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Effects of Age and Gender on Post Dural Puncture Headache

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Abstract: Post dural puncture headache is one of the most disturbing problems for patients in the post-operative process. When planning spinal anesthesia, age, and gender characteristics are of great importance in taking precautions against possible headaches. Our study retrospectively evaluated the proportions of age and gender characteristics in patients with headache symptoms after spinal anesthesia. We evaluated 43 patients who applied to our clinic with post-spinal headache between January 2016 and December 2018 and whose diagnosis was confirmed after examination and diagnostic. Considering the headache rates after spinal anesthesia, female patients were more (24 or 55.8%). The male population's average age in the groups was older (38.37 ± 11.10 vs. 31.96 ± 6.96 yr, mean ± SD; P = 0.026) has emerged. In our study, more post-dural puncture headache was found in young and female patients. In the light of these data, we think that our colleagues will be more likely to recognize patients who have the potential to develop headaches in patients undergoing spinal anesthesia.

Keywords: Dural Puncture, Age, Gender

Özet: Spinal anestezi sonrası baş ağrısı, hastalan post operatif süreçte en çok rahatsız eden problemlerden biridir. Hastaların spinal anestezi planlaması yaparken yaş ve cinsiyet özellikleri, oluşabilecek baş ağnsına karşı önlem almada büyük önem arz eder. Biz de çalışmamızda retrospektif olarak spinal anestezi sonrası bağ ağrısı semptomları olan hastalarda yaş ve cinsiyet özelliklerinin oranlanın değerlendirdikOcak 2016 ile Aralık 2018 arasında kliniğimize spinal sonrası baş ağnsı ile başvurmuş ve muayene ve tetkik sonrası tanısı kesinleşmiş 43 hastayı değerlendirdik. Spinal anestezi sonrası baş ağnsı oranlarına bakıldığında bayan hastaların daha fazla olduğu (24 or 55.8%) ve gruplar içinde de erkek popülasyonun yaş ortalamasının daha yaşlı olduğu (38.37±11.10 vs. 31.96± 6.96 yr, mean ±SD; P = 0.026) ortaya çıkmıştır. Çalışmamızda genç ve bayan hastalarda daha fazla oranda spinal sonrası baş ağnsı saptanmıştır. Bu veriler ışığında meslektaşlarımızın spinal anestezi uygulanacak hastalarda baş ağrısı oluşabilme potansiyeli olan hastalan daha rahat tanıma olasılıklan olacaktır diye düşünmekteyiz.

Anahtar Kelimeler: Dural Ponksiyon Sonrası Baş Ağrısı, Yaş, Cinsiyet

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INTRODUCTION

Gender and age in the development of post dural puncture headache (PDPH) is believed to be an independent risk factor. There is an incidence of PDPD, which was higher in young patients as a factor of age. (1) Some data in the anesthesiology literature indicate that there is no significant difference in the incidence of PDPH in terms of gender in some studies. (24) However, other random data suggest that women may have a higher incidence of PDPH than males (7.4% females, 3.4% males). (5) There may be several reasons why females have a higher incidence. It is accepted that women have a higher incidence of headaches, such as tension-type and migraine. (6, 7) There may also be differences in pain sensation processing, nociceptive information in women greater sensitivity to experimentally induced pain and mechanically, it aroused more pain. (8-10)

Finally, some data have also suggested that sex hormones may affect the incidence of some instances. (7, 11) Due to some studies' inconsistencies, we aimed to determine the effect of age and gender on PDPH in our study.

MATERIALS and METHODS

The archives of Konya Training and Research Hospital's database was searched from January 2016 to December 2018. The database was searched for all patients containing post- dural puncture headache, which yielded 43 patients. Our study is a retrospective case study that was performed according to the Declaration of Helsinki, approved by the ethics committee of Karatay University, Scientific Research Board (Ethics committee decision number:41901325-050.99). PDPH was defined as a headache occurring after a lumbar puncture that was postural. Inclusion criteria included randomized patients that evaluated only adult patients, and where the incidence of PDPH data was available for both genders. And, the other inclusion criteria included patients that were older than 18 ages. Exclusion criteria included patients whose definition of PDPH was unclear *(i.e.,* did not indicate a postural component of the headache). Only one gender was studied (e.g., parturients), the separate incidence of PDPH for the younger than 18 ages were not available. Our study also excluded patients performing the incidence of PDPH after a continuous spinal catheter.

Data *(e.g.,* number and mean age of males and female patients and ages) were collected, and results were recorded. The overall incidence of PDPH (weighted for patient observations) after lumbar puncture between male and female patients were compared. Also, age groups were compared as three patients (18-39 ages, 40-64 ages, and older than 65 ages). The level of significance for all tests was set at a level of 0.05. Demographic data were compared with chi-square (needle size and shape) and *t-tests* (age). A fixed-effects model was used. All statistical analyses *(i.e.,* determination of the pooled estimate, test for heterogeneity) were performed with SPSS 22.0 (SPSS Inc., Chicago, IL). After the data compilation was complete, we performed further analyses to assess the validity of our conclusions.

RESULTS

Our search resulted in 43 patients. There were 19 male and 24 female patients in the data. A total of 12 patients were rejected for the following reasons: 8 did not include an adequate definition of PDPH (i.e., did not indicate a postural component of the headache), 4 were pediatric patients. Table 1 shows the characteristics of the patients who were PDPH. There were more female (24 or 55.8%) than male (19 or 44.2%) patients. Overall, male patients were significantly older (38.37±11.10 vs. 31.96± 6.96 yr, mean±SD; $P = 0.026$) than female patients.

There were three different age groups: 18-39, 40-64, older, 65 ages. The patients included a definition of PDPH were significantly younger as the 18-39 ages group (32 or 74.4%), The 40-64 ages group were less (10 or 23.3%), and the last group as the older than 65 ages had the least rate (1 or 2.3%).

Figure 1 shows the pooled estimate of all included patients as a histogram chart. The odds ratio of a male patient developing a PDPH *versus* a female patient was 0.65 (95% confidence interval, 0.8H0.44), i.e., female patients have higher odds of developing PDPH compared with male patients.

DISCUSSION

The extent of gender and age as an independent risk factor for the development of PDPH is not clear. (1, 2) We performed a study to determine the effect of age and gender on the incidence of PDPH. Female patients had significantly higher odds of developing PDPH than male patients. This finding occurred even though male patients overall were substantially older. Although it is not apparent why young and female patients would have a higher incidence of PDPH, there may be several physiologic, anatomical, or psychosocial possibilities to explain the higher reported incidence of PDPH in young and female patients.

A direct relationship was found between age and incidence of PDPH. Patients under the age of 40 experienced a significantly higher rate of PDPH Ghaleb et al. had found that the incidence of PDPH was higher in the patients aged between 18 and30 years. (3) Pelvic et al. (4) enrolled 776 patients between the ages of 20 and45, and a 25 G spinal needle was used. It was found that PDPH occurred more frequently in younger generations. Chan et al. (5) found the incidence of PDPH to be 13.9% using a 25 G Quincke needle study that enrolled 101 patients with a mean age of 33.6 years; they emphasized in this study that PDPH is seen more frequently in younger patients. Contrarily, Schmittner et al. (6) reported that PDPH was seen in a patient group with a mean age of 42.3, whereas PDPH was not seen in another group of patients with a mean age 46.8. They determined that no significant differences were found in terms of PDPH incidence in different age groups. Further, in another study in which 361 patients had elective C/S surgery, the correlation between age and PDPH was researched, and no significant differences were found. (7)

In our study, we have found that the patients included a definition of PDPH were significantly younger in the 18-39 ages group (32 or 74.4%),

Female patients seem to process nociceptive information differently than male patients. Although this topic is complex, it appears that female patients generally exhibit greater sensitivity to experimental noxious stimuli than males. (8-10) Females also have the higher temporal summation of mechanically evoked pain, indicating that females may demonstrate a greater degree of central sensitization than males. (11) Gender differences in cerebral activation patterns in response to noxious stimuli are also noted, with females having greater activation of the contralateral prefrontal cortex, an activation pattern associated with increased pain perception. (12, 13) In addition to gender differences in nociceptive thresholds and processing, psychosocial factors may contribute to some of the differences seen in experimentally induced pain. (14) Postoperatively, females report a higher incidence of headache and pain despite possibly having a more significant analgesic response to opioids thanmen. (15-17)

Therefore, both biologic and psychosocial factors may contribute to the differences in pain perception, which may in part explain the increased incidence of reported PDPH in female patients in our study. There are other reasons why females might hypothetically report a higher incidence of PDPH.

Vasodilation of the cerebral vessels occurs typically in patients with PDPH as a homeostatic mechanism to compensate for cerebrospinal fluid loss and may theoretically contribute to the severity of PDPH. (18-20) Gender differences in the cerebral vasodilatory response are present, with premenopausal females exhibiting significantly greater vasodilatory response to acetazolamide than males or postmenopausal females. (21, 22) In addition, the incidence of PDPH seems to increase in females relative to male patients after the onset of puberty. (23) Estrogen has been shown to mediate cerebral artery tone and may dilate cerebral pial vessels. (24) Finally, younger (aged 30-40yr), presumably premenopausal women have a significantly higher cerebrovascular reactivity than older women (aged 50-60 yr) and men. (24)

Our study had some limitations. For our study, we could not obtain the spinal needle size and type applied to possible patients because this was not recorded in the relevant data. It would be more meaningful for us to evaluate patients with this information that we will receive intra-operatively. In addition, if we included headaches for which we made the differential diagnosis, we would have the opportunity to compare those with and without PDPH in our study.

In summary, as a result of our systematic examination, it was found that PDPH was higher in the young age group and the female gender. Our analysis does not allow us to determine the rationale behind these findings. Still, we believe that our study in young and female patients may guide our colleagues in the post-operative follow-up.

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