健 康 管 理 學 刊
第十一卷第二期民國一百零二年十二月
99-106 頁

Journal of Health Management
Vol. 11, No. 2, December 2013
pp. 99-106

手術對鼻中膈彎曲病患睡眠之影響

Effect of Nasal Surgery on Sleep Improvement in Patients with Nasal Septum Deviation

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摘要：鼻中膈彎曲病患因鼻部症狀影響，使得睡眠品質變差，手術是改善鼻中膈彎曲症狀的方法之一。本研究目即爲探討鼻中膈彎曲病患在手術前後睡眠品質、嗜睡及失眠之嚴重程度。採橫斷式研究設計，共收案 110 位病患。採用匹茲堡睡眠品質量表、嗜睡量表及阿森斯失眠量表分別測量睡眠品質、嗜睡及失眠。研究結果發現鼻中膈彎曲病患睡眠品質差，平均分數爲 7.26±3.54 (0–21)且呈現失眠狀況平均分數爲 7.55±4.70 (0–24)，嗜睡問題平均分數爲 8.95±4.24(0–24)。鼻中膈彎曲病患手術前後失眠程度、睡眠品質、嗜睡皆有顯著改善，達到統計顯著差異。鼻中膈彎曲病患經歷失眠及睡眠品質，故研究建議鼻中膈彎曲個案可以手術方式改善鼻中膈患者症狀，將可較佳的睡眠品質、減輕嗜睡及改善失眠。

關鍵字：鼻中膈彎曲、睡眠品質、嗜睡、失眠

Abstract: Nasal septum deviation (NSD) can result in sleep disorders. One of the strategies to treat the problem is to perform a nasal operation. The purpose of the present study was to determine and compare NSD patients' sleep quality and experiences of sleepiness and insomnia before and after surgery. This study was a cross-sectional research design. We recruited and interviewed 110 NSD

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patients for this study. The Pittsburgh Sleep Quality Index (PSQI), the Epworth Sleepiness Scale (ESS), and the Athens Insomnia Scale (AIS) were used to measure sleep quality, sleepiness, and insomnia, respectively. The results demonstrated that the NSD patients had poor sleep quality and that the average PSQI score was 7.26±3.54 (0–21) before the operation. The patients also experienced insomnia, with an average AIS score of 7.55±4.70 (0–24). The mean ESS score, on the other hand, was 8.92±4.24 (0–24). The NSD patients showed significantly improved sleep quality and reduced sleepiness and insomnia after a nasal operation. NSD patients experience poor sleep quality, and insomnia. The results suggest that nasal surgery can improve NSD symptoms that interfere with sleeping, thus helping patients get more quality sleep and reducing their sleepiness and improving insomnia.

Keywords: Nasal septum deviated; Sleep quality; Sleepiness; Insomnia

1. Introduction

The nasal septum is a plate that functions to separate the left and right chambers of the nose. If the nasal septum deviates or leans to one side, it can cause a partial or complete obstruction of the nose channel. The condition is termed nasal septum deviation (NSD), which is most frequently caused by congenital anatomy abnormality and by the compression of the nose during childbirth. It can also be caused by trauma (Matthias, 2008). In Korea, the prevalence rate of NSD was 42.94%, most cases of which were male and 8.8% of which had nasal channel obstruction (Cho *et al.*, 2008). Moreover, NSD is associated with other nasal diseases, including chronic hypertrophy rhinitis and chronic para-nasal sinusitis. As a result, respiratory problems are common, such as nasal distress.

Nasal distress interferes with sleep and causes tiredness, day sleepiness, and decreased memory in NSD patients. Inflammation could also affect the patients' breathing during sleep (Matthias, 2008). The NSD patients had stuffy noses that cause upper airway resistance, obstructive hypopnea, obstructive sleep apnea, and sleep-disordered breathing. Snoring during sleep can cause upper airway resistance and can add other serious nasal symptoms (Hsiao *et al*., 2009; Li, Lee, *et al.*, 2008). Naturally, a stuffy nose seems to increase the airway resistance, resulting in upper respiratory tract obstruction. If this condition was accompanied with snoring, the symptoms would then be serious and complex. The patients would suffer poor sleep (Léger *et al.*, 2006). Physicians usually prescribe oral drugs to treat nasal distress. However, if symptoms became serious, the patients would seek advance treatment, which is nasal operation (Matthias, 2008; Schwentner *et al.*, 2006). A nasal operation can improve stuffy nose and obstructive sleep apnea at night. Therefore, after operation, sleepiness during the day, snoring, sleep quality, awakening at night, respiratory problems during sleep, and alertness during the day are much better than before surgery (Hsiao *et al.*, 2009; Li, Lee, *et al.*, 2008; Li, Lin, *et al.*, 2008;. Lavie *et al.*, 1982). However, more clinical studies are needed to prove the efficacy of the operation (Baumann, 2010; Willatt, 2009).

The surgery for NSD includes submucous resection, submucous turbinectomy, septomeatoplasty, and septoturbinoplasty. The purpose of the operation is to rectify the deviated nasal septum (Matthias,

2008; Schwentner *et al.*, 2006). It can improve nasal symptoms and can decrease the frequency of taking drugs as well as reduce their side effects (Matthias, 2008; Stewart *et al.*, 2004). There is no available literature that explores sleep quality before and after surgery for NSD patients. Therefore, the present study hopes to explore the effects of nasal operation on the sleep of NSD patients. The aims of this study were (1) to assess the state of sleep quality, insomnia, and sleepiness before and after operation; (2) to compare the differences of sleep quality, insomnia, and sleepiness before and after operation; (3) to explore the relationships among sleep quality, insomnia, and sleepiness.

2. Methods

2.1 Selection of study subjects

NSD patients were recruited from the surgical ward of a teaching hospital in northern Taiwan. The selection criteria required that patients must (a) have undergone an operation for NSD, (b) be at least 18 years old, (c) not take hypnotic pills, (d) and be able to communicate in Mandarin or Taiwanese. Patients were excluded from the study if they had other operations besides the NSD surgery, had been diagnosed with sleep disorders, and had recently traveled overseas one week before and had jetlag.

2.2 Study design

This study was a cross-sectional research design and approved by the Institutional Review Board of Cathay Gerneral Hospital (CT98105). Patients who met the selection criteria were individually approached by the researchers, who described the study to the patients and obtained their informed consent from May 2010 to December 2011. At first, the researchers explained the questionnaire items to each patient, and the patients recorded their answers by themselves. When they returned the questionnares, we gave them post-operation questionnares in envelopes, which they must mail to us one month after the operation. The researchers called them by phone to remind them about it. If a questionnaire was lost, the researchers would mail a new questionnare. The questionnaires were considered valid if they were completed within 3 days.

2.3 Measurements

Demographic data: A demographic information sheet covers basic patient information, such as age, gender, educational level, marital status, number of naps in a day, experience of other nasal diseases, and characteristics of insomnia. Insomnia involves a series of complaints of difficultly initiating or maintaining sleep, non-restorative sleep for at least one month, and impairment of daily functioning.

2.3.1 Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) is a subjective self-report of sleep quality patterns. It consists of seven dimensions, including subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, sleep medications, and daytime dysfunction (Buysse *et al.*, 1989). The patients recall their sleep quality in the past month. The sum of these component scores yields one global score of subjective sleep quality with a range of 0–21. The higher the score is, the worse the

sleep quality is. A score of >5 indicates poor sleep quality. If the test-retest reliability is high (r=0.85, p<0.001), the sensitivity is 89.6% and is specifically 86.5% at a 5 cut-point (Buysse *et al.*, 1989).

2.3.2 Epworth Sleepiness Scale

The Epworth Sleepiness Scale (ESS) is a brief, self-administered questionnaire. It has eight items to measure sleepiness severity in daily life. The score ranges from 0 to 24, showing good reliability and validity (Johns, 1991). A score of >10 indicates sleepiness (Chen *et al.*, 2002).

2.3.3 Athens Insomnia Scale

The Athens Insomnia Scale (AIS) is an instrument that measures the severity of insomnia. It includes eight items, each scored from 0 (no problem at all) to 3 (a very serious problem). It gives a total score of 0–24. A total score greater than or equal to 6 indicates insomnia. The AIS is based on the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) and measures the sleep status in research and clinical practice. The AIS consists of eight measuring items: (1) difficulty of inducing sleep, (2) awakening during the night, (3) early-morning awakening, (4) total sleep time, (5) overall sleep quality, (6) well-being during the day, (7) functioning capacity during the day, and (8) sleepiness during the day. It has the screening ability with a cutoff score of 6 based on the balance between sensitivity (93%) and specificity (85%). It was reported to have a good predictive value of 99% (Soldatos *et al.*, 2000; Soldatos *et al.*, 2003).

2.4 Statistical analysis

Descriptive statistics were used to describe the PSQI, the AIS, the ESS, and the demographic data. The relationships between the PSQI, the AIS, and the ESS were evaluated by calculating the Pearson product moment correlation coefficients. We compared the PSQI, AIS, and ESS pre- and post-operation results using t-test. All P values of <0.05 were considered statistically significant.

3. Results

3.1 Demographic data

The study was initiated with a total of 169 NSD patients, and 120 questionnaires were returned. Ten of these, however, were not completed. Therefore, only 110 patients completed all questionnaires, with a completion rate of 65.1%. The average age of the participants was 34.05±10.47 years. Most were males (77.3%), and 68.2% fit the insomnia criteria. They had no other nose diseases except NSD. The demographic characteristics of the patients are listed in Table 1.

3.2 The severity of sleepiness, sleep quality, and insomnia before and after the operation for NSD patients

Before operation, the patients' average score was 7.26±3.54, as evaluated by the PSQI. It indicated that patients experienced poor sleep quality. The average AIS score was 7.55±4.70, which was beyond standard and showed that the patients suffered from insomnia. The ESS score was 8.92±4.24, which is

within the normal range, indicating no sleepiness for patients. After the operation, the scores of sleep quality, insomnia, and sleepiness were decreased and showed improved conditions. The comparison using t-test indicated a statistically significant difference between pre- and post-operation results. The details are listed in Table 2.

Table 1 Demographic data (*N*=110)

Variables	*n*	*%*	*Mean*	*SD*
Age	110	100	34.05	10.47
Gender				
Male	85	77.3		
Female	25	22.7		
Education				
≤12 years	34	30.9		
>12 years	76	69.1		
marital status				
Married	53	48.2		
Others	57	51.8		
Others nasal diseased				
No	95	86.4		
Yes	15	15		
Fit criteria of insomnia				
Yes	75	68.2		
No	35	31.8		
Nap				
No	45	40.9		
Yes	65	59.1		

Table 2 The severity of sleepiness, sleep quality, and insomnia before and after operation for NSD patients (*N*=110)

Variables	before		after				Differences	
	M	*SD*	*M*	*SD*	*t*	*p*	*M*	*SD*
PSQI	7.26	3.54	3.77	2.89	7.46	<0.001	3.49	3.43
ESS	8.95	4.24	5.54	3.81	10.67	<0.001	3.37	4.72
AIS	7.55	4.70	3.16	3.59	10.01	<0.001	4.39	4.60

Note. Pittsburgh Sleep Quality Index (PSQI)(range of 0~21); Epworth Sleepiness Scale (ESS) (range of 0~24); Athens Insomnia Scale (AIS) (range of 0~24).

3.3 The relationships among insomnia, sleepiness, and sleep quality before and after operation for NSD patients

Before the operation, the PSQI scores were correlated with the AIS scores (r=0.89, P <0.001) but not with the ESS data (P >0.05). After the surgery, the PSQI scores were correlated with the AIS and ESS scores (P <0.01). The results show high correlations between pre- and post-operation data on insomnia (r=0.41, P <0.001), sleepiness (r=0.32, P =0.001), and sleep quality (r=0.45, P <0.001) in NSD patients. All relationships between the scores are listed in Table 3.

Table 3 Relationships among insomnia, sleepiness, and sleep quality for NSD patients (*N*=110)

	ESS		PSQI		AIS
	before	after	before	after	before
ESS					
After	0.32** (p=0.001)				
PSQI					
Before	0.16(p=0.089)				
After		0.31** (p=0.001)	0.45** (p<0.001)		
AIS					
Before	0.09(p=0.361)		0.89** (p<0.001)		
After		0.34** (p<0.001)		0.79** (p<0.001)	0.41** (p<0.001)

4. Discussion

NSD patients would often have stuffy nose and would snore at night, interfering with the quality of their sleep (Li, Lee, *et al.*, 2008). In the present study, the NSD patients also showed poor sleep quality and insomnia before the operation. Medical professionals need to address these sleep issues. When people feel nasal discomfort, they go to see a doctor. Doctors then prescribe conservative treatment and medical drugs to relieve symptoms. However, when the symptoms become serious, an operation will be necessary to correct the original anatomy problem. Research results indicate that a nasal operation improves symptoms and increases life quality (Matthias, 2008; Arunachalam *et al.*, 2001; Heimer *et al.*, 1983; Stewart *et al.*, 2004; Schwentner *et al.*, 2006). In this study, sleep quality, insomnia, and sleepiness were improved after surgery. The sleep quality reached good states, and the scores for insomnia were in a normal range. The outcome was good for the patients' sleep. Their sleep quality, insomnia, and sleepiness were positively correlated. After the operation, the PSQI, AIS, and ESS scores were all decreased.

Of the participants, 65.1% completed the questionnaires. The rate of questionnaire completion was excess 60% and acceptable. However, there were several limitations in the study. Firstly, we recruited NSD patients from a teaching hospital, and their sleep disorders were more serious than those of outpatients. The study results could not be applied to all NSD patients. Furthermore, the instruments are all self-reported questionnaires, and the sleep data are all subjective. We suggest that the instruments can add portable polysomnographic data or Actiwatch data to obtain more objective sleep data in a further study. Moreover, these data can offer objective sleep parameters, including sleep onset latency, sleep efficiency, waking after sleep onset, and total sleep time. The results might provide useful information to scientific research and clinical practice. Future studies could follow a period to assess the long-sleep effect of nasal operation.

5. Conclusions

The NSD patients experienced poor sleep quality and insomnia before surgery. However, after the operation, their sleep quality, insomnia, and sleepiness improved. We therefore conclude that NSD patients with severe symptoms can opt to undergo nasal surgery to improve sleep quality.

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