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Evaluation of the Incidence of Post - anesthetic Complications in Recovery Unit of 9 - day Hospital in Torbat - e - Heydaryieh in 2016

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Abstract

Background: Today, surgery can help prevent many deaths and reduce unpleasant complications of illness; however, it may expose the patient to further risks and complications. The aim of this study was to evaluate the incidence of post - anesthesia complications in the recovery unit of the 9 - day medical education hospital of Torbat - e - Heydariyeh.

Methods: This cross - sectional study was performed on 268 patients who underwent surgery in the 9 - day medical education hospital of Torbat - e - Heydariyeh in 2016. A checklist with verified validity that has been used to collect information, contains section 1: patient demographic information and section 2: post - anesthetic complications. After performing any surgery, the checklist was completed by the anesthetist in the recovery unit. After collecting the data, the data analysis of descriptive statistics and Fisher's exact and Chi - square tests were analyzed with SPSS 20 software.

Results: Of the 268 patients examined in this study, 159 patient (59.3%) were female and 109 (40.7%) were male. In this study of postoperative complications in the recovery unit, 93 patients (34.7%) suffered from cardiovascular complications, 29 (10.8%) from respiratory, and 128 (47.7%) from neurological. Hypothermia and shivering with 60 (22.4%) and nausea and vomiting with 7 (6.2%) were the highest and least frequency.

Conclusions: Since incidence of postoperative complications seem to be high in the post - anesthetic care unit, several scientific studies are recommended and use of modern surgical procedure, anesthetics, and monitoring to prevent, detect, and control these complications in prenatal groups seems essential.

Keywords: Post - anesthetic Complications, Recovery, Torbat - e - Heydariyeh

1. Background

Today, surgical procedures are considered as one of the most widely used therapeutic methods in all societies such as poor or rich, rural or urban, and with any religious orientation. Surgery can prevent countless mortality and reduce unpleasant complications of diseases, however, it can also expose the patient with several side effects (1, 2).

Glucagon, cytokinesis, cortisol, catecholamine, and antidyroidic hormones release following the surgery and injury, which causes physiological disorders and the body's response to these disorders, so that all the changes disturb physiological balance of the body. On the other hand, the delayed effects of muscle relaxants and some anesthetic drugs eliminates the body's reactions to maintain its physiology balance, which in total causes unpleasant complications on various organs of the body (3-5). The rate of these complications has been reported in different studies. In the study conducted by Hines, this rate has been reported as 26.7% for total recovery complications and complications during the operation, and it has been stated that 30% of the patients admitted to recovery have shown at least one complication (6). In the study conducted by Poursheikian, the incidences of change (increase or decrease) in blood pressure, heart rate, respiration, pain, and shivering were 42%, 36% and 49%, 6.7%, and 22%, relatively (3). Dabir and colleagues, in their study, showed that 17.9% of patients have had shivering after anesthesia while it has also been showed that age, anesthesia, sex, performing surgeries increase lifetime compared to the diagnostic treatments and duration of operation, the probability of post - operative shivering (7). Since one of the main reasons for the mortality in patients undergoing surgery appears in the post - anesthetic stage and during the recovery, accordingly, development of standards for patient care in the

recovery phase is very evident in order to reduce the incidence of complications caused by anesthesia and surgery. The present study aimed to identify physiological changes and post - anesthetic complications in recovery in order to provide more safety, reduce mortality, and also the effect of some risk factors such as age, sex, duration, and type of surgery on the rate of incidence of these complications in 2016 in Torbat - e - Heydariyeh city, in Nohom - Dey educational hospital.

2. Methods

The present study was a cross - sectional descriptive - analytic study, which was performed on patients who underwent surgery at Nohom - Dey educational hospital of Torbat - e - Heidarieh in the last three months of 2016 and first three months of 2017. According to the formula for determining the sample size in descriptive studies to estimate the proportion in society, sample size was estimated to be 268 with a sample size of 0.6, 0.6, and 0.05, and the maximum number was 268. After obtaining the code of ethics and obtaining permission from the research vice of Torbat - e - Heydariyeh University of Medical Sciences, using an easy sampling method, postoperative complications of the patients undergoing surgery were investigated and recorded in the recovery environment by anesthesiologist. The inclusion criteria included all patients between the ages of 10 to 85 years admitted to the recovery department under general anesthesia (general, regional, sedentary) and the exclusion criteria included patients sent to the ICU - CCU unit, pregnant women with non - cesarean section, and patients who needed transfusion of blood products. The data collection tool was a checklist used in Faraj Study (8) whose validity was confirmed by 5 anesthetist and cardiologist specialist. This checklist contains two parts; Part I: basic information including personal information, type of surgery, and duration; and second part: post - anesthetic complications such as cardiovascular complications, respiratory complications, nausea and vomiting, and related disorders of the central nervous system, including Delirium reduced levels of consciousness, shivering, and pain and bleeding. After completion of the checklist by the anesthetist, the information was extracted and classified and the data was entered in the SPSS version 20. Data were analyzed using descriptive statistics and Chi - square and Fisher's exact tests. $P < 0.05$ was considered as meaningful.

3. Results

The results obtained in this study showed that among 268 patients, 159 (59.3%) were female and 109 (40.7%) were male. A total of 141 patients (52.6%) were placed in the age group of less than 35 years old while 91 (34%) of them were in the age group of 35 - 60 years old, and 35 (13.1%) were placed in the age group of more than 60 years old. According to the type of surgery, 86 (32.1%) had undergone female surgeries, 81 (30.2%), general surgery, 62 (23.1%), orthopedic surgery, 18 (6.7%), neurological surgery, and 4 (1.5%), ENT surgeries, and 17 (6.3%) had undergone other types of surgeries.

In this study, 34.7%, 10.8%, and 47.7% of the subjects showed symptoms of cardiovascular, respiratory, and neurological complications, and the remaining patients had not suffered from any complications.

Surgeries performed in the recovery department including, cardiovascular complications (blood pressure, heart rate), respiratory complications (hypoxia), neurological complications (confusion, restlessness and pain), and digestive complications (nausea) have been shown in Figure 1.

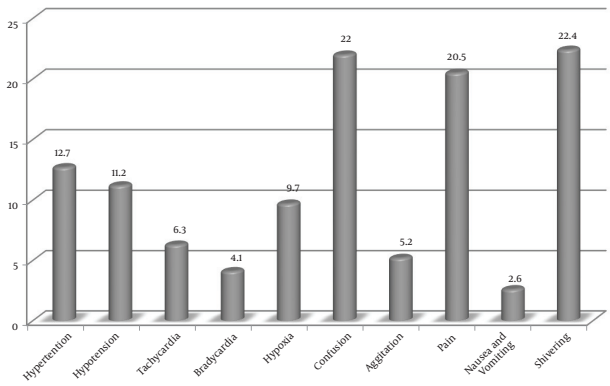

Figure 1. Relative Frequency of Cardiovascular, Respiratory and Digestive Complications in the Unit under Study

Complications including hypothermia and shivering in 60 patients (22.4%), confusion in 59 (22%) patients, pain in 55 (20.5%) patients, hypertension in 34 (12.7%) patients, hypoxia in 30 patients (2 / Hypotension was reported in 26 (9.7%) cases of hypoxia), tachycardia in 17 (6.3%) patients, bradycardia in 11 patients (1.4%), and ultimately nausea and vomiting in 7 (2.6%) patients were observed. In this study, 15 patients (5.6%) had only one complication. The frequency of post - operative complications by sex is presented in Table 1.

In the present study, there was a significant association between gender and bradycardia and gastrointestinal complications ($P < 0.05$). The incidence of nausea and vomiting was more common in women than in men, thus, a significant difference was observed ($P < 0.05$).

Table 1. Comparison of the Frequency of Postoperative Complications by Gender in the Unit under Study

Complications	Sex		P Value
	Male, N (%)	Female, N (%)	
Tachycardia			0.8
Yes	6 (5.5)	11 (7)	
No	103 (94.5)	146 (99.4)	
Arrhythmia			0.4
Yes	1 (0.9)	0 (0)	
No	108 (99.1)	158 (100)	
Bradycardia			0.009
Yes	9 (8.3)	2 (1.3)	
No	100 (91.7)	156 (68.7)	
Hypotension			0.27
Yes	9 (8.3)	21 (13.3)	
No	100 (91.7)	136 (86.1)	
Hypertension			0.42
Yes	16 (14.7)	18 (11.3)	
No	93 (85.3)	140 (88.1)	
Hypoxia			0.8
Yes	11 (10.1)	15 (9.5)	
No	98 (89.9)	143 (90.5)	
Confusion			0.08
Yes	30 (27.5)	29 (18.5)	
No	79 (72.5)	128 (81.5)	
Agitation			0.3
Yes	6 (3.7)	10 (6.3)	
No	105 (96.3)	148 (93.7)	
Pain			0.3
Yes	19 (18.3)	36 (23.7)	
No	85 (81.7)	116 (76.3)	
Shivering			0.18
Yes	20 (18.3)	40 (25.3)	
No	89 (81.7)	118 (74.7)	
Nausea and vomiting			0.04
Yes	00 (0))	7 (4.4)	
No	108 (100)	151 (95.6)	P Value

In terms of bradycardia, 4 patients (11.4%) were more than 60 years old, 4 patients (4.4%) were in the age group of 35 - 60 years old, and 2 patients (1.2%) were in the age group of younger than 35 years old. In addition, 11 patients (31.4%) from the age group of older than 60 years old, 15 (16.7%) patients from the age group of 35 - 60 years old and 8 patients (5.7%) from younger than 35 years old had the complication of hypertension, therefore, Chi - square test demonstrated no significant difference between age and complications including bradycardia and hypertension ($P < 0.05$). A total of 44 (31.2%) patients from the age group of younger than 35 years old and 12 (13.3%) from age group of 35 - 60 years old were suffering from shivering and there was also a statistically significant relationship between shivering and age ($P = 0.002$) (Table 2).

From the viewpoint of the relationship between surgical time and complication rates, a statistically significant relationship was found between surgical time with hypoxia ($P = 0.049$) and pain ($P > 0.001$) (Table 3). In terms of the time of surgery, there was also a statistically significant relationship between type of anesthesia and hypoxia, pain, confusion and shivering and nausea ($P < 0.05$) (Table 4). In this study, there was no significant relationship between the anesthetic agent and the prevalence of postoperative complications ($P > 0.05$).

4. Discussion

The aim of this study was to determine the association of post - operative complications with some factors such as gender, age, type of anesthesia, surgical time, anesthesiologist, and type of surgery. The most common complications reported during the recovery in various sources are cardiovascular events (3-7). In this study, 34.7% of patients had cardiovascular complications, among which 32.7% were female and 37.6% were male. Hypertension and hypotension were the most prevalent complications among cardiovascular complications with 12.7% and 11.2% rate, respectively. In contrast to hypotension, hypertension has higher risks for the patient and can cause complications, including dysrhythmia, infarction or heart failure, which require interventional treatments. Causes of hypertension can include pain, shivering, restlessness, or urinary retention, while hypotension is caused by hypovolemia (6). In the study of Poursheikhian, hypertension was observed in 35.5% while hypotension was found in 6.5% of patients (3). In the study conducted by Faraj and his colleagues it was reported that hypotension and hypertension have been observed in 12.5% and 08.2%, respectively (8).

The incidence of tachycardia in patients of this study was 6.3% and it has been a better result than other studies. The incidence of tachycardia was 18%, 10.4%, 11.7%, and 11% respectively (10-8%) in the studies conducted by Poursheikhian, Faraj, Kaviani, and Babin.

In this study, 10.8% of the patients showed respiratory complications, among which the most prevalent complication was hypoxia with 9.7%. In the study of Poursheikhian, the prevalence of hypoxia was 8.4%. Richard

Table 2. Comparison of Frequency of Postoperative Complications by Age Groups in the Unit under Study

Complications	Less than 35 Years Old, N (%)	Between 35 and 60 Years, N (%)	More than 60 Years, N (%)	P Value
Shivering				0.002
Yes	44 (31.2)	12 (13.3)	4 (11.4)	
No	97 (68.8)	78 (86.7)	31 (88.6)	
Hypertension				0.092
Yes	26 (11.9)	6 (26.1)	1 (33.3)	
No	193 (88.1)	17 (73.9)	2 (66.7)	
Bradycardia				0.055
Yes	3 (2.1)	4 (4.4)	4 (11.4)	
No	31 (88.6)	86 (95.6)	138 (97.9)	
Hypoxia				0.049
Yes	19 (8.7)	5 (21.7)	1 (33.3)	
No	200 (91.3)	18 (78.3)	2 (66.7)	
Pain				0.00
Yes	42 (19.6)	5 (21.7)	1 (33)	
No	172 (80.4)	9 (40.9)	2 (66)	

Table 3. Frequency of Postoperative Complications by Time Periods in the Unit under Study

Complications	Time Periods			P Value
	Less than 1, N(%)	Between 1 and 2, N(%)	More than 2, N(%)	
Hypoxia				0.049
Yes	19 (8.7)	5 (21.7)	1 (33.3)	
No	200 (91.3)	18 (78.3)	2 (66.7)	
Pain				< 0.001
Yes	42 (19.6)	13 (59.1)	1 (33)	
No	172 (80.4)	9 (40.9)	2 (66)	

et al., in a study entitled as hypoxia in recovery, reported prevalence of hypoxia as 14% (3). In this study, the incidence of this complication was 41.66%, which is due to high prevalence of hypoventilation and blockage of airways (8). Yip and Murphy have stated that complicated airway disorders are due to inappropriate technique of extubation, the effects of opiates, obesity, age, type of surgery, and inadequate reversal of muscle blockers. To prevent the risk of hypoxia that can be life - threatening, monitoring of oxygenation with ventilation is essential (9).

The frequency of pain in various studies has been reported with regard to the methods and techniques used to anesthetize, the use of opioids, and various pain relief methods. In a recent study, it was found that there is a relationship between pain and a number of factors including anesthesia type (general anesthesia), type of surgery (general surgery) and surgical time, which is based on the results of a study conducted by Poursheikhian on the incidence of complications after general anesthesia in the recovery department and the study of Entezary entitled as the prevalence of complications after anesthesia in Fatemi and Alavi hospitals (3). The incidence of pain has been reported in the studies including Popping (10) as 30-80%, in the study of Farsi (11) about 48%, in the study of Poursheikhian as 21.3% (3) and in study of Entezari as 26.9% (4). In our study, the incidence of pain was 20.5%, which was lower than other studies.

The incidence of hypothermia and shivering was 22.4% in this study. Dabir studied the prevalence of shivering during recovery and reported that 17.9% of the patients suffered from shivering after surgery (7). The incidence of shivering has been reported in different studies, ranging from 5% to 56% and the possible reasons can be: the difficulty of shiver detection, the difference between anesthetic drugs, the extent of the surgery, the operation room temperature and the temperature of the fluid used, age,

Table 4. Frequency of Postoperative Complications by Type of Anesthesia in the Unit under Study

Complications	Type of Anesthesia			P Value
	General, N (%)	Regional, N (%)	Sedation, N (%)	
Tachycardia				0.39
Yes	9 (9.8)	6 (5.4)	2 (3.2)	
No	83 (90.2)	104 (93.7)	60 (96.8)	
Arrhythmia				0.23
Yes	0 (0)	0 (0)	1 (1.6)	
No	92 (100)	111 (100)	61 (98.4)	
Bradycardia				0.1
Yes	2 (2.2)	3 (2.7)	6 (9.7)	
No	90 (97.8)	108 (97.3)	56 (90.3)	
Hypotension				0.4
Yes	6 (6.5)	20 (18)	4 (6.5)	
No	86 (93.5)	90 (81.1)	58 (93.5)	
Hypertension				0.09
Yes	18 (19.6)	9 (8.1)	7 (11.3)	
No	74 (80.2)	102 (91.1)	55 (88.7)	
Hypoxia				0.004
Yes	14 (15.2)	3(2.7)	9 (14.5)	
No	78 (84.4)	108 (97.3)	53 (85.5)	
Confusion				< 0.001
Yes	38 (41.8)	44 (3.6)	17 (27.4)	
No	53 (58.2)	107 (96.4)	45 (72.6)	
Agitation				0.01
Yes	9 (9.8)	1 (0.9)	4 (6.5)	
No	83 (90.2)	110 (99.1)	58 (93.5)	
Pain				< 0.001
Yes	34 (39.1)	10 (9.3)	11 (18.6)	
No	53 (60.9)	98 (90.7)	48 (81.4)	
Nausea and vomiting				0.3
Yes	1 (1.1)	5 (4.5)	1 (1.6)	
No	90 (98.9)	106 (95.5)	61 (98.4)	

sex, duration of surgery, and anesthetic procedure (6-8, 12). Shivering increases the consumption of oxygen in the body, hence interventions should be considered in order to treat this condition. Examples for considerations can include covering the patient adequately, observing the optimal operation room temperature and using warm serum that can be effective in reducing the incidence of this complication (3.4). Results obtained by Dabir et al., revealed a significant relationship between sex and shivering, however, in our study, there was no statistical significant relationship between sex and shivering. In regional anesthesia, the incidence of shivering was higher in comparison with other anesthetic procedures (36.9%), while the prevalence of this complication was highest compared to the general anesthetic studies (7).

Fortunately, in the recent study, none of the subjects showed a shock and allergy to the drugs, however, due to the large number of surgical operations and the observation of significant symptoms such as hypothermia and shivering, pain, changes in blood pressure and heart rate,

hypoxia, nausea and vomiting in the post - anesthetia care unit, carrying out appropriate measures in order to prevent, identify, and timely control these complications in prenatal groups seems necessary. Obviously, improving the quality of surgical services, increasing patient satisfaction and reducing the costs of treatment during the hospitalization and reducing the fear of surgical operations by using adequate and up - to - date equipment and also advanced monitoring, accurate implementation of patients' visiting, and accurate pre - operative precautions, applying trained staff, the use of new surgical and anesthetic techniques, and the use of drugs with less complications during anesthesia and shorter surgery times will be future requests of patients from therapeutic system. Obviously, achieving better quality indicators will require many research studies. It is important that having no complication in postoperative care is out of expect while they can be minimized through having appropriate measures. In general, reporting various complications in postoperative recovery can be different due to several reasons that have been investigated in the present study. Sex, age, type of anesthesia have been reported among the factors causing complications. Similarly, the reported differences in various studies may be due to measurements by the evaluator and the diagnosis of the disorder is mainly dependent on the assessor, which possibly lead to a low or over - proportionate reporting of the complications.

It is suggested that in order to study the complications and the related factors, conducting a study with more limited complications and controlled number of related factors can be effective.

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