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Postoperative delirium in patients undergoing head and neck surgery

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Abstract: Postoperative delirium (POD) is an acute change in cognitive status characterized by fluctuating consciousness and is associated with high incidences of morbidity, high complication rates, and long hospitalizations. This study was performed to determine pre and postoperative criteria for identifying patients at risk for delirium after major head and neck cancer surgery. In this descriptive analytical study**,** the subjects were 150 patients who underwent head and neck cancer surgery. Observations of subjects was conducted each shift and recorded using the delirium observation screening (DOS) scale. Preoperative factors included age, solitary life condition, drug treatment, preoperative hospitalized days, nutrition status, sensory impairment, comorbid diseases, surgical history, and history of delirium. Hospitalization time in excess of 10 days was considered as a long hospital stay. Postoperative delirium occurred in 40 of the 150 patients (26.6%), 24 men and 16 women. The duration of delirium ranged from 1 to 5 days, with a mean of 2.54 ± 0.84 days. Twenty five of the 90 men and 20 of the 60 women developed postoperative delirium. No significant difference was found in the occurrence of delirium between men and women. There were no significant differences in the occurrence of delirium according to the presence or absence of psychiatric disease history, preoperative radiotherapy, smoking habit, alcohol habit, solitary life, or long hospital stay. The incidence of postoperative delirium in patients with major cancer surgery of the head and neck was as high as 26.6.
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1. Introduction

Cancers that are known collectively as head and neck cancers usually begin in the squamous cells that line the moist, mucosal surfaces inside the head and neck. These squamous cell cancers are often referred to as squamous cell carcinomas of the head and neck.(Genther and Gourin 2012; Shah et al. 2012) Head and neck cancers can also begin in the salivary glands, but salivary gland cancers are relatively uncommon. Salivary glands contain many different types of cells that can become cancerous, so there are many different types of salivary gland cancer.(Ihrig et al. 2011; Marks et al. 2010) Cancers of the head and neck are further categorized by the area of the head or neck in which they begin. Most operations for head and neck cancer involve a hospital stay and an operation under general anaesthetic. But, in some situations if you have a very small cancer, it may be treated with a simple operation or laser surgery with no need to stay in hospital overnight.(Shiiba et al. 2009; Lansford et al. 2008) The extent of surgery depends on the size of the cancer and where it is. Delirium is defined as an acute disorder of attention and cognition. It is an abnormal mental state that included disorientation, combativeness, irritability and fear. Patients may have sensory misrepresentations or frank hallucinations. They may disconnect themselves from monitoring devices or even life support equipment and cause harm to themselves.(Weinstein et al. 2007; Kuo et al. 2008) Postoperative delirium is not an uncommon problem encountered in the intensive care unit. Its incidence varies from 10 to 60% in postoperative patients with orthopaedic, gynecological and cardiac procedures. Incidence in head and neck surgery patients with major reconstructions and image distortions may be much more due to the psycho-social issues involved.(Low et al. 2007; Taguchi et al. 2007) It is common in hospitalized patients and is associated with increased morbidity, length of stay in hospital and high dependency areas and a substantial financial burden. The classic manifestations of this syndrome are impaired cognition and decreased ability to maintain

attention. It is usually seen on the first or second postoperative day and symptoms are often worse at night.(Azama et al. 2007; Neyman et al. 2005) This study provided an opportunity to apply concepts about delirium in patients undergoing head and neck cancer surgery.

2. Material and Methods

In this descriptive-analytical study conducted at The subjects were 150 patients who underwent head and neck cancer surgery in Emam Reza Hospital, Tabriz between December 2010 and December 2012. Their age ranged from 6 to 83 years, with a mean of 46.24 ± 8.56 years. This study was approved by ethic committee of Tabriz university of medical sciences. Written consent was obtained from all the patients. Patients that had a risk for abnormal vital signs were sent to the intensive care unit for at least 12 h after the operation. An adjustable and portable patient or patient-relative controlled analgesic pump (fentanyl) was used on most patients for postoperative pain relief. Inouye summarized the clinical features of delirium: (1) acute onset, (2) fluctuating course, (3) inattention, (4) disorganized thinking, (5) altered level of consciousness, (6) perceptual disturbances, (7) psychomotor disturbances, (8) altered sleep-wake cycle, and (9) emotional disturbances. Patients with the first and second features, and any two of the other features, were evaluated by nurses. Observations of subjects was conducted each shift and recorded using the delirium observation screening (DOS) scale. This scale was developed based on the DSM-IV criteria for delirium (American Psychiatric Association 1994), literature review, clinical experience, and expert opinion. The DOS scale items can be observed by nurses during the regular care of the patients, and completing the scale takes only a few minutes. The scale shows high internal consistency (Cronbach's alpha, 0.96) and good predictive validity against a DSM-IV diagnosis ($P < 0.001$). Preoperative factors included age, solitary life condition, drug treatment, preoperative hospitalized days, nutrition status, sensory impairment, comorbid diseases, surgical history, history of delirium. Hospitalization time in excess of 10 days was considered as a long hospital stay. The malnutrition diagnostic criteria were total protein less than 61 g/L. Patients with sensory impairment were those who had diagnosed glaucoma, cataracts, blindness or deafness. Comorbid diseases were hypertension, diabetes mellitus, pulmonary disease, cardiac disease, central nervous system disorder, psychiatric disorder, chronic kidney disease, and chronic liver disease.

Statistical analysis

All data were analyzed by using SPSS 16.0. Numerical variables and ordinal variables were presented as mean and standard deviation (SD). Absolute numbers were for categorical variables. *T* tests were used for statistical analysis of the difference in the mean values between the delirium group and non-delirium control group, and the χ^2 test was used for the comparison of the categorical data. A *P* value less than 0.05 was considered statistically significant. Logistic regression analysis was also used to evaluate the various factors related to postoperative delirium.

3. Results

Postoperative delirium occurred in 40 of the 150 patients (26.6%), 24 men and 16 women. The delirium was observed between 2 and 5 days after surgery, with a mean of 3.2 ± 0.24 days. The duration of delirium ranged from 1 to 5 days, with a mean of 2.54 ± 0.84 days. Twenty five of the 90 men and 20 of the 60 women developed postoperative delirium. No significant difference was found in the occurrence of delirium between men and women. There was no significant difference in the ages of the patients with and without delirium. Thirty six of 40 delirium patients and 60 of 110 nondelirium patients had stage IV cancer, and there was a statistical difference in the occurrence of delirium between stage IV and the other stages (P < 0:05). There was no statistical difference in the surgical risk assessed by the ASA classification between the patient subsets. There were no significant differences in the occurrence of delirium according to the presence or absence of psychiatric disease history, preoperative radiotherapy, smoking habit, alcohol habit, solitary life, or long hospital stay (Table 1).

Table 1. Association between preoperative factors and delirium

	Delirium (%)	Non-delirium (%)	Statistical analysis
Mean age (years)	44.54 ± 5.46	48.12 ± 7.16	n.s.
Stage IV	6/40 (15)	60/110 (54.5)	*
Surgical risk	2.1	1.7	n.s.
Psychiatric disease	4/40 (10.0)	12/110 (10.9)	n.s.
Preoperative radiotherapy	36/40 (90.0)	70/110 (63.6)	n.s.
Smoking habit	20/40 (50.0)	60/110 (54.5)	n.s.
Alcohol habit	30/40 (75.0)	52/110 (47.2)	n.s.
Solitary life	8/40 (20.0)	14/110 (12.7)	n.s.
Long hospital stay	30/40 (75.0)	72/110 (65.4)	n.s.

n.s., no significant difference.
*** P < 0:05.**

There was no significant difference in the performance of radical neck dissection and tracheotomy between the delirium and nondelirium patient subsets. There was no significant difference in the intraoperative blood loss volume between the delirium and nondelirium patient subsets, but there were statistical differences in blood transfusion (P < 0:05) and infusion (P < 0:05) volumes between the subsets. The differences were remarkable in patients who received a blood transfusion of more than 4 units and infusion of more than 5000 ml. There were no significant differences between temperature above 38 8C, opiate use, or repeated surgerybetween the subsets. No significant differences were found in any of the postoperative laboratory data examined, including values of WBC, Na, K, BUN, Cr, PO2 or minimum oxygen saturation for three postoperative days, fluid balance for two postoperative days between the patient subsets.

4. Discussions

Diabetic subjects probably have a higher risk of the We undertook this study to identify specific clinical variables related to pre and postoperative delirium. The incidence of postoperative delirium in patients who have undergone head and neck cancer surgery has been reported to be 17%; it was observed in 26.6% of the patients in the current study. The incidence of delirium in our study was similar to that reported previously.(Yamagata et al. 2005; Kunimatsu et al. 2004) This study confirmed some of the previously identified predictors of postoperative delirium. Monden et al. published a clinical prediction rule for delirium after elective noncardiac surgery (hereinafter, the Marcantonio rule), which assigns 1 point for each of 6 predictors: (1) age older than 69 years; (2) poor preoperative cognitive status; (3) high risk surgery; (4) poor preoperative functional status; (5) markedly abnormal serum sodium, potassium, or glucose levels; and (6) heavy alcohol drinking, as defined by self-reported consumption of more than 2 drinks daily.(Monden et al. 2003) Several studies have indicated that advanced age of more than 70 years is a predisposing factor for postoperative delirium, because postoperative delirium increases obviously with age, and because a reduction in sensory perception may precipitate the confusion associated with advanced age.(Botella de et al. 2003; Harris and Poole 2002) However, our study did not show age as a factor of delirium. The discrepancy between previous reports and our results may be due to that in our study many subjects were younger than 70 years. Various intraoperative and postoperative factors have been indicated in association with delirium. Among these, as intraoperative factors, blood loss, transfusions, and infusion have been reported to be significantly associated with the development and severity of postoperative delirium. Blood transfusions and postoperative hematocrit value have been reported as postoperative factors. In laboratory tests, an increased WBC count as a consequence of infection, abnormal serum albumin, sodium, and potassium levels, and inadequate delivery of oxygen to the brain caused by low hematocrit have been reported as significant etiological factors in delirium patients. However, the current study showed no significant association between laboratory results, including postoperative arterial blood gas, and delirium. This discrepancy may be because there is no massive abnormal change in the extracellular fluid in head and neck surgery, unlike in abdominal and vascular surgery.(Brignolo et al. 2001; Gallivan and Reiter 2001) Although stage IV tumor was significantly associated with the development of delirium, as a preoperative factor, we believe the association was dependent on the extent of the surgery, rather than on the advanced lesion. The occurrence of postoperative delirium may be

associated with the postoperative conscious level. Further investigation including the conscious level is necessary to clarify the effect of medication for sleep disorder.(Emmelot-Vonk et al. 2001; Reinert 2000)

Conclusion

The incidence of postoperative delirium in patients with major cancer surgery of the head and neck was as high as 26.6.

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