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ORIGINAL ARTICLE

Determination of Factors Affecting Sleep Quality in Postoperative Patients and Improvement of Correctible Causes

Postoperatif Hastalarda Uyku Kalitesini Etkileyen Faktörler ve Düzeltilebilecek Nedenlerin Saptanması

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ABSTRACT

Patients who had postoperative major abdominal surgery and major cardiovascular surgery were included in our study. A total of 103 patients were included in the study. Patients were evaluated with the Pitssburg sleep quality index questionnaire between five and seven days postoperatively. All questionnaires and scales were administered by the same researcher without specifying the participant's name in order to maintain consistency. After explaining the scope and purpose of the study, written consent of all participants was obtained. Pittsburg sleep quality index is a 19-item self-report scale that evaluates sleep quality and disorder. It consists of 24 questions, 19 questions are self-report questions, 5 questions are questions to be answered by the spouse or roommate. The 18 scored questions of the scale consist of 7 components. Subjective Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disorder, Sleeping Drug Use, and Daytime Dysfunction. Each component is evaluated over 0-3 points. The total score of the 7 components gives the scale total score. The total score ranges from 0 to 21. A total score greater than 5 indicates "poor sleep quality". In our study, we aimed to investigate whether anesthetic agents, concomitant diseases, type of surgery, and some biochemical parameters affect sleep quality in postoperative patients. The diseases we investigated included hypertension, chronic obstructive pulmonary diseases, asthma, heart failure, cerebrovascular diseases, thyroid function disorders, diabetes mellitus, chronic kidney diseases, and chronic kidney failure. We also evaluated the sociocultural levels of the patients as an important part of the study. Educational status of our patients, literacy rates and occupations were also important to us. In our study, we showed that anesthetic agents [hypnotic and opioid] had no effect on sleep quality, and sleep quality was worse in cardiovascular surgery cases, although it was not statistically significant. We showed that a long operation time (5 hours and more) impairs postoperative sleep quality, thyroid diseases affect sleep quality badly, and sleep disorders are more common especially in patients with COPD. We think that sleep has a very important place in accelerating the recovery process of postoperative patients and that sleep disorders should be questioned better and that postoperative patients with sleep disorders should definitely seek psychological and medical help.

Keywords: sleep quality, pittsburg sleep quality index, postoperative sleep quality

ÖZ

Çalışmamıza postoperatif major abdominal cerrahi geçiren ve major kalp damar cerrahi vakası geçiren hastalar dahil edilmiştir. Çalışmaya toplam 103 hasta dahil edilmiştir. Hastalar postoperatif beş ile yedi gün arasında Pitssburg uyku kalitesi indeksi anketi ile değerlendirilmiştir. Tüm anket ve ölçekler tutarlılığı korumak amacıyla aynı araştırmacı tarafından ve katılımcı ismi belirtilmeden uygulanmıştır. Çalışmanın kapsam ve amacı açıklandıktan sonra bütün katılımcıların yazılı izinleri alınmıştır. Pittsburg uyku kalitesi indeksi uyku kalitesini ve bozukluğunu değerlendiren, 19 maddelik bir özbildirim olceğidir. 24 sorudan oluşur, 19 soru özbildirim sorusu, 5 soru eş veya oda arkadaşı tarafından yanıtlanacak sorulardır. Ölçeğin puanlanan 18 sorusu 7 bileşenden oluşur. Oznel Uyku Kalitesi, Uyku Latensi, Uyku Süresi, Alışılmış Uyku Etkinliği, Uyku Bozukluğu, Uyku İlacı Kullanımı ve Gündüz İşlev Bozukluğudur. Her bir bileşen 0-3 puan uzerinden değerlendirilir. 7 bileşenin toplam puanı ölçek toplam puanını verir. Toplam puan 0-21 arasında değişir. Toplam puanın 5'ten büyük olması "kötü uyku kalitesini" gösterir. Biz çalışmamızda postoperatif hastalarda uyku kalitesini anestezik maddeler, yandaş hastalıklar, cerrahi türü, bazı biyokimyasal parametrelerin etkileyip etkilemediğini araştırmayı hedefledik. Araştırdığımız hastalıklar arasında hipertansiyon, kronik obtruktif akciğer hastalıkları, astım, kalp yetmezliği serebrovasküler hastalıklar, tiroid fonsiyon bozuklukları, diyabetes mellitus kronik böbrek hastalıkları, kronik böbrek yetmezliği bulunmaktaydı. Aynı zamanda hastaların sosyokültürel düzeylerini de çalışmanın önemli bir parçası olarak değerlendirdik. Hastalarımızın eğitim durumları okuma yazma oranları ve meslekleri de bizim için önemliydi. Çalışmamızda anestezik maddelerin [hipnotik ve opioid] uyku kalitesi üzerine bir etkisi olmadığın uyku kalitesinin istatistiksel olarak anlamlı olmasa da kalp damar cerrahisi vakalarında daha kötü olduğunu gösterdik. Ameliyat süresinin uzun olmasının (5saat ve üzeri) postoperatif uyku kalitesini bozduğunu, tiroid hastalıklarının uyku kalitesini kötü etkilediğini ve özellikle koahı olan hastalarda uyku bozukluğunun daha sık olduğunu gösterdik. Postoperatif hastaların iyileşme sürecinin hızlandırılması için uykunun çok önemli bir yer teşkil ettiğini ve uyku bozukluklarının daha iyi sorgulanması gerektiğini ve mutlaka uyku bozukluğu olan postoperatif hastaların psikolojik ve medikal yardım alması gerektiğini düşünüyoruz.

Anahtar Kelimeler: uyku kalitesi, pittsburg uyku kalitesi indeksi, postoperatif uyku kalitesi

Introduction

Sleep; in addition to being a reversible state of unconsciousness, is not just a state of inactivity that allows the body to rest, but also an active regeneration period that prepares the whole body for life. Sleep is one of the basic and indispensable daily life activities that affects the quality of life and health of individuals, and

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it is a concept with physiological, psychological and social dimensions. Sleep is a fundamental element in strengthening physical growth and academic performance (1).

Sleep is not a temporary interruption of daily life or wasted time. It is an active period that is important to renew mental and physical health every day and covers one third of our lives.

There are about 85 types of sleeping sicknesses most of which cause a decrease in quality of life and deterioration in a person's health. Sleep disorders are public health problems as they can cause traffic and occupational accidents. Some sleep disorders cause difficulty falling or staying asleep. Other sleep disorders cause excessive daytime sleepiness. Problems with the body's biological clock cause people to be sleepy at the wrong time of day. Sleep walking, bedwetting, nightmares and other problems can also disrupt sleep. Some sleep disorders are life-threatening (2,3).

Sleep quality is affected by various factors and altered routine status of a person perioperatively effects sleep in the postoperative period, definitely. In this study, we aimed to investigate the factors affecting postoperative sleep quality and determine the correctible causes.

Material and Methods

This study is a prospective, nonrandomized analysis of patients who underwent cardiac surgery or abdominal surgery between January 2013 and June 2013 at a single center. The study was approved by the Institutional Medical Advisory Board.

After explaining the scope and purpose of the study, written consent of all participants was obtained. Demographical data were collected from the hospital database and patients were evaluated with the Pittsburgh sleep quality index questionnaire between five and seven days postoperatively. Patients hospitalized for seven days are either those with postoperative infection or other complications. The normal average hospitalization day is about five days. The patients were interviewed directly at the patient bed. All questionnaires and scales were administered by the same researcher without specifying the participant's name in order to maintain consistency. Anesthetic agents, type of surgery, biochemical parameters, chronic diseases such as hypertension, chronic obstructive pulmonary disease, asthma, heart failure, cerebrovascular disease, thyroid dysfunction, diabetes mellitus, chronic kidney disease; socio-cultural levels and educational status (i.e. literacy rates and occupation) were investigated as potential factors affecting sleep quality.

Pittsburgh Sleep Quality Index (PSQI):

Pittsburgh Sleep Quality Index: PSQI was developed by Buysse et al. (10) and adapted into Turkish by Ağargun et al. (11). PSQI is a 19-item self-report scale that assesses sleep quality and disturbance over the past month. It consists of 24 questions: 19 self-report questions, 5 questions to be answered by the spouse or roommate. The 18 questions of the scale consist of 7 components; Subjective Sleep Quality, Sleep Latency, Sleep Duration, Habitual Sleep Efficiency, Sleep Disorder, Sleeping Drug Use, and Daytime Dysfunction. Each component is evaluated over 0-3 points. Scoring; If it has not happened in the last month, it's 0, if it is less than once a week, it is 1, if it is once or twice a week, it is 2, and if it is three or more times a week, it is 3. The sleep quality evaluation asked in the survey is; It is scored as very good 0, fairly good 1, fairly bad 2, very bad 3.

The total score of the 7 components gives the scale total score. The total score ranges from 0 to 21. A total score greater than 5 indicates "poor sleep quality".

Statistical Analysis

Statistical analyzes were performed in IBM SPSS for Windows Version 21.0 package program (Statistical Package for the Social Sciences, International Business Machines, Inc., Armonk, New York, USA). Numerical variables were summarized as mean ± standard deviation and median [min – max], and categorical variables were summarized as numbers and percentages. Parametric test assumptions (normality and homogeneity of variances) were checked before the groups were compared in terms of numerical variables. Whether there was a difference between two independent groups in terms of numerical variables was investigated by t-test in independent groups if parametric test assumptions were met. If the parametric test assumptions were not met, the Mann-Whitney U test was used. The difference between the groups in terms of categorical variables was examined with the chi-square test or Fisher exact test. Significance level was taken as $p<0.05$.

Results

A total of 103 patients were included in the study. Mean age was 53.35±13.9 years. Sixty-seven patients were male (65%). Of 103 patients, according to PSQI, 53 (51,45%) patients had poor sleep quality and 50 (48,55%) patients had good sleep quality, postoperatively.

Age, marital status, sex, obesity, hypertension, diabetes, alcohol consumption and smoking did not have any significant impact on sleep quality in our study. The socioeconomic status of the patients was also evaluated and their education level was also questioned. Sleep quality of high school graduates and individuals with higher education level was better than the patients with lower education (Table 1).

The anesthetic drugs used were divided into those used in induction and those used in maintenance. No significant difference was found when the drugs used in induction were divided into those using midazolam and those not using midazolam (p:0,576). When the drugs used in maintenance were evaluated, no significant difference was found between the use of desflurane-sevoflurane and the use of desflurane and midazolam p:0,761) (Table 2).

Table 1. Comparison of good and bad results according to marital status, age and gender

		Good sleep (n=50)	Poor sleep (n=53)	p
Gender F/M (%)		14/36 (28/72)	22/31 (41.5/58.5)	0.219
Age (years)		52.5±14.0	54.2±13.8	0.530
Marital status (Single /married) (%)		8/42 (16/84)	4/49 (7.5/92.5)	0.303
Height		171.9±7.5	169.6±7.5	0.120
Weight		75.8±7.5	72.9±10.2	0.102
BMI		25.5±2.7	25.6±3.7	0.845
Obesity		12 (24)	10 (18.9)	0.693
High school and university (+/-)(%)		21/29 (42/58)	35/18 (66/34)	0.024
Education status (%)	Literate	5 (10)	14 (26.4)	0.045
	Primary school	5 (10)	11 (20.8)	
	Middle school	11 (22)	10 (18.9)	
	High school	21 (42)	15 (28.3)	
	University	8 (16)	3 (5.7)	

BMI. body mass index; percentages in brackets.

Table 2. Effect of anesthetic substances on sleep quality

		Good sleep (n=50)	Poor sleep (n=53)	p-value
Drug used	Propofol(%)	14 (28)	16 (30.2)	0.628
	Penthotal(%)	4 (8)	7 (13.2)	
	Midazolam(%)	32 (64)	30 (56.6)	
Induction (nonmidazolam / with midazolam) (%)		18/32 (36/64)	23/30 (43,4/56,6)	0.572
Drug used (maintenance)	Sevoflurane(%)	11 (22)	15 (28.3)	0.761
	Desflurane(%)	9 (18)	9 (7)	
	Midazolam-desflurane(%)	30 (60)	29 (54.7)	
Drug used (maintenance)	Fentanyl(%)	31 (62)	27 (50.9)	0.351
	Remifentanil(%)	19 (38)	26 (49.1)	

Table 3. Parameters evaluated in the evaluation of good and bad sleep

		Good sleep (n=50	Poor sleep (n=53)	p-value
Operation time (hours)		4.8±1.4 4 [3 – 8]	5.7±2.5 5 [3 – 14]	0.053
Hypertension		32 (64)	35 (66)	0.992
Diabetes mellitus		12 (24)	17 (32.1)	0.489
COPD		3 (6)	13 (24.5)	0.020
Chronic renal diseases/ failure		1 (2)	7 (13.2)	0.041
Guatr		-	5 (9.4)	0.047
Cerebrovascular diseases		1 (2)	1 (1.9)	1.000
Time to fall asleep (minutes)		19.5±11.3 15 [5 – 60]	67.4±39.4 60 [10 – 180]	<0.001
Awakening hour in the morning (time)		7.5± 0.7 8 [6 – 9]	6.3±1.0 6 [3 – 8]	<0.001
Duration of night sleep(hours)		7.6±0.7 8 [6 – 9]	5.3±1.3 5 [2 – 8]	<0.001
Hematocrit (%)		30.4±4.6 29.5 [22 – 41]	30.5±4.1 29.7 [23.8 – 39]	0.853
Urea (mg/dL)		44.8±20.9 43 [8 – 132]	47.8±27.2 50 [3 – 148]	0.942
Creatinine (mg/dL)		1.02±0.36 0.98 [0.41 – 2.02]	0.95±0.52 0.86 [0.30 – 2.70]	0.147
Surgery type	Cardiovascular	30 (60)	31 (58.5)	1.000
	Abdominal	20 (40)	22 (41.5)	
Effective Sleep	Very good	29 (58)	1 (1.9)	**<0.001**
	Good	21 (42)	17 (32.1)	
	Bad	-	23 (43.4)	
	Very bad	-	12 (22.6)	

COPD, chronic obstructive pulmonary disease; Percentages in brackets

The postoperative sleep quality of patients who underwent surgery over five hours or more duration was worse but not statistically significant (p:0.053).

The effect of the presence of chronic obstructive pulmonary diseases (COPD) on sleep quality was also evaluated. It was determined that the presence of COPD had a negative effect on sleep quality (p:0,020). Thirteen of 16 COPD patients had impaired sleep quality (Table 3).

In this study, it was established that sleep quality was impaired in patients with chronic renal failure (p:0.041) and goiter (p:0.047).Contrary to expectations, sleep quality was better in patients with high school or higher education level (p:0,024) (Table 1) . Another finding was that people with good sleep had a shorter time to fall asleep. Individuals with poor sleep woke up earlier in the morning. People with good sleep took longer to actually sleep at night. Individuals with bad sleep had a higher rate of bad and very bad effective sleep. Individuals with good sleep had a higher rate of subjective and very good sleep.

Discussion

Patients underwent major abdominal surgery had better sleep quality, which made us think that cardiopulmonary bypass had a bad effect on sleep. This finding is supported by the Hedges et al.'s study comparing patients who underwent coronary bypass surgery in terms of cardiopulmonary bypass use, PSQI revealed that sleep quality was better in patients who underwent off-pump coronary bypass surgery. (4)

Many sleep studies have shown that sleep quality deteriorates as age increases due to the decreased REM duration (5). In this study, we did not find a good or bad effect of age on sleep quality (p: 0,530). This insignificance may be due to the younger cohort population of our study (6), which leads to the suggestion of new studies with a wider and older age range.

The presence of COPD significantly affects sleep quality. Thirteen of 16 postoperative patients with COPD in our study had poor sleep quality (p:0.020). In many large patient studies conducted by Douglas et al., they showed that patients with COPD, interstitial lung disease or asthma had significantly disturbed sleep, and they attributed this to lung diseases, concomitant obstructive sleep apnea syndrome, hypoxia and hypoventilation during sleep (5-7). Lung capacity, which is already limited may decrease further with the opening of the abdomen and thorax in the operations performed, with the contribution of pain and atelectasis, and the sleep quality deteriorates with the increase in hypoxia and night coughing.

Studies conducted in hemodialysis patients with chronic kidney disease and chronic kidney failure have shown that sleep quality is impaired due to the frequent occurrence of itching and restless legs syndrome (8-10). In a study conducted by Saeedi et al. on 82 hemodialysis patients, they showed that patients who were given a one-month sleep hygiene treatment had a better sleep quality when evaluated with the PSQI one month later (11). In sleep hygiene treatment, patients were told and taught what they should and should not do before going to sleep. Edalat et al., in their study on 115 hemodialysis patients, found that 85% of the patients had sleep disorders. In addition, they showed that the duration of hemodialysis, diabetes and age had no effect on sleep quality (12). Harris et al. attributed sleep disturbance to cytokines that cause pain in hemodialysis patients. In addition, Pai et al. attributed sleep disturbance in hemodialysis patients to a higher prevalence of depression and a higher prevalence of anemia (10). Han et al.'s study suggests that PSQI score can be used as a predictor of all-cause mortality in dialysis patients and the cutoff applied to predict mortality was higher than the traditional diagnostic point. This is the first study in which a new cutoff has been investigated and used to predict the relationship of SQ measured by PSQI and all-cause mortality (13).

Although, the relationship of hypertension with poor or good sleep quality in our study could not be shown, the study by Yuan et al. showed that poor sleep quality is a bad risk factor for early-onset hypertension in young and middle age (14). Concurrently, our findings in this study support abovementioned manuscripts as chronic renal disease and chronic renal failure significantly affect sleep quality (p:0,041). (Table 4)

We also aimed to investigate whether anesthetic substances have an effect on postoperative sleep quality. Hypnotic drugs used in induction were propofol, pentothal and midazolam. The ones used in the maintenance were sevoflurane and desflurane. The opioids used in maintenance were remifentanil and fentanyl. No statistically significant difference was found between any of these drugs on sleep quality. Contrarily in the literature; Wenk et al. found that patients who were administered fentanyl-based anesthesia slept better than patients who were administered remifentanil-based anesthesia, and showed that the sleep of patients who received remifentanil in the first three weeks postoperatively was disrupted and returned to normal in the next three weeks (15). The fact that we could not find a difference in our study may have been due to the shorter postoperative follow-up period.

Smoking is known to prolong the time it takes to fall asleep. It is known that smokers have shorter sleep times and, accordingly, worse subjective sleep quality, which leads to deterioration in daytime functions and lengthens the time to fall asleep (16). In our study, no sleep disturbance was found in patients who used alcohol and cigarettes; however, this might be due to the small number of patients and the lack of reporting.

Obesity is known to be a predisposing factor for COPD and sleep apnea syndrome. In the study of Hung et al., it was found that obesity and female gender increase sleep disorders (17). In our study, patients with a body mass index of 30 and above were considered obese, and the effect of obesity on sleep quality was

investigated. A total of 22 patients were considered obese, and 12 of these patients had good sleep quality and 10 had poor sleep. No significant difference was found between the two groups (p:0.693).

The effect of the length of the operation was also evaluated. Sleep quality was worse in surgeries of 5 hours or more (p:0,053). Although it is not statistically significant, the long duration of the operation impairs sleep quality due to the presence of perioperative complications, the size of the operation field and pain were the causes of this sleep disorder.

As a result, contrary to the few studies conducted, it is found that anesthetic agents had no effect on postoperative sleep quality in this cohort. When comorbid diseases were evaluated, it was found that the rate of sleep disturbance was higher in patients with chronic renal disease and failure, due to the frequency of itching and restless legs syndrome, pain rates and chronic anemia.

The presence of COPD impairs postoperative sleep quality, and the sleep quality of patients with preoperative and postoperative COPD can be improved with aggressive treatment and with devices that will keep the airway open at night in patients with sleep apnea syndrome. Only two of 103 patients included, requested medical and psychological help for sleep disorders.

Limitations:

This study was limited by the small sample size and lack of a control group. Postoperative short follow-up limited the observation of effects of surgery on sleep quality in the long term. This was a single-center experience; therefore, outcome interpretation is limited by institutional bias. Implications of this study need further investigation.

Conclusion

Sleep has a very important place in accelerating the recovery process of postoperative patients. Preoperative assessment for sleep disorders is crucial for better postoperative course. Sleep quality is very important both to prevent future diseases and to increase the quality of life, particularly in patients with chronic diseases.

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