Original Article

Epidemiological Profile of Acute Low Back Pain in Operated Patients Under Spinal Anesthesia in Kashan University of Medical Sciences' Teaching Hospitals in 2019

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Abstract

Aims: According to the global burden of disease study 2019, low back pain (LBP) is among the top ten high-burden diseases and injuries. As a common complication of spinal anesthesia, this study aimed to consider the incidence of LBP and related factors in operating patients under spinal anesthesia in Kashan University of Medical Sciences' (KAUMS) hospitals in 2019. **Materials and Methods:** During a cross-sectional study, patients who underwent surgical procedures under spinal anesthesia at the teaching hospitals of KAUMS in 2019 were evaluated. Needed information about surgery and anesthesia was retrieved from the medical records. In addition, information about LBP was extracted from patients' records as well as telephone calls. Using SPSS for statistical analysis, $P < 0.05$ was considered statistically significant. **Results:** During the study period, the total number of 460 surgical patients were considered. Among them, 290 were men (63.0%) and the mean age of participants was 38.6 ± 6.2. The incidence of LBP among study participants was 47.6%. Regarding sex, women were 2.8 times more likely to develop a backache than men (odds ratio = 2.8, 95% confidence interval: 1.8–4.8, $P < 0.001$) after spinal anesthesia. The highest frequency of pain was seen in gynecologic surgeries, lateral position, and ages 26–44 years. **Conclusion:** The incidence of LBP after spinal anesthesia was 47.6% and it was significantly associated with age (mostly in 26–44 y), gender (higher in women), type of surgery (higher in gynecologic procedures), and surgical position (higher in lateral position).

Keywords: Epidemiology, incidence, low back pain, spinal anesthesia

Introduction

Worldwide, low back pain (LBP) has a high prevalence and morbidity and affects up to 84% of the world population in their lifetime.[1] Furthermore, the costs of this problem for society are high because of work absence and to some extent due to health-care resources used for pain therapies. In addition, quality of life of patients seriously affected and also they experience limitations during their physical activity.[2] In a series of more than 1000 patients, backache following previous spinal anesthesia was the main cause for refusing the next spinal anesthesia.[3] Spinal anesthesia is a common method of anesthesia that can be easily performed by the anesthesiologist. This type of anesthesia has a rapid onset and provides proper pain control when relaxing the muscles in outpatient and many routine surgeries.[4] Studies show that spinal anesthesia significantly reduces mortality, for example, it is reported that the probability of maternal death in cesarean section under general anesthesia is 16 times higher than spinal anesthesia, so this method is commonly used in cesarean section.[5,6] It is

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also commonly used in lower limb orthopedic and urological surgeries.[5,7] A series of studies have been performed on the complications of spinal anesthesia and LBP is known as one of its common complications.[8-10] In different studies, the prevalence of LBP due to spinal anesthesia has been reported between 2.5% and 54%.[11-13] The back area has a complex structure that includes a network of bones, joints, muscles, fascia, ligaments, and nerves. The source of traumatic back pain can be any of the above factors or a combination of them. According to a study, 25% of patients experience LBP after surgical operation with any type of anesthesia, and the source of it is not diagnosed in 85% of cases.[14] Although the factors affecting the incidence of LBP after spinal anesthesia have not been determined precisely, but in various studies, several factors have been suggested in the pathogenesis of postspinal LBP such as age, sex, type of surgery, duration of surgery, duration of immobility, the position during the operation, the number of attempts to spinal puncture, the patient's weight, and transfer of patients between operating table to stretcher.[6,15,16] In various studies, however, there is a consensus on the development of back pain caused by spinal anesthesia; although the prevalence varies from study to study, there is no agreement on the factors associated with such pain.[14] Postoperative back pain has negative impact on the patient's quality of life and on the other hand, it also may have psychological effects on the patient and his family. In addition, it may impose high financial costs on families and society.[17,18] However, it is assumed that by determining the frequency of post-spinal LBP and risk factors in patients undergoing surgery in our teaching hospitals, stakeholders encourage to reduce its prevalence by controlling risk factors.

Materials and Methods

This was a cross-sectional study. The target population of this study was patients referred to the operating rooms of the teaching hospitals of Kashan University of Medical Sciences (KAUMS) (Shahid Beheshti, Naghavi) during 2019–2020 who underwent spinal anesthesia. The study commenced after receiving approval by the Institutional Review Board (Ethical Code no: IR.KAUMS.REC.1398044).

Study population

Patients aged >16 and <85 years who underwent surgical procedures under spinal anesthesia at the teaching hospitals of KAUMS from March to October 2019 were included the study. Since the following factors may be confounders for the outcome parameter, they were considered as exclusion criteria: Patients with a history of LBP, those who had received a drug other than bupivacaine for anesthesia, patients with a history of previous spinal anesthesia, and cases who could not be reached by telephone, or who had died.

Sample size calculation

The sample size was calculated based on expecting incidence of 29% for back pain[19] at the 95% confidence level, $\alpha = 0.5$ and $d = 0.05$.

Study design and data collection

This cross-sectional study was performed based on exciting data. Needed information was retrieved from the medical records of the patients, including gender, age, weight, height, occupation, type of surgery, position during the surgery, duration of surgery, and puncture site. In addition to the demographic characteristics, the patients' telephone numbers were also extracted from the patients' profiles, so that it could ask them about the LBP after discharging from the hospital or in the case of misregistration of medical records. Therefore, information about LBP was extracted from patients' records as well as telephone calls. In this study, LBP that lasted <4 weeks was considered as acute.[20] The data were collected by two anesthesia technicians who were trained for this reason. The data collection process was regularly supervised and followed up by the chief researcher. To ensure the quality of the data, during the data collection period, the collectors were closely monitored, and at the end of the data collection process, the data were checked manually for completeness.

Data analysis

Descriptive statistics were used for the presentation of the data. Chi-square tests were performed to compare sex, spinal puncture level, position of intervention, educational status, patients' profession, type and duration of surgery, and surgical position.

Results

In the present study, the total number of 460 surgical patients were considered. Among them, 290 were men (63.0%) and the mean age of participants was 38.6 ± 6.2. Most participants, 135 (29.3%), underwent orthopedic surgery and the highest number 267 (58%) of them belonged to the age group of 25–44 years [Table 1]. The overall incidence of postanesthesia

Table 1: Demographic characteristics of study participants

Variable	Category	Frequency (%)
Gender	Male	290 (63)
	Female	170 (37)
Age	≤25	74 (16.1)
	26-44	267 (58)
	≥45	119 (25.9)
Profession	Student	41 (8.9)
	Housewife	156 (33.9)
	Sedentary	69 (15)
	Manual worker	127 (27.6)
	Others	67 (14.6)
Type of surgery	Orthopedic	135 (29.3)
	Urology	66 (14.4)
	Cesarean section	116 (25.2)
	General surgery	128 (27.8)
	Gynecologic surgery	15 (3.3)
Position	Supine	316 (68.7)
	Prone	54 (11.8)
	Lateral	19 (4.1)
	Lithotomy	71 (15.4)

LBP among study participants during the study period was 219 (47.6%) (confidence interval [CI]: 0.431–0.521). However, the incidence rate of LBP among women was significantly more 108 (63.5%) than men 111 (38.3%) [Table 2]. In other words, women who underwent surgery under spinal anesthesia were 2.8 times more likely to develop a backache than men (odds ratio [OR] = 2.8, 95% CI: 1.8–4.8, $P < 0.001$) [Tables 2 and 3]. Regarding the type of surgery, the highest incidence rates of LBP of 10 (66.7%) and 77 (66.4%) were observed in patients who underwent gynecologic and cesarean section, respectively. The lowest incidence was in patients who underwent urologic operations. In addition, in terms of surgical position, patients in the lateral position had the highest frequency of 11 (57.9%) of postoperative LBP. Although postspinal backache was found to be more common with longer duration of surgery compared with short one, this difference was not significant [Tables 2 and 3]. The same was true for the injection site. Patients who underwent surgery under spinal anesthesia at L_4-L_5 had not significantly lower chance to develop a backache than who received spinal anesthesia at L_3–L_4 (OR = 0.92, 95% CI: 0.54–1.58 $P = 0.78$) [Tables 2 and 3].

Table 2: Anesthesia and surgery related factors of study participants in terms of post spinal low back pain

Variable	Postspinal back pain		*P*
	Yes (%)	No (%)	
Gender			
Female	108 (63.5)	62 (36.5)	<0.001
Male	111 (38.3)	179 (61.7)	
Age			
≤25	35 (47.3)	39 (52.7)	0.01
26-44	141 (52.8)	126 (47.2)	
≥45	43 (36.1)	76 (63.9)	
Position			
Supine	163 (51.6)	153 (48.4)	0.02
Prone	19 (35.2)	35 (64.8)	
Lateral	11 (57.9)	8 (42.1)	
Lithotomy	26 (36.6)	45 (63.4)	
Type of surgery			
Orthopedic	57 (42.2)	78 (57.8)	<0.001
Urology	24 (36.9)	41 (63.1)	
Cesarean section	77 (66.4)	39 (33.6)	
General surgery	51 (39.5)	78 (60.5)	
Gynecologic surgery	10 (66.7)	5 (33.3)	
Duration (min)			
≤60	66 (49.6)	67 (50.4)	0.58
>60	153 (46.8)	174 (53.2)	
Puncture			
L3-L4	29 (46)	34 (54)	0.78
L4-L5	190 (47.9)	207 (52.1)	
BMI			
<18.5	4 (50)	4 (50)	0.8
18.5≤ BMI ≤25	83 (49.1)	86 (50.9)	
>25	132 (46.6)	151 (53.4)	

BMI: Body mass index

Discussion

In general, LBP is an important health problem that can disrupt a person's normal life.[21] One of the causes of LBP has been attributed to spinal anesthesia. In one study, LBP from previous anesthesia was the major cause for refusing spinal anesthesia.[3] In the present study, the incidence of LBP after spinal anesthesia was 47.6%. A series of studies have been addressed the incidence of postspinal anesthesia LBP. The incidence of postoperative LBP varied in these studies, and the factors associated with such pain have been reported differently. The incidence of back pain in our study was high compared to some other studies. Khajavi *et al*. reported 18% of LBP due to spinal anesthesia,[13] while Tekgül *et al*. reported this rate as 29.3%,[19] Yirgu and Weyessa 38%,[1] and Dadkhah *et al*. between 21% and 25.4%, depending on the spinal approach (median or paramedian),[22] and Flaatten and Raeder 54.9%.[23] The reasons for these discrepancies can be methodological differences, for example, the difference in perception of LBP among patients. From prickling sensation at the insertion site of the needle to radiating pain to the legs, upper and lower back pains are generally reported as back pain by the patients.[3] On the other hand, the duration of LBP, which is considered as acute pain, is dissimilar in different studies. In the Dadkhah *et al*.'s study, pain was considered as acute LBP for up to 1 week after surgery, while in the present study and Yirgu and Weyessa's study, pain was considered as acute for up to 4 weeks after surgery. Differences in sample size can also be justified by the differences of reported LBP after spinal anesthesia in different studies. The sample size was 220 in Dadkhah *et al*.'s study, 318 in Yirgu and Weyessa's study, and 460 in the present study. The reason for the approximate similarity of LBP incidence in our study (47.6%) with Yirgu and Weyessa's study (38%) (in terms of being higher than most of the studies) could be our similarity in the definition of LBP and sample size. Moreover, socioeconomic factors should not be overlooked in interpreting these differences. For example, the availability of a good social welfare system can prevent the patient back to daily work soon after being discharged from the hospital that may contribute to exacerbating LBP.

According to our study, women were 2.8 times more likely to develop LBP after spinal anesthesia than men. Although this result differs from some published studies,[19,24] this is consistent with result of Yirgu and Weyessa's study in this regard. A possible explanation for this contradiction might be

Table 3: Associated factors of post spinal low back pain

Variable	Category	*P*	OR	CI (lower-upper)
Puncture site	L3-L4	0.78	0.92	0.54-1.58
	L4-L5*			
Duration (min)	>60	0.58	1.1	0.74-1.67
	≤60*			
Gender	Female	<0.001	2.8	1.89-4.15
	Male*			

L: Lumbar vertebra, OR: Odds ratio, CI: Confidence Interval, *: Base line

that methodological differences. For example, the Schwabe and Hopf[24] study had been performed in nonobstetric setting. In general, other studies have confirmed the higher prevalence of LBP in women than men.[25,26]

In our study, no significant relationship was found between postspinal LBP regarding injection site, body mass index, and duration of surgical operation. These findings are supported fully by the results of the Schwabe and Hopf[24] and to some extent Tekgül *et al*.'s studies.[19] However, Yirgu and Weyessa[1] and Tekgül *et al*.[19] found a significant relationship between longer surgery duration and postoperative back pain. In the current study also, LBP was associated with longer surgery duration, but this difference was not significant.

In the current study, we found a significant association between type of surgery (orthopedic operations) and position of surgery (lateral) on the one hand and postspinal anesthesia LBP on the other hand. Although these results differ from some published studies,[19,24] they are consistent with Yirgu and Weyessa's study. Nevertheless, in Yirgu and Weyessa's study, unlike our study, an association was found between lithotomy position and LBP.

Some limitations to this study need to be acknowledged. First, these findings are limited by the use of a cross-sectional design based on existing data and patients follow-up by phone. Second, in many cases, the patients' records were incomplete, and information such as the size of the spinal needle and the number of injection attempts were not included, which in many studies was ironically associated with LBP.

The strength of this study is the relatively high sample size and multiplicity of study variables and high accuracy in data collection. Eventually, what should not be neglected is that transient neurological symptoms (TNS) sometimes may be confused by postspinal LBP[3] and one mainly important factor in this regard is the type of drug for intrathecal use. Lidocaine has been concerned about such neurological symptoms.[27] In this study, we only studied patients who received bupivacaine as a local anesthetic, a drug which TNS has rarely been attributed to it. Therefore, it may be assumed that the cases of LBP in this study are related only to the anesthesia technique.

Conclusion

This study showed that the incidence of LBP after spinal anesthesia was 47.6% and it was significantly associated with age (mostly in 26–44 y), gender (higher in women), type of surgery (higher in gynecologic procedures), and surgical position (higher in lateral position).

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Conflicts of interest

There are no conflicts of interest.

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