

ORIGINAL RESEARCH

Evaluation of the Relationship of Low Back Pain with Spinal Anesthesia and its Related Factors in Patients Undergoing Urological Surgery

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Abstract: **Background:** Spinal anesthesia is the common method in outpatient surgeries, which has complications such as back pain. We aimed to evaluate the relationship between low back pain (LBP) with spinal anesthesia and its related factors in patients undergoing urological surgery.

Materials and methods: In this cross-sectional study, 1000 patients undergoing urological surgery were enrolled. The severity of LBP was measured using the VAS (visual analog scale) pain on the 1st day, the 1st week, and the 1st month postoperatively. Patients' age, sex, and the duration of surgery were collected. data analysis was performed using SPSS software, version 17.

Results: Of the 1000 patients undergoing urological surgery, 636 (63.6%) patients and 364 (36.5%) patients underwent spinal and general anesthesia, respectively. In patients under general anesthesia, the LBP prevalence was higher than in patients under spinal anesthesia on the 1st week and the 1st month after surgery ($P<0.05$). So, the LBP prevalence was as follows: on the 1st day (general anesthesia: 14.5% vs spinal anesthesia: 24.1%, $p=0.09$), at the 1st week (general anesthesia: 24.9% vs spinal anesthesia: 13.5%, $P=0.001$) and the 1st month (general anesthesia: 13.8% vs spinal anesthesia: 4%, $P=0.001$). On 1st day and 1st week after surgery, the rate of LBP was significantly higher in the >45-year age group than in the age group less than 45 years ($P<0.05$). The pain rate was higher in patients who had surgery duration of more than 2.5 hours in all three time periods ($P=0.001$).

Conclusions: Although the LBP prevalence on 1st day after surgery in patients undergoing urological surgeries under spinal anesthesia was higher than in patients who underwent general anesthesia, there was a significant decrease in pain levels during the first week and month following the surgery in patients under spinal anesthesia. Older age and longer duration of surgery were related factors to pain.

Keywords: Urological surgery, Spinal anesthesia, Low Back pain, Backache, Risk factors

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1. Introduction

Spinal anesthesia is one of the most common types of preferred anesthesia in the clinic which is widely used especially in lower limb surgeries, anorectal interventions, urology, obstetrics and gynecology, and abdominal surgeries (1, 2). The belief is that the severe complications of spinal anesthesia are rare, but their frequency may have been underestimated. Some common complications of spinal anesthesia

are Backache (more common with epidural anesthesia), postural puncture headache, nausea, vomiting, hypotension, neurological injury, spinal hematoma, and arachnoiditis (3-5). The two main complications of spinal anesthesia are headache and back pain (6, 7). The prevalence of backache is reported in 25% of all surgical patients undergoing spinal anesthesia, and its incidence may be increased by up to 50% in long surgeries (8). Post-spinal backache causes discomfort in patients, leading to rejection of its use for the next operations (9, 10). Several factors such as the shape of the needle, size, sex, age of the patient, and the number of spinal anesthesia are involved in the occurrence of these complications. Transient back pain after spinal anesthesia is a com-

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mon complication that usually resolves after a few days, and sometimes the inflammation around the vertebrae may take 2-3 weeks to resolve (11, 12). Urological surgery, is short and limited to the pelvis area, making it suitable for spinal anesthesia (13). Patients undergoing nephrectomy are usually in lateral decubitus position and are at risk for pressure ulcers, nerve damage, or venous congestion (14). The prevalence of back pain depends on the type of surgery. For example, the incidence of postoperative back pain after prostate surgery is higher than other urological surgeries. Other factors such as the patient's age, the surgeon's experience, and the type of anesthesia used can also affect the prevalence of back pain (8).

The prevalence of low back pain after spinal anesthesia in surgeries such as cesarean section and orthopedic surgeries has been reported differently (2, 9, 15-18). There are a few studies investigating post-spinal anesthesia back pain in urological surgeries. One study showed that the area of needle insertion and type of anesthetics have effects on back pain in urological surgeries following spinal anesthesia (19). Therefore, we aimed to evaluate the relationship of low back pain with spinal anesthesia and its related factors in patients undergoing urological surgery.

2. Material and Methods

In this descriptive-cross-sectional study, the patients undergoing urological surgery with spinal anesthesia at Urmia Imam Khomeini Hospital between 21 March 2021 and 20 March 2022 were included by census sampling.

Inclusion criteria were the age of 15-65 years, ASA I and II (ASA: American Society of Anesthesiologists, ASA 1: A normal healthy patient, ASA 2: A patient with mild systemic disease). Also, Patients were enrolled in the study who had no previous history of back pain. Exclusion criteria were any prohibition for spinal anesthesia, the inability to sit for spinal anesthesia, the patient's unwillingness to be anesthetized, any possibility of increasing the patient's intracranial pressure, the presence of coagulation problems, and the duration of surgery exceeding 250 minutes. Spinal Anesthesia was done using the No. 25 Konik needle and L2-L3 and L3-L4 space and T10 anesthesia level. The type of needle and the method were the same in all patients. The anesthetic drug used was bupivacaine 0.5 and hyperbaric 2 mg. Patients were asked about the pain caused by the procedure using VAS (visual analog scale). The severity of pain was measured on the first day after surgery in the hospital and at one week, and one month after discharge by phone calls. The pain score was categorized as 0: no pain, 1-3: mild pain, 3-7: moderate pain, and >7: severe pain.

2.1. Statistical analysis

Continuous variables were presented as mean \pm standard deviation (SD). The categorical variables were shown as n (%). The pain severity (no, mild, moderate, and severe) was compared using Chi-square or Fisher's Exact tests. Data analysis was performed using SPSS17 software and a P value less than 0.05 was considered as significant level.

3. Results

In this study, 1000 patients undergoing urological surgery were included at the beginning of the study. In follow-up, 576 and 366 patients completed the study after one week and one month after the surgery, respectively. 189 (18.9%) patients and 811 (81.1%) patients were women and men, respectively. The mean \pm SD age of the patients was 47.06 \pm 13.12 years (minimum 18 and maximum 96 years and median 45 years).

Totally, Of the 1000 patients undergoing urological surgery on the first day, 776 (77.6%) had no back pain, 139 (13.9%) had mild back pain, 58 (5.8%) had moderate pain, and 27 (2.7%) had severe pain, of whom, 636 (63.6%) patients and 364 (36.5%) patients underwent spinal and general anesthesia, respectively. Of the 364 patients without spinal anesthesia, 293 (80.5%) had no pain, 39 (10.7%) had mild pain, 22 (6%) had moderate pain, and 10 (2.7%) had severe pain. Of the 636 patients with spinal anesthesia, 483 (75.9%) had no pain, 100 (15.7%) had mild pain, 36 (5.7%) had moderate pain, and 17 (2.7%) had severe pain. There was no significant difference in the severity of back pain between patients with and without spinal anesthesia on the first day ($P=0.09$, Table 1).

One week after surgery, of the 205 patients without spinal anesthesia, 154 (75.1%) had no pain, 21 (10.2%) had mild pain, 23 (11.2%) had moderate pain, and 7 (3.4%) had severe pain. Of the 371 patients with spinal anesthesia, 321 (86.5%) had no pain, 36 (19.7%) had mild pain, 11 (3%) had moderate pain, and 3 (0.8%) had severe pain. There was a significant difference in the severity of back pain between patients with and without spinal anesthesia one week after surgery ($P=0.001$, Table 1).

One month after surgery, of the 116 patients without spinal anesthesia, 100 (86.2%) had no pain, 5 (4.3%) had mild pain, 9 (7.8%) had moderate pain, and 2 (1.7%) had severe pain. Of the 250 patients with spinal anesthesia, 240 (96%) had no pain, 4 (1.6%) had mild pain, 3 (1.2%) had moderate pain, and 3 (1.2%) had severe pain. There was a significant difference in the severity of back pain between patients with and without spinal anesthesia one month after surgery ($P=0.001$, Table 1). Totally, in patients without spinal anesthesia, 14.5%, 24.9%, and 13.8% of patients had low back pain on the first day, first week, and the first month after surgery, respectively.

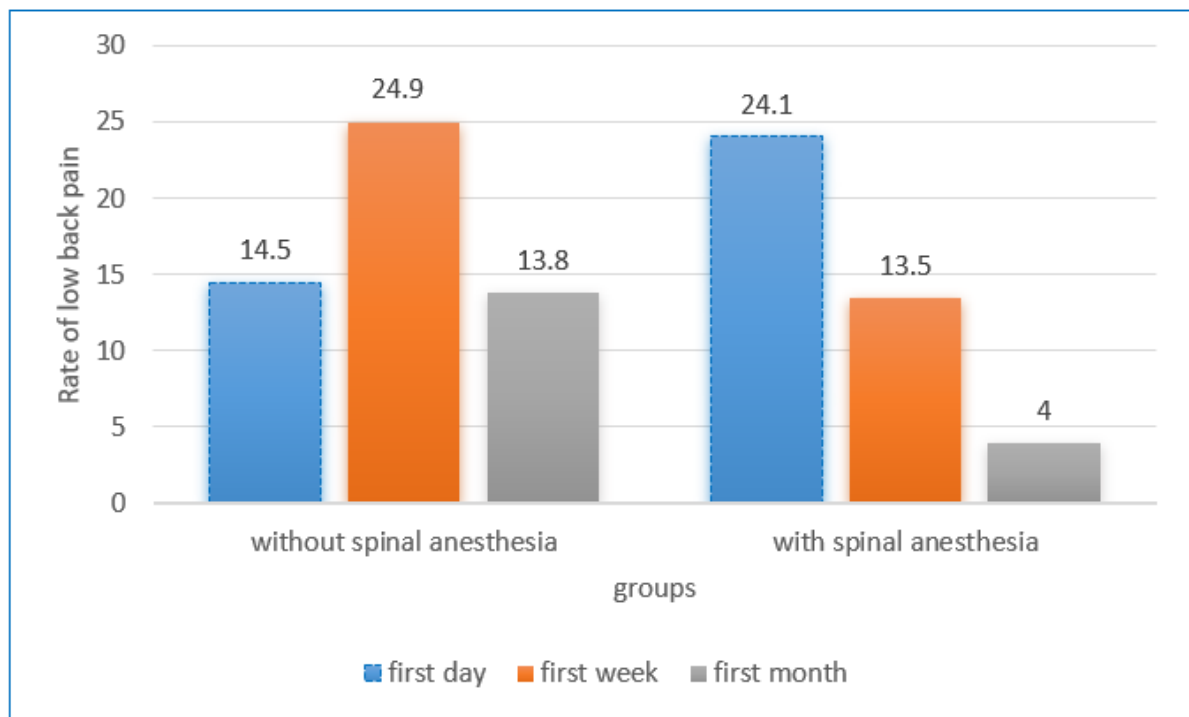


Figure 1: The rate of low back pain on 1st day, 1st week, and 1st month after surgery in patients without and with spinal anesthesia.

Table 1: Comparison of the severity of low back pain between spinal and general anesthesia on 1st day, 1st week, and 1st month after surgery in patients undergoing urological surgery.

The severity of back pain	Spinal anesthesia, n(%)		Total	p-value
	No	Yes		
First day	No pain	293 (80.5)	483 (75.9)	0.09¶
	Mild	39 (10.7)	100 (15.7)	
	Moderate	22 (6)	36 (5.7)	
	Sever	10 (2.7)	17 (2.7)	
One week after surgery	No pain	154 (75.1)	321 (86.5)	0.001¶
	Mild	21 (10.2)	36 (9.7)	
	Moderate	23 (11.2)	11 (3)	
	Sever	7 (3.4)	3 (0.8)	
One month after surgery	No pain	100 (86.2)	240 (96)	0.001¶¶
	Mild	5 (4.3)	4 (1.6)	
	Moderate	9 (7.8)	3 (1.2)	
	Sever	2 (1.7)	3 (1.2)	

¶: Chi-square test, ¶¶: Fisher's Exact test

However, in patients with spinal anesthesia, 24.1%, 13.5%, and 4% of patients had low back pain on the first day, first week, and the first month after surgery, respectively (figure 1).

On the first day and first week after surgery, the rate of low back pain was significantly higher in the >45-year age group compared with patients with age less than 45 years ($P < 0.05$). So, from the 504 patients in the age group of less than 45 years, 455 (90.3%) had no pain, 36 (7.1%) had mild back pain,

8 (1.6%) had moderate pain, and 5 (1%) had severe pain. So, from the 496 patients in the age group of over 45 years, 321 (64.7%) had no pain, 103 patients (20.8%) had mild pain, 50 patients (10.1%) had moderate pain, and 22 patients (4.4%) had severe back pain. There was a significant difference in the severity of back pain between age groups on the first day after surgery with spinal anesthesia ($P = 0.001$, Table 2). One week after the surgery, from the 286 patients in the age group of less than 45 years, 253 (88.5%) had no back pain,

Table 2: The related factors of low back pain on 1st day, 1st week, and 1st month after surgery in patients undergoing urological surgery.

Risk factors		Low back pain, n (%)					
		1st day		1st week		1st month	
		No	yes	No	yes	No	yes
Age groups	< 45 years	455 (90.3)	49 (9.7)	253 (88.5)	33 (11.5)	169 (94.9)	9 (5.1)
	> 45 years	321 (64.7)	175 (35.3)	222 (76.6)	68 (23.4)	171 (91)	17 (9)
p-value [¶]		0.001		0.003		0.12	
sex	female	148 (78.3)	41 (21.3)	64 (87.7)	9 (12.3)	55 (95.5)	2 (4.5)
	male	628 (77.4)	183 (22.6)	411 (81.7)	92 (18.3)	285 (92.2)	24 (7.8)
p-value [¶]		0.08		0.4		0.6	
Duration of surgery	< 1 hour	268 (97.1)	8 (2.9)	146 (96.7)	5 (3.3)	98 (99)	1 (1)
	1-2.5 hour	499 (73.4)	181 (26.6)	314 (78.9)	84 (2.1)	224 (91.1)	22 (8.9)
	> 2.5 hour	9 (20.5)	35 (79.5)	15 (55.6)	12 (44.4)	340 (92.9)	26 (7.1)
p-value [¶]		0.001		0.001		0.001	

[¶]: Chi-square test.

18 (6.3%) had mild pain, 12 (4.2%) had moderate pain, and 3 (1%) had severe back pain. Also, of the 290 patients over 45 years of age, 222 (76.6%) had no pain, 39 (13.4%) had mild pain, 22 (7.6%) had moderate pain, and 7 (2.4%) had severe back pain. There was a significant difference in the severity of back pain between age groups one week after surgery ($P=0.003$, Table 2).

One month after the surgery, from the 178 patients in the age group of less than 45 years, 169 (94.9%) had no pain, and pain severity was mild in 3 (1.7%) and moderate in 6 (3.4%). Of the 188 patients over 45 years of age, 171 (91%) had no pain, 6 (2.3%) had mild pain, 6 (3.2%) had moderate pain, and 5 (2.7%) had severe back pain. There was no significant difference in the severity of back pain between age groups one month after surgery ($P=0.12$, Table 2).

On the first day of surgery, of the 189 female patients, 148 (78.3%) had no pain, 32 (16.9%) had mild pain, 8 (4.2%) had moderate pain, and 1 (0.5%) had severe pain and from the 811 male patients, 628 (77.4%) had no pain, 107 (13.2%) had mild pain, 50 (6.2%) had moderate pain, and 26 (4%) had severe pain. There was no significant difference in the severity of back pain between men and women on the first day after surgery with spinal anesthesia ($P=0.08$, Table 2).

One week after surgery, of the 73 female patients, 64 (87.7%) had no pain, 6 (8.2%) had mild pain, and 3 (4.1%) had moderate pain. Of the 503 male patients under spinal anesthesia, 411 (81.7%) had no pain, 51 (10.1%) had mild pain, 31 (6.2%) had moderate pain, and 10 (2%) had severe pain. There was no significant difference in the severity of back pain between men and women one week after surgery with spinal anesthesia ($P=0.4$, Table 2).

One month after surgery, of the 57 female patients under spinal anesthesia, 55 (95.5%) had no pain, 1 (1.8%) had mild pain, and 1 (1.8%) had moderate pain. Of the 309 male pa-

tients under spinal anesthesia, 285 (92.2%) had no pain, 8 (2.6%) had mild pain, 11 (3.6%) had moderate pain, and 5 (1.6%) had severe pain. There was no significant difference in the severity of back pain between men and women in patients with spinal anesthesia one month after the surgery ($P=0.6$).

On the first day of surgery, of the 276 patients with surgery duration of under 1 hour, 268 (97.1%) had no pain, and 8 (2.9%) had pain. of the 680 patients with 1-2.5 hours of surgery duration, 499 (73.4%) had no pain, and 181 (26.6%) had pain. The rate of low back pain was 79.5% in patients with surgery time of more than 2.5 hours. There was a significant difference in low back pain between the duration of surgery ($P=0.001$). One week after urological surgery, the rate of low back pain was 3.3%, 2.1%, and 44.4% in patients with <1 hour, 1-2.5 hours, and >2.5 of surgery duration, respectively. There was a significant difference in low back pain between the duration of surgery and one week after surgery ($P=0.001$). One month after surgery, the rate of low back pain was zero, 8.9% and 7.1% in patients with <1 hour, 1-2.5 hours, and >2.5 of surgery duration, respectively. There was a significant difference in low back pain between the duration of surgery on one month after surgery ($P=0.001$, Table 2).

4. Discussion

Spinal anesthesia is used as a common anesthesia technique in surgeries such as lower extremity surgery, anorectal, urological, obstetric, and gynecological interventions, and lower abdominal procedures (2, 20). Among the complications of spinal anesthesia, headache, and back pain are the most common (6, 7). The present study, for the first time, has focused on the evaluation of the relationship of low back pain with spinal anesthesia and its related factors in patients undergoing urological surgery.

The current study showed that a total of 22.4 % of patients had experienced low back pain on 1st day after surgery. The prevalence of low back pain after spinal anesthesia in surgeries such as cesarean section and orthopedic surgeries has been reported differently (2, 9, 15-18). Rakmani and colleagues reported that back pain was found in 34% of patients under cesarean section (15).

Our findings showed that in patients without spinal anesthesia, the prevalence of low back pain on 1st day after surgery was higher than in patients without spinal anesthesia, but the rate was significantly lowest in the 1st week and 1st month after surgery. So, in patients without spinal anesthesia, 14.5%, 24.9%, and 13.8% of patients had low back pain on the 1st day, 1st week, and 1st month after surgery, respectively. However, in patients under spinal anesthesia, the prevalence of low back pain was 24.1%, 13.5%, and 4% on the 1st week and 1st month after surgery, respectively.

In another study, the prevalence of back pain was 36% and 29% in regional and general anesthesia, respectively (15). Another study showed that the prevalence of backache at post-operative 1st, 2nd, 3rd days, and 4th week was 38.0, 29.9, 16.0, and 31.6% in all patients undergoing surgical procedures under spinal anesthesia, respectively (9). Forozeshfard and co-workers showed that 5.9% of patients under spinal anesthesia experienced low back pain within the first week and low back pain was found in 5%, 6.9%, and 6.2% of orthopedic, urology, and other surgeries (18). Another study showed that the overall prevalence of post-spinal back pain was 40.5% in all emergency and elective surgeries (20).

In addition, studies have shown that the prevalence of low back pain varies among different techniques (8, 21). A study has shown that the rate of low back pain was 21.1% and 25.4% in median and paramedian methods respectively (8). Another study showed that the Incidence of post-spinal low backache is less in the paramedian approach than in the median approach (21).

The current study showed that the prevalence of low back pain was significantly higher in patients over 45 years of age and those who had a longer period of surgery more than 2.5 hours. In evaluating the severity of back pain in patients undergoing urological surgery with spinal anesthesia according to the duration of the surgery, we concluded that patients who underwent urological surgery with a longer duration suffered more back pain than patients who had a shorter duration of surgery. The severity of back pain in male and female patients undergoing urological surgery with spinal anesthesia did not show any significant difference on the first day, week, and month after surgery.

The prevalence of back pain depends on the type of surgery. For example, the incidence of postoperative back pain after prostate surgery is higher than other urological surgeries. Other factors such as patient age, shape of the needle, size,

gender, age of the patient, the number of spinal anesthesia, surgeon's experience, and the type of anesthesia used can also affect the prevalence of back pain (8, 12, 22). A study showed that the area of needle insertion and type of anesthetics have effects on back pain in urologic surgeries following spinal anesthesia (19).

5. Conclusion

Although the low back pain prevalence on 1st day after surgery in patients undergoing urological surgeries under spinal anesthesia was higher than in patients who underwent general anesthesia, there was a significant decrease in pain levels during the first week and month following the surgery in patients under spinal anesthesia. Older age and longer duration of surgery were related factors to pain.

6. Appendix

6.1. Acknowledgment

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6.2. Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

6.3. Funding support

None.

6.4. Author's contributions

All the authors had the same contribution.

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