Original Article

Prevalence Of Post Anesthesia Complications And Their Related Factors In Urologic Surgery

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Abstract

Introduction: Today, surgical approaches are one of the main treatment options for many urological diseases. Anesthesia during surgery, despite its many benefits, causes complications after surgery and during recovery. Identifying these complications is important for their prevention and proper management. Therefore, the present study was aimed at investigating the prevalence of post-anesthesia complications and related factors in the post-anesthesia care unit in urologic surgeries.

Materials and methods: A descriptive/analytical cross-sectional study was conducted on patients hospitalized in the urology department of the hospital who underwent urologic surgeries with different anesthesia approaches. Complications of anesthesia after entering recovery including chills, nausea and vomiting upon arrival, 15 minutes and 30 minutes after entering recovery along with hemodynamic changes, respiratory complications and neurological complications were recorded. The collected data were analyzed using SPSS software.

Results: In this study, 123 patients were examined. Pain 30 minutes after entering recovery (P=0.01) and nausea and vomiting 15 minutes after entering recovery were more in women than men (P=0.03). People with underlying disease had more pain upon entering recovery (P=0.03), increased blood pressure (P=0.001) and hypoxia (P=0.02). Pain upon entering recovery was higher in sedation and general anesthesia than regional anesthesia (P=0.01). Chills and bradycardia were more frequent in regional anesthesia (P=0.001), while the frequency of respiratory distress and larynx spasm was more in sedation (P=0.001). Pain upon entering recovery was found to be more in bladder and prostate surgery and ureter and urinary tract surgery (P=0.049). Reduction of blood pressure and larynx spasm was observed in bladder and prostate surgery more than other types of surgery (P=0.049). Post anesthetic agitation in testicular and scrotal surgery was more than other types of surgery (P=0.001).

Conclusion: The results demonstrated that increased blood pressure, respiratory distress, hypoxia and restlessness were the most common hemodynamic, respiratory and neurological complications of anesthesia after urologic surgery. The frequency of pain in sedation and general anesthesia was also found to be more than that of regional anesthesia, while the frequency of shivering was higher in regional anesthesia. Respiratory complications were recorded to be the most frequent in sedation. Additionally, some anesthesia complications were significantly related to the underlying characteristics of the patients, such that pain, nausea, and vomiting were more common in women, while pain, increased blood pressure, and hypoxia were more frequent in patients with underlying diseases.

Keywords: Anesthesia, Complications, Urology, Recovery.

INTRODUCTION

Nowadays, urologic diseases are considered to be common causes of medical visits all over the world (1). Disorders such as renal calculi, prostate diseases and malignancies of the urogenital system are common urological diseases that may require surgical interventions in addition to medical and supportive treatments (2, 3). Therefore, surgical approaches are considered the main treatment options in many urologic diseases. Therefore, a large part of the cost caused by these diseases is related to surgery, hospitalization of patients and post-surgery complications (4, 5). In recent decades, surgery has undergone more changes than in its entire past history (6). These changes follow the goals of minimizing the consumption of hospital resources, reducing

costs and increasing patient satisfaction (7). Several anesthetic techniques have been used for various surgeries (8-10).

Anesthesia is effective in reducing the sensation of pain, lowering the level of consciousness, relaxing the muscles, immobilizing the patient and forgetting the events surrounding the patient's surgery, which helps during surgery (11, 12). Regional anesthesia, such as spinal or epidural anesthesia, as well as general anesthesia, are two common anesthesia approaches that come with advantages and disadvantages. Anesthesia is effective in reducing the sensation of pain, lowering the level of consciousness, relaxing the muscles, immobilizing the patient and forgetting the events surrounding the patient's surgery, which helps during surgery (11, 12). Regional anesthesia such as spinal or epidural anesthesia as well as general anesthesia are common anesthesia approaches that have advantages and disadvantages. The benefits of spinal anesthesia include a lower risk of cardiovascular events during and after surgery, reducing the risk of arterial and venous thrombosis, as well as reducing the risk of hypoxia. On the other hand, general anesthesia may be associated with greater patient satisfaction and the possibility of longer surgeries. The use of spinal anesthesia may be associated with limitations in conditions such as a history of spinal surgery, degenerative spinal disease, ankylosing spondylitis and kyphoscoliosis (13-15).

Despite the usefulness of anesthesia and surgery in the treatment of the disease, they have inevitable negative effects on the quality of life of patients and cause various discomforts after surgery. The goal is to achieve optimal surgical conditions and to ensure a quick initial recovery without complications in the provision of general anesthesia (16).

Complications of anesthesia may include pain, chills, nausea and vomiting, hemodynamic instabilities, breathing problems, the incidence and prevalence of which after anesthesia varies depending on the type of surgery and anesthesia technique. In patients who undergo urological surgery, therapeutic procedures and interventions are performed on the kidney, adrenal, urethra, bladder, prostate, scrotum, testicles and spermatic cord, and since their nervous origin is from the sacral and thoracolumbar system. Fast and uncomplicated induction of anesthesia are of great importance (17).

Urologic diseases are among the most common medical problems worldwide. Also, the extent of urology practices and the subsequent postoperative complications after anesthesia can be seen in all ages from children to adults. Therefore, further studies are needed to investigate the common cases of post-anesthesia complications, and to take action for preventing further complications as quickly as possible.

Materials and Methods

This descriptive/analytical cross-sectional study was conducted on patients hospitalized in the urology department of Shahid Bahoner Hospital, Kerman-Iran, who underwent urological surgeries with different anesthesia approaches in 2022. Patients who met the inclusion and exclusion criteria were included in the study using convenience sampling. Inclusion criteria included patients hospitalized in the urology department during the mentioned period, candidates for urological surgery under general or regional anesthesia or sedation, age 10 to 80 years, and the patient's willingness to participate in the research. Exclusion criteria included defects in the patient's clinical record and inability to communicate in the recovery department.

Since relatively limited and inconsistent studies have been conducted in this field in the country, this study aimed to investigate the prevalence of post-anesthesia complications and related factors in the post-anesthesia care unit in cases of urological surgery.

Procedure

First, patient information including age, gender, underlying disease, type of surgery, type of anesthesia, duration of surgery, duration of anesthesia, preoperative blood pressure, and preoperative heart rate were recorded in the data collection form. The type of anesthesia complication including chills, nausea and vomiting and pain was recorded on arrival and at 15 and 30 minutes in the recovery room. Also, respiratory complications, cardiovascular instability, neurological complications were recorded based on the observation of PACU nurses. In the present study, hemodynamic changes were recorded in the form of a 20% decrease or increase in blood pressure and heart rate from the baseline (before anesthesia). Respiratory complications were recorded in case of saturation drop more than 10% (less than 90%), larynx spasm and respiratory distress. Nervous complications include delirium and restlessness as the anesthesia wears off, which were recorded in the data collection form if observed by the PACU nurse.

Data analysis

Descriptive statistics including frequency, percentage, mean and standard deviation were used to describe the research data. Chi-square test and Fisher's exact test as well as independent T-test were used for analytical statistics. SPSS software version 26 was used for statistical analysis. A p-value < 0.05 was considered.

ETHICAL CONSIDERATIONS

The present study was approved by the research ethics committee of Kerman University of Medical Sciences under ID number IR.KMU.AH.REC.1401.030. All collected data remained confidential with the researcher and was used only for research purposes.

RESULTS

In the present study, a total of 123 patients were included in the study, consisting of 91 (74%) men and 32 (26%) women. In terms of underlying disease, 9 people (7.3%) had cardiovascular disease, followed by respiratory disease (16 cases; 13%), diabetes (6 cases; 4.9%), hypertension (28 cases; 22.8%), kidney failure (3 cases; 2.4%), and nerve problems (1 cases; 0.8%). Examination of the type of surgery in the studied patients showed that 45.5% underwent ureter and urinary tract surgery, followed by kidney surgery (28.5%), testicular and scrotal surgery (14.6%), and bladder and prostate surgery (11.4%). The frequency distribution of the type of anesthesia in the patients was investigated and the results showed that 78.9% of the studied patients were under general anesthesia, followed by regional anesthesia (15.4 %) and sedation (5.7%). The average duration of surgery in the studied patients was determined as 2.23 ± 0.97 hours. The average duration of anesthesia was 140.56 ± 58.06 minutes. The post-surgery vital signs of the patients showed that the average systolic and diastolic blood pressure were 137.8 ± 23.45 and 83.01 ± 16.74 mm Hg, respectively. Furthermore, the average heart rate was recorded as 90.59 ± 19.75 pulses per minute.

Table 1 shows the frequency distribution of the type of complication after entering recovery. As can be seen, the most common complications during recovery included pain upon admission (42.3%). The most common neurological complication was agitation during recovery (12.2%).

Table 1: Frequency distribution of anesthesia complications in patients

Type of complication		Frequency
General complications of recovery	Pain on arrival	52 (42.3%)
	Pain 15 minutes later	43 (35%)
	Pain 30 minutes later	2 (1.6%)
	Shivering upon arrival	7 (5.7%)
	Chills 15 minutes later	13 (10.6%)
	Chills 30 minutes later	0 (0%)
	Nausea and vomiting upon arrival	1 (0.8%)
	Nausea and vomiting 15 minutes later	9 (7.3%)
	Nausea and vomiting 30 minutes later	2 (1.6%)
Hemodynamic changes	Increased blood pressure	14 (11.4%)
	Lower blood pressure	1 (0.8%)
	tachycardia	1 (0.8%)
	Bradycardia	8 (6.5%)
Respiratory complications	hypoxia	8 (6.5%)
	respiratory distress	13 (10.6%)
	Laryngeal spasm	1 (0.8%)
Neurological complications	delirium	1 (0.8%)
	Restlessness during recovery from anesthesia	15 (12.2%)

Table 2 shows the comparison of the frequency of each of the complications of anesthesia according to the gender of the patients. As shown, pain 30 minutes after entering recovery was significantly higher in women (6.3%) than men (0%) (P=0.01). Moreover, nausea and vomiting 15 minutes after entering recovery was significantly more in women (15.6%) than men (4.4%) (P=0.03). No significant difference was observed in terms of other complications of anesthesia between women and men.

Table 2: Distribution of the frequency of anesthesia complications by gender

Type of complications			Male		female		P-Value
			Frequency	Percent	Frequency	Percent	
General complications of recovery	Pain on arrival	has it	43	47.3%	9	28.1%	0.06
		does not have	48	52.7%	23	71.9%	
	Pain 15 minutes later	has it	31	34.1%	12	37.5%	0.72
		does not have	60	65.9%	20	62.5%	
	Pain 30 minutes later	has it	0	0.0%	2	6.3%	0.01
		does not have	91	100.0%	30	93.8%	
	Shivering upon arrival	has it	4	4.4%	3	9.4%	0.29
		does not have	87	95.6%	29	90.6%	
	Chills 15 minutes later	has it	11	12.1%	2	6.3%	0.35
		does not have	80	87.9%	30	93.8%	
	Chills 30 minutes later	has it	0	0.0%	0	0.0%	-
		does not have	91	100.0%	32	100.0%	
	Nausea and vomiting upon arrival	has it	0	0.0%	1	3.1%	0.09
		does not have	91	100.0%	31	96.9%	
	Nausea and vomiting 15 minutes later	has it	4	4.4%	5	15.6%	0.03
		does not have	87	95.6%	27	84.4%	
	Nausea and vomiting 30 minutes later	has it	2	2.2%	0	0.0%	0.39
		does not have	89	97.8%	32	100.0%	
Hemodynamic changes	Increased blood pressure	has it	9	9.9%	5	15.6%	0.38
		does not have	82	90.1%	27	84.4%	
	Lower blood pressure	has it	1	1.1%	0	0.0%	0.55
		does not have	90	98.9%	32	100.0%	
	tachycardia	has it	0	0.0%	1	3.1%	0.09
		does not have	91	100.0%	31	96.9%	
	Bradycardia	has it	8	8.8%	0	0.0%	0.08
		does not have	83	91.2%	32	100.0%	
Respiratory complications	hypoxia	has it	5	5.5%	3	9.4%	0.44
		does not have	86	94.5%	29	90.6%	
	respiratory distress	has it	9	9.9%	4	12.5%	0.68
		does not have	82	90.1%	28	87.5%	
	Laryngeal spasm	has it	1	1.1%	0	0.0%	0.55
		does not have	90	98.9%	32	100.0%	
	delirium	has it	0	0.0%	1	3.1%	0.09

Neurological complications		does not have	91	100.0%	31	96.9%	
General complications of recovery	Restlessness during recovery from anesthesia	has it	13	14.3%	2	6.3%	0.23
		does not have	78	85.7%	30	93.8%	

Table 3 shows the comparison of the frequency of each anesthesia complication according to underlying disease. Pain upon entering recovery was found to be significantly higher in people with underlying disease (54.3%) than in individuals without underlying disease (35.1%) (P=0.03). No significant difference was observed in terms of other complications of anesthesia according to underlying disease.

Table 3: Frequency of type of anesthesia complication by underlying disease

Type of complications			underlying disease		No underlying disease		P-Value
			Frequency	Percent	Frequency	Percent	
General complications of recovery	Pain on arrival	has it	25	54.3%	27	35.1%	0.03
		does not have	21	45.7%	50	64.9%	
	Pain 15 minutes later	has it	18	39.1%	25	32.5%	0.45
		does not have	28	60.9%	52	67.5%	
	Pain 30 minutes later	has it	1	2.2%	1	1.3%	0.71
		does not have	45	97.8%	76	98.7%	
	Shivering upon arrival	has it	1	2.2%	6	7.8%	0.19
		does not have	45	97.8%	71	92.2%	
	Chills 15 minutes later	has it	1	2.2%	12	15.6%	0.01
		does not have	45	97.8%	65	84.4%	
	Chills 30 minutes later	has it	0	0.0%	0	0.0%	-
		does not have	46	100.0%	77	100.0%	
	Nausea and vomiting upon arrival	has it	0	0.0%	1	1.3%	0.43
		does not have	46	100.0%	76	98.7%	
	Nausea and vomiting 15 minutes later	has it	1	2.2%	8	10.4%	0.09
		does not have	45	97.8%	69	89.6%	
	Nausea and vomiting 30 minutes later	has it	0	0.0%	2	2.6%	0.27
		does not have	46	100.0%	75	97.4%	
Hemodynamic changes	Increased blood pressure	has it	14	30.4%	0	0.0%	0.001
		does not have	32	69.6%	77	100.0%	
	Lower blood pressure	has it	1	2.2%	0	0.0%	0.19
		does not have	45	97.8%	77	100.0%	
	tachycardia	has it	1	2.2%	0	0.0%	0.19
		does not have	45	97.8%	77	100.0%	
	Bradycardia	has it	3	6.5%	5	6.5%	0.99
		does not have	43	93.5%	72	93.5%	
Respiratory complications	hypoxia	has it	6	13.0%	2	2.6%	0.02
		does not have	40	87.0%	75	97.4%	
	respiratory distress	has it	6	13.0%	7	9.1%	0.49
		does not have	40	87.0%	70	90.9%	
	Laryngeal spasm	has it	1	2.2%	0	0.0%	0.19
		does not have	45	97.8%	77	100.0%	
Neurological complications	delirium	has it	0	0.0%	1	1.3%	0.43
		does not have	46	100.0%	76	98.7%	
	Restlessness during recovery from anesthesia	has it	1	2.2%	14	18.2%	0.009
		does not have	45	97.8%	63	81.8%	

A comparison of the frequency of each of the complications of anesthesia according to the type of anesthesia shows that pain upon entering recovery in sedation (85.7%) occurred significantly more than general anesthesia (43.3%) and regional anesthesia

(21.1%), (p=0.01). Shivering 15 minutes after entering recovery was significantly more in regional anesthesia (36.8%) than general anesthesia (6.2%) and sedation (0%), (P=0.001). Furthermore, bradycardia was observed in regional anesthesia (26.3%) more than sedation (14.3%) and general anesthesia (2.1%), (P=0.001).

The incidence of respiratory distress was significantly higher in sedation (57.1%) than general anesthesia (9.3%) and regional anesthesia (0%), (P=0.001). Also, the incidence of laryngeal spasm in sedation (14.3%) was higher than general anesthesia (0%) and regional anesthesia (0%) (P=0.001). No significant difference was found in the frequency of anesthesia complications between the three types of anesthesia.

Overall, the most common side effects of sedation included pain upon entering recovery (85.7%), respiratory distress (57.1%), agitation, larynx spasm, and bradycardia (14.3%). The most common complications of general anesthesia included pain upon entering recovery (43.3%), pain 15 minutes after entering recovery (39.2%), agitation (14.4%) and increased blood pressure (13.4%).

The most common complications of regional anesthesia included chills 15 minutes after entering recovery (36.8%), bradycardia (26.3%), pain upon entering recovery (21.1%), and pain 15 minutes after entering recovery (21.1%), and nausea and vomiting 15 minutes after entering recovery (15.8%).

Table 4 shows the frequency of anesthesia complications by type of surgery. As shown, the pain at the time of recovery was found to be significantly higher in bladder and prostate surgery (57.1%), and ureter and urinary tract surgery (51.8%) (P=0.049).

Also, a greater reduction in blood pressure and larynx spasm was observed in bladder and prostate surgery (7.1%) than other types of surgery (0%), (P=0.049).

Post anesthetic agitation was significantly higher in testicle and scrotum surgery (50%) than other types of surgery (P=0.001). There was no difference in other anesthesia complications according to the type of surgery.

Table 4: The frequency of anesthesia complications by type of surgery

Type of complications			Bladder and prostate		kidney		Ureters and ducts		Testicles and scrotum		P-Value
			Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	
General complications of recovery	Pain on arrival	has it	8	57.1%	9	25.7%	29	51.8%	6	33.3%	0.049
		does not have	6	42.9%	26	74.3%	27	48.2%	12	66.7%	
	Pain 15 minutes later	has it	3	21.4%	15	42.9%	17	30.4%	8	44.4%	0.34
		does not have	11	78.6%	20	57.1%	39	69.6%	10	55.6%	
	Pain 30 minutes later	has it	0	0.0%	2	5.7%	0	0.0%	0	0.0%	0.16
		does not have	14	100.0%	33	94.3%	56	100.0%	18	100.0%	
	Shivering upon arrival	has it	1	7.1%	1	2.9%	5	8.9%	0	0.0%	0.43
		does not have	13	92.9%	34	97.1%	51	91.1%	18	100.0%	
	Chills 15 minutes later	has it	1	7.1%	6	17.1%	2	3.6%	4	22.2%	0.06
		does not have	13	92.9%	29	82.9%	54	96.4%	14	77.8%	
	Chills 30 minutes later	has it	0	0.0%	0	0.0%	0	0.0%	0	0.0%	-
		does not have	14	100.0%	35	100.0%	56	100.0%	18	100.0%	
	Nausea and vomiting upon arrival	has it	0	0.0%	0	0.0%	1	1.8%	0	0.0%	0.75
		does not have	14	100.0%	35	100.0%	55	98.2%	18	100.0%	
	Nausea and vomiting 15	has it	1	7.1%	2	5.7%	5	8.9%	1	5.6%	0.93

	minutes later	does not have	13	92.9%	33	94.3%	51	91.1%	17	94.4%	
	Nausea and vomiting 30 minutes later	has it	0	0.0%	2	5.7%	0	0.0%	0	0.0%	0.16
		does not have	14	100.0%	33	94.3%	56	100.0%	18	100.0%	
Hemodynamic changes	Increased blood pressure	has it	3	21.4%	7	20.0%	4	7.1%	0	0.0%	0.06
		does not have	11	78.6%	28	80.0%	52	92.9%	18	100.0%	
	Lower blood pressure	has it	1	7.1%	0	0.0%	0	0.0%	0	0.0%	0.049
		does not have	13	92.9%	35	100.0%	56	100.0%	18	100.0%	
	tachycardia	has it	0	0.0%	1	2.9%	0	0.0%	0	0.0%	0.49
		does not have	14	100.0%	34	97.1%	56	100.0%	18	100.0%	
	Bradycardia	has it	3	21.4%	0	0.0%	4	7.1%	1	5.6%	0.054
		does not have	11	78.6%	35	100.0%	52	92.9%	17	94.4%	
Respiratory complications	hypoxia	has it	1	7.1%	3	8.6%	4	7.1%	0	0.0%	0.67
		does not have	13	92.9%	32	91.4%	52	92.9%	18	100.0%	
	respiratory distress	has it	0	0.0%	4	11.4%	8	14.3%	1	5.6%	0.39
		does not have	14	100.0%	31	88.6%	48	85.7%	17	94.4%	
	Laryngeal spasm	has it	1	7.1%	0	0.0%	0	0.0%	0	0.0%	0.049
		does not have	13	92.9%	35	100.0%	56	100.0%	18	100.0%	
Neurological complications	delirium	has it	0	0.0%	0	0.0%	1	1.8%	0	0.0%	0.75
		does not have	14	100.0%	35	100.0%	55	98.2%	18	100.0%	
	Restlessness during recovery from anesthesia	has it	1	7.1%	2	5.7%	3	5.4%	9	50.0%	0.001
		does not have	13	92.9%	33	94.3%	53	94.6%	9	50.0%	

The average age of the patients was examined according to the complications of anesthesia, and the results showed that the mean and standard deviation of the age of the patients with high blood pressure was 59.3 ± 3.14 years, which was significantly higher than the patients without such complications (43.23± 2.44 years), (P=0.02).

Also, the average age of patients with post anesthetic agitation was significantly lower than that of patients without such a complication (P=0.001). No significant difference was found in terms of average age in patients suffered from other complications of anesthesia.

DISCUSSION

Urologic surgery is one of the common therapeutic interventions that require various anesthetic approaches, and are widely used to treat diseases of the urogenital system. Awareness of the frequency of anesthesia complications in these surgical interventions is very important in adopting appropriate preventive and therapeutic approaches to minimize these complications (18).

Therefore, a cross-sectional study was conducted on 123 patients who underwent urological surgery to investigate the frequency of anesthesia complications. The findings of the present study showed that pain upon entering recovery (42.3%) and pain 15 minutes after entering recovery (35%) were the most common complications after urologic surgeries.

Chills 15 minutes after entering recovery (10.6%) and nausea and vomiting 15 minutes after entering recovery (7.3%) were also among the most common side effects upon entering recovery. The most common hemodynamic complications included increased blood pressure (11.4%) and bradycardia (6.5%). The most common respiratory complications included respiratory distress (10.6%) and hypoxia (6.5%). The most common neurological complication was post anesthetic agitation (12.2%).

Examining the frequency of anesthesia complications by types of anesthesia showed that the most common complications of sedation included pain upon entering recovery (85.7%), respiratory distress (57.1%), post anesthetic agitation, larynx spasm, and bradycardia (14.3%).

The most common complications of general anesthesia included pain upon entering recovery (43.3%), pain 15 minutes after entering recovery (39.2%), post anesthetic agitation (14.4%) and increased blood pressure (13.4%). The most common complications of regional anesthesia include chills 15 minutes after entering recovery (36.8%), bradycardia (26.3%), pain upon entering recovery (21.1%), and pain 15 minutes after entering recovery (21.1%), and nausea and vomiting 15 minutes after entering recovery (15.8%). Comparison of the frequency of complications according to the type of anesthesia showed that the pain upon entering recovery and respiratory distress in sedation was more than in other types of anesthesia.

These complications were also more common in general anesthesia than in regional anesthesia. Also, larynx spasm was more common in sedation than in other types of anesthesia. On the other hand, shivering 15 minutes after recovery and bradycardia in regional anesthesia were more than in other types of anesthesia.

Similar to our study, Poorsheykhian et al showed that pain (21.3%), chills (21.9%) and nausea and vomiting (11.6%) were the most common general complications after entering recovery in urological surgeries. Also, similar to the present study, hypertension (35.5%) was the most common cardiovascular complication, post anesthetic agitation (26.5%) was the most common neurological complication, and tachypnea (49%) was the most common respiratory complication (19). On the other hand, similar to the findings of the present study, Ghonooti et al.'s study also found that tachypnea and respiratory distress were the most common respiratory complications after entering recovery (20). In Morris et al.'s study, hypoxemia was observed in 14% of cases after entering recovery (21). These findings show that monitoring the state of oxygenation along with the state of ventilation is necessary to prevent the risk of hypoxia, which can be life-threatening.

In this study, shivering was also one of the common side effects after entering recovery (10.6%), which was 22% in Poorsheykhian's study (19) and 26% in Yimer et al.'s study. The present study also demonstrated that the frequency of shivering in regional anesthesia (36.8%) was more than general anesthesia and sedation. Several mechanisms are involved in thermoregulatory changes after regional anesthesia. Regional anesthesia, including spinal and epidural anesthesia, can be capable of causing defects in autonomic temperature regulation below the blocked level, and vascular vasodilation is effective in changes in body temperature distribution (22).

In line with the findings of the present study, Mehrabi et al showed in their research that regional anesthesia in percutaneous nephrolithotripsy surgery was associated with less postoperative pain compared to general anesthesia (23). These researchers considered such a finding to be related to the analgesic effect of spinal anesthetic agents. A similar finding was observed in Masoudifar et al.'s study on cases of TUL surgery (13).

Tyritzis et al also showed that regional anesthesia is associated with less pain in transurethral surgeries compared to general anesthesia 2 hours after the operation. In justifying these findings, these researchers stated that the pain associated with the catheter and detrusor contraction is more effectively controlled with regional anesthesia, and therefore the pain intensity is less than general anesthesia two hours after the operation, but this difference between the two types of anesthesia decreases over time (24).

This study also showed that pain 30 minutes after entering recovery and nausea and vomiting 15 minutes after entering recovery were more in women than men, but no significant difference was observed in terms of other anesthetic complications between women and men. Similar to our study, Poorsheykhian et al reported that the frequency of postoperative pain in the recovery unit was significantly higher in women than in men (19). Similar findings were also reported in the study of Buchanan et al. (25). In justifying this finding, some researchers have stated that there are gender differences in the feeling of pain, so that women are at a greater risk of chronic pain disorders and show a greater reaction to painful stimuli than men (26). The occurrence of nausea and vomiting after surgery is associated with a complex physiology, and various mechanisms have been implicated in its occurrence. The autonomic nervous system involved with controlling nausea and vomiting is located in the reticular region of the brainstem, which receives afferent pathways. This system can also be stimulated by disturbances in the oropharynx and digestive tube, mobility, pain, hypoxia and hypotension. In accordance with the findings of the present study, it has been shown that women are more prone to nausea and vomiting after surgery than men (25).

The findings of the present study also showed that patients with underlying disease significantly experienced more pain upon arrival, increased blood pressure, and hypoxia after anesthesia. This is while shivering and post anesthetic agitation was observed more in patients without underlying disease. In addition, the average age of patients with high blood pressure was more than that of patients without this complication. While the average age of patients with post anesthetic agitation was found to be lower than that of patients without this complication. There was no significant difference in terms of age in other complications of anesthesia. In line with the findings of this study, Poorsheykhian et al.'s study had a higher prevalence of hypoxemia after surgery in older patients (19). According to these findings, it seems that old age and underlying disease, especially blood pressure and respiratory diseases, are involved in aggravating the complications of anesthesia, so that blood pressure changes are seen more in patients with underlying disease due to the presence of disorders in blood pressure regulating system, or high blood pressure level is seen more before the operation.

These people are also prone to more hypoxia after surgery, which may be caused by underlying respiratory diseases, reduced lung compliance due to underlying disease, or aging (27). Therefore, patients with underlying diseases should be given special attention in terms of blood pressure and oxygen level monitoring during and after the operation.

CONCLUSION

The results showed that increased blood pressure, respiratory distress, hypoxia, and restlessness were the most common hemodynamic, respiratory, and neurological complications of anesthesia after urologic surgery. The frequency of pain in sedation and general anesthesia was more than that of regional anesthesia, while the frequency of shivering was higher in regional anesthesia. Respiratory complications were the most frequent in sedation. Also, some complications of anesthesia had a significant relationship with the underlying characteristics of the patients; Pain, nausea, and vomiting were found to be more common in women, and pain, increased blood pressure, and hypoxia were more frequent in patients with underlying diseases.

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