

## Delirium prevalence and related risk factors in patients with head and neck cancer Surgery

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### Abstract

**Background & Aims:** Delirium is a common problem in hospitalized patients and may threaten the patient's life. Patients undergoing surgery may experience such a common complication. The high mortality in patients with delirium and lack of a rapid recovery from the disease, reveal the importance of addressing this problem. So the purpose of this study is to show the risk factors in the major head and neck cancer surgeries that cause delirium and help patients.

**Materials & Methods:** In this study, 104 patients with head and neck cancer candidates for surgery in Imam Reza Hospital in Tabriz university of medical sciences were studied. Demographic characteristics and risk factors of delirium were recorded and a personality test of MMPI was performed. All selected samples were studied. Data, based on T-TEST and ANOVA were analyzed.

**Results:** Based on obtained information %49.4 of study participants were female and %59.6 of men. More than 16% of them had previous disease such as Hypertension, Diabetes, Cardiac Infarction, Atrial fibrillation and pulmonary disease.

Results showed that %90.4 of patients was without delirium and %9.6 of them has experienced delirium. Findings also showed that the most frequent diagnosis in terms of MMPI test sequence was related to anxiety disorder such as schizoaffective and severe depression. Results indicated a significant relation between literacy and the likelihood of patients experiencing delirium is  $P=0.5$ . A significant relation between the type of surgery and the risk of delirium exists in the cancer of the larynx ( $P=0.1$ ) and also there was meaningful relation between the factors of the MMPI and delirium experiencing MA ( $p=0.5$ ) Pd ( $p=0.5$ ). There was no remarkable affinity between delirium and the existence of Hypertension, Diabetes, the residing period in ICU and the duration of Cardio Pulmonary diseases, potassium, sodium and glucose. The other findings also indicated that the MMPI test can be used as a tool to diagnose Delirium.

**Conclusion:** Because of high mortality in delirious patients we can get cognitive tests to recognize high risk persons to prevent. Psychic or psychotherapy is one of the first step of treatment.

**Keywords:** Delirium, Risk Factors, Head and Neck cancer surgery

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## Introduction

Delirium is defined as confusion and abnormal behavior that interfered with postoperative recovery. Delirium as an underdiagnosed disorder is classified as a syndrome rather than a disease. The classic manifestations of this syndrome are impaired cognition and decreased ability to maintain attention (1). It is usually seen on the first or second postoperative day and symptoms are often worse at night (2).

Delirium is frequently encountered in patients undergoing heart surgery and in some studies has been reported with a frequency of up to 90% in these patients (3).

In a study at Ahvaz University, it was also shown that there are further risk factors including cognitive, visual and auditory impairment, immobility, dehydration, sleep deprivation, and age 65 years old or higher there was meaningful (4).

In a similar study in Gilan University it was shown that 13.4% of patients in ICU of heart department experienced delirium in patient age 65 years old or higher (5).

In kerman university at the surgical department showed that in 6.7% of the post-operative patients experienced delirium (6).

According to the orthopedic department report, in thirteen (26%) were possibly or definitely delirious following of major orthopedic surgery (7).

In another study it was shown that the duration of delirium was short for patient who had operation than of patient without surgery, but the mortality was similar and high (8).

A study done in Vancouver on the post-operative delirium in geriatric patients showed 17.5% of patients experience delirium after surgery. A significant relation between age and level of the albumin are frequently reported (9).

In another study, it was shown that 73% of cases of the surgical ICU and 67% of the trauma ICU experienced delirium (10).

Age, time of operation, kind of surgery, transfusion, low hematocrit, level of sodium, and level of potassium were supposed a major risk factor for occurring of delirium post-operative head and neck cancer surgery (11).

Significant risk factors in a meta-analysis were age, dementia, severe illness, poor vision, urinary catheters, polypharmacy and low albumin (12).

Given the high mortality rate of delirious patients and their relatives and medical institutions as well as the lack of a rapid recovery from the disease, reveals the importance of addressing this problem. Since there is a few studies about delirium after major head and neck cancer surgery, this study was carried out to determine risk factors for development of delirium after major head and neck cancer surgery.

## Materials and Methods

In this study, 104 patients with head and neck advanced cancer were candidates for surgery in Imam Reza Hospital in Tabriz University of medical sciences. This study was approved by the Ethic Committee of Tabriz University of medical sciences. Written consent was obtained from all the patients. Sampling and questionnaires of demographic characteristics and risk factors of delirium and a personality test of MMPI were used. Inclusion criteria were advanced head and neck cancers (advanced oral and tongue cancer, radical neck dissection, advanced hypo pharynx and larynx cancers), and exclusion criteria were minor surgery in limited mucosal cancer and biopsy. All patient data, based on T-TEST and ANOVA, were analyzed.

## Results

Based on information obtained %49.4 of the study participants were female and %59.6 of them was

men. More than 16% of them had the previous disease such as Hypertension, Diabetes, Cardiac infarction, atrial fibrillation and pulmonary disease.

Results showed that 90.4% of patients was without delirium and 9.6% of them has experienced delirium. The findings also showed that the most frequent diagnosis in terms of MMPI test sequences related to anxiety disorder such as schizoaffective and severe depression.

Results indicated a significant relationship between literacy and the likelihood of patients experiencing delirious ( $P=0.05$ ). A significant relationship between the type of surgery and the risk of delirium exists in the cancer of the larynx ( $P=0.01$ ), and also there was a meaningful relationship between the factors of the MMPI and delirium experiencing MA ( $p=0.05$ ) Pd ( $p=0.05$ ). There is no remarkable affinity between Delirium and the existence of Hypertension, Diabetes, the residing period in ICU

and the duration of Cardio Pulmonary diseases, potassium, sodium and glucose. No significant differences were found in any of the postoperative laboratory data examined, including values of WBC, Na, K, BUN, Cr, PO<sub>2</sub> or minimum oxygen saturation for three postoperative days, fluid balance for two postoperative days between the patient subsets.

The other findings also indicated that the MMPI test can be used as a tool to diagnose Delirium.

**Relationship between type of surgery and delirium:**

Based on data in the Table (1, 2) and K2 examination delirium was occurred as follow: 26.1% of the laryngeal cancer, 5.8% of the neck dissection, and 4.7% of the oral cavity and tongue cancer after surgery. This means that frequency of the delirium was higher in advanced laryngeal cancer surgery than the others.

**Table 1.** Prevalence of patient for surgery

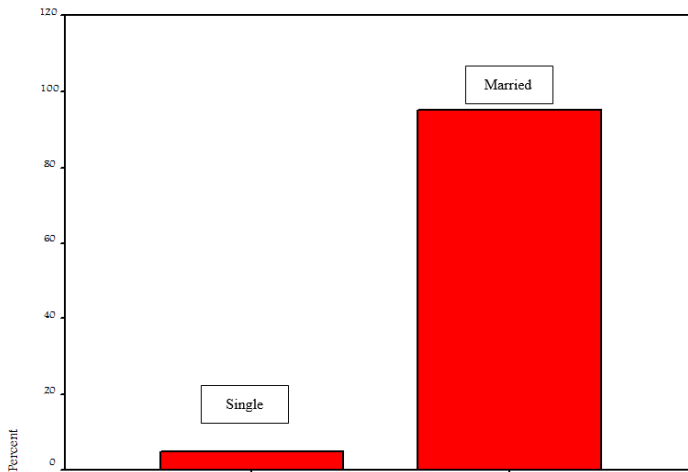
patients	frequency	percent	Valid percent	Cumulative percent
Laryngeal cancer	23	22.1	22.1	22.1
Neck dissection	17	16.5	16.3	38.5
Oral and tongue cancer	64	61.5	61.5	100.0
total	104	100.0	100.0	

**Table 2.** Frequency of Delirium in different cancer surgery

patients	frequency	percent
Laryngeal cancer	6/23	26.1
Neck dissection	1/17	5.8
Oral and tongue cancer	3/64	4.7
total	10	100.0

**Marital status of the patients:**

Data in Fig.1 showed that 94.2% of the participants in this study were married and 1% was single, so most of the patients were married.



**Fig.1.** Frequency of Marital status of the patients

### Relationship between level of education of patients and delirium:

Based on data in the Table 3, there was a significant relationship between literacy and the likelihood of patients experiencing delirium ( $P=0.05$ ).

This study shows that Semi literacy was a prevalent characteristic in most of the delirious patients.

**Table 3.** Relationship between level of education of patients and delirium

Level of education	Prevalence	Percent	Delirium	
Illiterate	52	50	7	6.7%
Junior high school	29	27.9	2	1.9%
Diploma	17	16.3	1	0.96%
Associate Degree	3	2.9	-	-
Bachelor	3	2.9	-	-
Total	104	100	100	

### Discussion

This study was carried out to determine risk factors for delirium after major head and neck cancer surgery. Our study showed Semi literacy was a prevalent characteristic in most of the delirious patients, which means that 70% patients experienced delirium were illiterate. Also the type of surgery was meaningful as 60% of delirium occurred in post-operative of advanced laryngeal cancer. Literacy and advance laryngeal cancer surgery were the main risk factors for delirium among patients.

This finding confirms the findings of the thoracic and heart disease center of Tabriz University of medical sciences and the Marmara University Hospital study (14, 13).

Giluan, Tehran, Kerman Vancouver researches (3, 4, 5, 9) attend to this sign that the profile of delirious patients in MMPI test is different. This confirms the findings of Shealy AE15, Kampman R16 and the comparative studies of surgeries which indicated that delirium in orthopedic and trauma and also head and neck cancer patients are more than others. In accordance

of previous studies, this survey showed that semi literacy was a prevalent characteristic in most of the delirious patients. Also the type of surgery was meaningful. 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 (17, 18). However, the current study showed no significant association between laboratory results, including postoperative arterial blood gas, and delirium. This discrepancy may be due to the fact that there is no massive abnormal change in the extracellular fluid in head and neck surgery, unlike in abdominal and vascular surgery.

Although advanced tumor (staged 3 or more) was significantly associated with the development of delirium, as a preoperative factor, but we believe that the association was dependent on the extent and duration of the surgery.

It can be pointed that cognitive disorders are less frequent when somebody is educated and have enough familiarity with the environment and surrounding vicinity.

Because of high mortality and morality in delirious patients we can get cognitive tests and recognize high risk persons to prevent. Psychic and psychotherapy is one of first step treatment.

### Conclusion

Because of high mortality and morality in delirious patients we can get cognitive tests for recognize high risk persons to preventing. Psychic and psychotherapy is one of first step treatment in these patients.

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### References

1. Rafee R. An introduction to behavioral sciences, clinical psychiatry. Tehran: Arjmand publication; 2003. P. 337.
2. Sadock BJ, Sadock VA. Kaplan&Sadock's Synopsis of Psychiatry. 9<sup>th</sup> ed. Philadelphia: Lippincott Williams & Wilkins; 2003. P.552.
3. Yildizeli M, Özyurtkan O, Batirel HF, Kuscu K, Bekiroglu N, Yüksel M. Factors associated with postoperative delirium after thoracic surgery. *Ann ThoracSurg* 2005;79: 1004–9.
4. Tashakori A, Shanehsaz A, KhajehMoughahi N. Comparison of incidence rate of post-operative Delirium between patients with open-heart surgery and general surgery, Ahwaz Golestan Hospital. *Sci Med J* 2004;41: 37–43.
5. Modirmya M, Khalkhali M. Delirium In CCU patients. *Gilan Univ J* 2002; 1: 1–7.
6. BaghaeiVaji M, Dehghan A, OstovarSirjani F, Parvaresh N. A study on the incidence of postoperative Delirium in the operated patients in Kerman medical sciences university hospitals in 1999. *J Kerman Univ Med Sci* . 2001; 8: 74–80.
7. Rogers MP, Liang MH, Daltroy LH, Eaton H, Peteet J, Wright E. et al. Delirium after elective orthopedic surgery: risk factors and natural history. *Int J Psychiatry Med* 1989; 19: 109–21.
8. Manos PJ, Wu R. The Duration of Delirium in medical and Post-operative Patients Referred for psychiatric consultation. *Ann ClinPsychiatry* 1997;9: 219–26.
9. McAlpine JN, Hodgson EJ, Abramowitz S, Richman SM, Su Y, Kelly MG, et al. The incidence and risk factors associated with postoperative delirium in geriatric patients undergoing surgery for suspected gynecologic malignancies. *Gynecol Oncol* 2008;109(2): 296–302.

10. Pandharipande P, Cotton BA, Shintani A, Thompson J, Pun BT, Morris JA Jr. et al. Prevalence and risk factors for development of delirium in surgical and trauma intensive care unit patients. *J Trauma* 2008;65: 34–41.
11. Yamagata K, Onizawa K, Yusa H, Wakatsuki T, Yanagawa T, Yoshida H. Risk factors for postoperative delirium in patients undergoing head and neck cancer surgery. *Int J Oral Maxillofac Surg* 2005;34(1): 33–6.
12. Penel N, Amela EY, Mallet Y, Lefebvre D, Clisant S, Kara A. et al. A simple predictive model for postoperative mortality after head and neck cancer surgery with opening of mucosa. *Oral Oncol* 2007;43: 174–80.
13. Jodati A, Safaie N, Raoofi M, Ghorbani L, Ranjbar F, Noorazar G, et al. Prevalence and risk factors of postoperative delirium in patients undergoing open heart surgery in northwest of iran. *J Cardiovasc Thorac Res* 2013;5(3): 97–9.
14. Yildizeli B, Ozyurtkan MO, Batirel HF, Kuşcu K, Bekiroğlu N, Yüksel M. Factors associated with postoperative delirium after thoracic surgery. *Ann Thorac Surg* 2005;79(3): 1004–9.
15. Shealy AE, Walker DR. Minnesota Multiphasic Personality Inventory prediction of intellectual changes following cardiac surgery. *J Nerv Ment Dis* 1978;166: 263–7.
16. Kampman R, Tienari P, Outakoski J, Hirvenoja R, Juolasmaa A. Psychic complications following open heart surgery: A review article. *Nord Psykiatr Tidsskr* 1977;31(7): 484–95.
17. Sanaei Y. Prevalence of psychological problem in Tehran hospital in 1387 <http://www.lsnatums.com/news/archives/research/003456.php/html>
18. Gallivan KH, Reiter D. Acute alcohol withdrawal and free flap mandibular reconstruction outcomes. *Arch Facial Plast Surg* 2001;3: 264-6.