Effectiveness of Single Dose Intravenous Aminophylline Administration on Prevention of Post Dural Puncture Headache in Patients Who Received Spinal Anesthesia for Elective Cesarean Section

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Abstract: Post dural puncture headache is a relatively common complication in spinal anesthesia, so several kinds of regimens has been suggested for treatment of this problem. The aim was to determine whether single dose of intravenous aminophylline (1-1.5-mg/kg) can decrease the incidence of this complication in cesarean section or not. So in a double blind randomized study, 120 patients undergoing spinal anesthesia for the elective cesarean section, participated. After cord clamping, 1mg/ kg aminophylline injected intravenously in 60 patient but others didn't receive it. At 1st, 4th, 24th and 48th hours after operation, these 120 patients evaluated for Post dural puncture headache. Data was analyzed statistically by independent T-test and chi-square between two groups. Results showed that the incidence rate of post dural puncture headache is significantly lower than control one (5% vs 23.3%, P<0.001) and severe headache after 48 hours was 3 and 11% respectively. It seems that the incidence of post dural puncture headache decreases in those patients who received single dose intravenous aminophylline after cord clamping. The article can potentially help clinicians to use different combinations of effective drugs for preventing pains instead of curing them.

Key words: Spinal Anesthesia • Cesarean Section • Aminophylline • Post Dural Puncture Headache

INTRODUCTION

One of the relatively common complications of spinal anesthesia is post dural puncture headache that its incidence has been reported up to 70% [1]. Post dural puncture headache (PDPH) is a kind of headache that worsens by standing up and dwindles with recumbency. methods are used for the headache treatment such as Methylxantines (e.g caffeine and theophylline). Probably vascular expansion caused by returning the lost cerebrospinal fluid (CSF) can be the main cause of the headache. It seems that Methylxantines’ derivations lead to vascular contraction and can reduce the headache. On the other hand, these drugs may decrease the headache by blocking the purine receptors. Vasopressin, Sumatriptan and ACTH were used in the treatment of such headache [2-6]. Continuous injection of pain relieving agents through spinal catheter and keeping the catheter for 12-20 hours can decrease the incidence of PDPH [7-8]. One of the preventive methods for reducing PDPH is to use small gauge needles (≤25) or pencil-point needles. Bed rest, pain relieving agents and intravenous fluid administration are among other therapies. For the treatment of mild headaches, reducing activity, pain relieving agents and methylxantines are also effective. Furthermore Methylxantines and Epidural Blood Patch (EBP) are promising agents for the treatment of PDPH.

Although Epidural Blood Patch is one of the most effective treatment methods for PDPH [6, 9], pharmacologic management is less invasive method in comparison with EBP. Epidural injection of NaCL 0.9% or dextran is used as an alternative when the EBP is unsuccessful or contraindicated [10].

This was demonstrated that intravenous tiapride-which is a dopamine antagonist drug with anti psychosis activity -can decrease PDPH incidence in comparison with the placebo group [11].

In the other hand, Theophylline which causes the contraction in cerebral veins has beneficial effects on PDPH treatment [12]. The present study was designed to evaluate the effectiveness of single dose intravenous aminophylline administration on prevention of Post Dural Puncture Headache in patients who received spinal anesthesia for elective cesarean section.
MATERIALS AND METHODS

In this double-blind randomized study (patient and researcher), there were 120 patients undergoing elective cesarean section as participants. The purpose and design of the trial was explained to all the patients when they were alert before they gave informed written consent. After performing the spinal anesthesia, the patients were randomly divided into two groups with an accidental allocation. The age range of participants was between 18-36 years. The patients who have headache, psychiatric problems, back pain, preeclampsia, coagulation disorders, convulsion background, spinal anesthesia history and those who used any kinds of opiates were excluded from the study.

Needle No.23 used for the spinal anesthesia. The selected location for spinal anesthesia was intervertebral space at L3-L4. Then 2cc Lidocaine 1% used for skin anesthesia. After this, a combination of 55 mg lidocaine 5% and 5 mg mepridine were used for spinal anesthesia. The cesarean section was performed after the fixation of anesthesia in T4 level. After the child birth and umbilical cord clamping, 1mg/kg aminophylline injected intravenously with cardiac monitoring in the patients of the case group.

In case of hypotension in both groups, 5 mg ephedrine was intravenously utilized. In both groups, the patients rested 24 hours after operation and then started walking. The patients were asked about having headache 1, 4 and 24 hours after their exit of the operation room and 48 hours after operation. The questioner did not know anything about the intervention and just trained to examine the headache existence in the patients. All the variables in both groups were collected in a questionnaire and analyzed by SPSS version 17. Independent T-test and chi-square were used for data analysis in the study.

RESULTS

There were 60 patients in the case group with the age of 18-36 years, weight 65-110 kg, height 150-170 cm and 60 patients in control group with the age of 18-36 years, weight 56-110 kg and height 145-170 cm as the study participants. The demographic characteristics of the patients are shown in Table 1. In 1 and 4 hours after operation, 1 and 2 cases of headache were reported respectively which were not statistically significant. The headache disappeared after few hours. In case group which used intravenous aminophylline, 3 of patients (5%) developed headache in 24 hours after operation. In control group that was not received aminophylline, 19 (31%) patients were reported with the headache which is statistically significant (P <0.001). The headache incidence in the case and control groups was respectively 3 patients (5%) and 14 patients (23.3%). This was statistically significant (P<0.004). Table 2 shows the headache incidence in the case and control group during 24 and 48 hours after operation.

DISCUSSION

The results of the study indicated that, although methyxantines is effective in treatment of PDPH, it may effectively use in prevention and reduction of the headache too. Further investigations are needed to generalize the results of this study to different conditions.
CONCLUSION

There are few researches on the methylxantines effectiveness on Post Dural Puncture Headache (PDPH) management. In one study, the effect of theophylline in the treatment (not prevention) of PDPH was examined (abstract published) [13]. Feuerstein et al. reported the positive impact of theophylline on headache reduction. Their results showed that from 11 patients with PDPH, the headache in 6 patients received oral theophylline reduced more in comparison with other 5 patients that was taken placebo [14].

Another study showed that using 500 mg intravenous caffeine sodium benzoate resulted in improvement of headache to%90 of the patients, on the contrary, only %63 of those received placebo got better [15].

The results gained from other researches on the efficacy of oral metergine 0.25 mg, 3 times per day for 48 hours performed on 25 patients with PDPH demonstrated that 24 patients were relieved and just one of them needed Epidural Blood Patch [16].

In Halker and et al. survey, the effectiveness of intravenous caffeine in the PDPH treatment was studied and the author mentioned that despite the small sample size, this method can prevent headache [17]. Camman et al., compared the severity of headache after drug receipt, 4 and 24 hours after Lumbar Puncture by the visual analogue pain scale in two groups received oral caffeine and placebo. This showed the significant difference in regard to headache severity in both groups. The author concluded that caffeine, even temporary, may cause PDPH reduction [3].

Baumgarten in another study pointed to the role of caffeine in headache treatment in 70-75% cases [18].

More over intravenous aminophylline 5-6mg/kg per 20 min or oral theophylline 300mg each 6-8 hours can be effective in the improvement of such headaches [19-20]. As it is obvious, all these researches emphasized on the effectiveness of methylxantines derivatives on the reduction of PDPH.

Results of the present study showed that the headache incidence in the case group was less than the control one (3 patients versus 19 patients). It seems that, this statistically significant difference between these arms can determine the effectiveness of methylxantines in the reduction of PDPH.

At the same time the limitations of this study should be taken into consideration. Although the mean age of the patients in both groups is relatively similar, the mean height in case group is 6cm more than control group. Also the mean weight in case group is 5 kg more than control group. These background differences may cause changes into our conclusion. Although the data collection performed by a trained nurse that did not know anything about the intervention, the other stages of the study were performed by the doctors who knew the whole project and it may cause bias in the study.

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