society of Anesthesiologists physical status, and comorbid diseases. The use of intravenous aminophylline during spinal anesthesia performance was not associated with postdural puncture headache occurrence ( $p>0.05$ ). Postdural puncture headache incidence following caesarean section was not affected by intraoperative intravenous aminophylline administered during spinal anesthesia.

**Keywords** Aminophylline, Caesarean, Postdural puncture headache, Intravenous

### Introduction

Patients may experience postdural puncture headache (PDPH) as a result of spinal anesthesia, which has a range of occurrence of 0-36%, and it is severe enough to have a negative impact on their everyday lives [1]. It was August Bier, who was the first practitioner of spinal anesthesia, who reported the first occurrence of PDPH caused by spinal anesthesia [2].

PDPH is caused by a decrease in the systemic pressure of the cerebrospinal fluid (CSF) caused by the loss of CSF from the spinal needle entrance point [1]. There are two possible mechanisms that can be explained by these two situations. A decrease in CSF pressure causes tension in intracranial structures that causes headache. In addition, headache can be caused by venodilation as a result of a decreased CSF volume compensated by a higher blood volume [3].

The medications used for preventing PDPH were the subject of a meta-analysis released recently. Intravenous aminophylline practice is associated with a reduced frequency of PDPH, they concluded. There is a possibility that aminophylline's pharmacological effects may be transient for preventing PDPH. In other words, it cannot influence the development of PDPH. We investigated whether intravenous aminophylline, a pharmacological method applied in current anesthesia practice from time to time in the prevention of post-discharge hypotension, is effective for this purpose.

## Materials and Methods

Files of patients who underwent caesarean operations, records of intraoperative anesthesia, and hospital automation system records were retrospectively scanned after ethics committee approval. All patients who were to participate in the study provided informed consent during the control examinations. An analysis was conducted on records of patients over 18 years undergoing caesarean sections under spinal anesthesia. The study excluded patients who underwent deep sedation or general anesthesia during any phase of the operation due to spinal anesthesia failure, those who were obese, those who had chronic headache, and those who regularly consumed analgesics or took medications like aminophylline.

Furthermore, patients who received combined spinal-epidural anesthesia were excluded from the evaluation. PDPH is diagnosed using the diagnosis criteria developed by the headache classification committee of the International Headache Society [6].

Additional information included chiropractic spine needles, frequency of application, ASA physical status classification, use of intravenous aminophylline after clamping of the umbilical cord following baby delivery, as well as the development of PDPH, in addition to the written or electronic records.

**Table 1: Anesthesia attempts, postdural puncture headache frequency, and patient characteristics**

	<b>Aminophylline groupn=40</b>	<b>Control groupn=35</b>	<b>p</b>
<b>Age(Year)</b>	32±8.6	26±5.9	0.3
<b>Weight (kg)</b>	70±5.6	71±4.9	0.05
<b>Height(cm)</b>	165.0±3.9	164±4.4	0.4

<b>ASA</b>	<b>I</b>	65(84%)	58(79%)	0.3
	<b>II</b>	9(12%)	12(17%)	
<b>Comorbidity*</b>	<b>No</b>	62(79.9%)	60(83.8%)	0.6
	<b>Yes</b>	35(17.6%)	38(14.9%)	
<b>AttemptNo</b>	<b>1</b>	52(66.9%)	44(61.7%)	0.5
	<b>2</b>	18(23.6%)	21(29.8%)	
	<b>3</b>	4(6.3%)	4(6.7%)	
<b>PDPH</b>		12/80	9/69	0.6

**Table 2: Correlation between variables related to postdural puncture headache**

	<b>r</b>	<b>p</b>
<b>Age</b>	-.05	0.47
<b>Weight</b>	-.05	0.5
<b>Height</b>	.1	0.2
<b>ASA</b>	-.06	0.4
<b>Comorbidity</b>	-.02	0.8
<b>AttemptNumber</b>	.03	0.6
<b>ApplicationofAminophylline</b>	.1	0.2

### Statistical analysis

A statistical analysis was performed using SPSS 16.0 for the Social Sciences. Kolmogorov-Smirnov Z tests were used to determine normality, and Levene and Welch tests were used to determine homogeneous variances. In order to compute a mean, a standard deviation, median, or percentage was taken into consideration. We used independent sample tests to determine whether there was a difference between groups and Mann-Whitney tests to determine the correlation between variables. We also used Spearman's Rho correlation test to determine if there was a correlation between variables. The significance level was accepted at P 0.05.

### Results

An analysis of 75 cases of spinal anesthesia was conducted. During the analysis, five patients were excluded because they were given general anesthesia due to spinal anesthesia failure. There were 75 patients in the study whose ages ranged from 17 to 51, their weights ranged from 56 to 87 kg, their heights ranged from 154 to 172 cm, and their BMIs ranged from 29 to 31 kg.m<sup>2</sup>. There were 124 patients who did not have comorbidity and 80 patients were administered spinal anesthesia on their first attempt (n=98, 65.8%). There were 53.6% of patients who received 1.5 mg.kg<sup>-1</sup> intravenous aminophylline (53.6%), 69 patients (46.4%) were not given aminophylline or any prophylactic drugs, and 21 patients developed PDPH (13% in groups receiving intravenous aminophylline and 13% in groups receiving control drugs).

The same experienced anesthetist administered spinal anesthesia to all patients with the same 25G Quincke spinal needle for 2 mL 0.5% hyperbaric bupivacaine at the interval L3-4. The number of attempts, comorbidity, the ASA physical status and PDPH did not differ significantly between patients who were given intraoperative intravenous aminophylline or who were not (Table 1,  $p>0.05$ ). It could not be determined whether spinal anesthesia and variables related to PDPH patients were correlated (Table 2,  $p>0.05$ ).

## Discussion

It is common for spinal anesthesia patients to suffer from postdural puncture headache, which can negatively affect their quality of life and increase treatment cost. Consequently, many medications were used as prophylactics in preoperative or intraoperative settings to prevent PDPH. Caffeine, dexamethasone, indomethacin, and aminophylline are among the medications involved in this treatment [7-13]. A three-dose regimen of oral caffeine was studied in two published studies: 75, 125, and 300 mg [7,8]. The combination of caffeine and paracetamol was not found to be effective, and caffeine alone was not found to be effective. PDPH cannot be treated effectively by either rectal indomethacin or intravenous dexamethasone. Methylxanthine derivation has not been explained in detail exactly how headache is prevented [13]. Aminophylline, however, may cause cerebral vasodilation through its effects on central nervous system function [5]. There have been studies that have used aminophylline for PDPH prevention showing that giving 250mg aminophylline with caffeine and magnesium together didn't affect PDPH incidence when administered intravenously. 75 patients with caesarean sections were enrolled in this study and received medications postoperatively.

Prophylaxis with intravenous aminophylline has been found to be effective in other studies involving pregnant women [5]. After the infant was born and the cord clamped, aminophylline was administered intraoperatively in a dose of 1mg kg<sup>-1</sup>. Accordingly, aminophylline significantly reduced headache incidence during the 24- and 48-hour period. Nevertheless, our research found that the headache incidence observed in patients who applied aminophylline was not different from that of patients who did not. Prophylaxis with aminophylline had no correlation with headache incidence.

Furthermore, 1.5mg.kg<sup>-1</sup> aminophylline was observed to be more effective than placebo in treating patients after lower extremity surgery (n=34). Incidences of PDPH ranged from 5.88% to 42.85%. Using a 23G Quincke spinal needle, the researchers conducted their study. Additionally, aminophylline was administered 15 minutes before the end of the operation. Our research used a 25G Quincke spinal needle to administer spinal anesthesia. This is why we observed an incidence of 14.1% for PDPH. To conduct our study, we included 75 patients. The study included 75 patients in total, but only 69 patients received aminophylline or placebo. The intraoperative period also included the administration of 1.5 mg.kg<sup>-1</sup> of aminophylline. We drafted a similar research to what was published [5].

Our research was limited by a small number of samples. In addition, different populations of patients were involved in the study. Also, only one sex was examined because of caesarean section patients.

## Conclusion

It was our opinion that intravenous aminophylline was not effective in reducing PDPH during the intraoperative period. Nonetheless, there is a need for more comprehensive randomized controlled trials covering a greater number of subjects.

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