

# ROLE OF AGE ON POSTOPERATIVE DELIRIUM (POD) INCIDENCE IN UROLOGY PATIENTS

**Haxhire GANI, Majlinda NAÇO,  
Vjollca BEQIRI, Rajmonda TARE,  
Dhurata TORBA, Rudin DOMI,  
Pirro PRIFTI**

Hospital University Center "Mother Teresa", Service of Surgery

## Abstract

**Background:** Delirium is a frequent post operative disorder to the sick and elderly, and always has been associated with extent of day stay in hospital, and certainly more cost for the hospital as well. The delirium causes an increased mortality and an increasing of mental status deterioration characterized by reduction of environmental recognition as well as the disorder of alertness. The purposes of this study are: The effectiveness of routine screening of postoperative Delirium in the elderly using Confusion Assessment Method (CAM). Psychiatrists are not necessary in this case. Understanding of risk factors and strategies for prevention and treatment, -Understanding of the impact of this psychotic disorders in postoperative morbidity and mortality. Recognition of the economic impact of these disorders in the health service. Describing of the etiology and incidence of Delirium post-operative.

**The material and methods:** In this study are included 2890 patients aged over 65 years who underwent an operation at the urologic clinic. This study is prospective and random. All patients with psychological problems in admission and that were treated for these pathologies before admission in Urology Clinic are excluded from the study.

**Results:** Are evaluated all the data taken from patients and from their examinations as: age, usage of medications, symptoms and problems, biochemical and clinical balance, hemodynamic examination, and preoperative, intra operative and postoperative evaluations. Is observed that post operative Delirium occurred at 543 patients from 2890 in total on the average of 19% of patients. Incidence was increased with increasing of age from 16%, 19%, to 23%.

**Conclusion:** Postoperative Delirium occurs as a result of the combination of several factors, not just those related to internal physiological age, but combining of these factors with the diseases which carries this age, with

medications used for this age, with surgical stress, with biochemical imbalances, hemodynamic problems, and electrolytic disorders as well.

**Key word:** POD, CAM, surgical stress, physiological age.

## Introduction

With the increase of the average age the surgeries in elderly are also increased. The surgery plays an important role on emotional and spiritual deterioration on elderly. As per American psychiatric association Delirium is defined as "disorientation to time place and person and decrease of ability to concentrate or to pay attention or decrease ability for correct perception". Post operation Delirium is closely associated with high mortality and morbidity and with longer hospitalization.

Being able to diagnose Delirium is the main goal as per it is diagnosed without any specific laboratory tests or other kind of examination and patients don't have physical changes that could assist on delirium diagnoses (even if they have psychophysical changes they could be associated with other pathologic). New technology in surgery and anesthesia and improved postoperative intensive care has made surgeries in elderly possible. Regardless of improved surgery outcome, on elderly a large number of that patient have experience on cognitive disorders. Patients that are delirious often are disoriented on person, are unable to make decisions, unable to perceive danger and have short term memory loss. Risk factors to this complication are: advanced age, increase on medication usage, cerebral damages, surgery and anesthesia, hypoxia, infection, stress, overwhelmed, electrolyte disbalance, pain and endocrine/ metabolic disorders. Delirium is a very costly complication; it costs a lot to diagnose, to treat and to deal with other complications that are closely related to Delirium. Hearing and vision problems are highly associated with this problem. Etiology of psychiatrist complication postoperatively is multifactorial. There are few mechanisms known that

contribute to postoperative delirium occurrence. Many theories support neurotransmitter imbalance. One of the most widely accepted theory is cholinergic deficit. Another hypothesis supports abnormal level of melatonin and serotonin, abnormal metabolism of tryptophan which is precursor for both melatonin and serotonin Noradrenergic hyperactivity. Neuron damage from stress, oxidative or inflammation, increase of proinflammatory cytokines, especially that of interleukin-6 and interleukin -8,25 and also increase of protein C-reactive. Delirium could be multi-factorial and could have unclear etiology. There have been proposed an association between inflammation and neurotransmitters, where inflammation induces per vascular edema which leads to hypoxia which is associated with acetylcholine synthesis reduction. On general Delirium displays global dysfunction of the brain. On electroencephalography was found a fast decrease of Alfa frequency and a gradual increase of theta. When the patient is hypoactive we mainly have total hypo perfusion of frontal lobe, temporal lobe, occipital and parietal on CT scan, thalamus and on lentikular cells. Delirium improves when blood flow returns to normal; this suggests that hypo perfusion could play a role. Previous comorbidity is a factor on the increase of this complication as well. Diabetic, HTA, vascular accidents, acute myocardial, atria fibrillation, poor nourishment, urgent surgery, alcohol abuse post operation analgesia, surgery length, benzodiazepine, anticholinergics, immobilization. Multiple medication use, urinary catheter, electrolyte abnormalities, need for blood transfusion, pre-operation hemodynamic, and hypoxemia. Physiologic changes to the elderly brain is loss of thalamus neuron and basal ganglion, general reduction of neuron density, and loss of 30% of brain mass on ages after 80 years old. Decrease of serotonin receptor numbers on cortex. Decrease of acetylcholine/acetylcholine receptor levels on some brain areas. Decrease of dopamine levels on neostriatum and nigra substance and reduction of dopamine receptors on neostriatum. Increase of post-operation cortisol. Nevertheless the physiologic and psychic age is not the same with chronologic one. Old age is a multiple factor process where adaptive capacity is gradually reduced and gradual reduction of functional ability of many systems is seen. While trying to analyze and discover factors (not the above one because there we could not intervene but the one that are associated with intervention and anesthesia). Full understanding of pharmacokinetic and pharmacodynamic to those patients. We could take interventional measures to prevent or minimize those complications. On the cases when it could not be prevented, the treatment is not only symptomatic as it was done until now but etiologic and pathiopathologic as well. Successful prevention or effective treatment of those complications has a very positive and direct effect on surgery outcome and patients' quality of life.

## Material and method

This study is random and prospective. As a method was used Confusion Assessment Method (CAM). All patients that were admitted in the urology clinic were over 65 years old (2890 patients). The study period started from January 2006 - December 2011. Patients that had been diagnosed and treated for psychiatric problems (Alzheimer's, Dementia senile, Schizophrenia) were excluded from the study. All patients were analyzed as per inclusion requirement and after were analyzed to determine which factor had bigger effect or had no effect on those complications.

**Preoperative assessment for delirium risk:** All patients underwent a detailed assessment (possible existing illness). Some of them were receiving medication for other health problems they could have had. Were they consuming alcohol, did they smoke, the age. The readiness for surgery and knowledge level around the procedure that was to be done. Was analyzed the kind of anesthesia which was planned to be performed, laboratory values (blood count, electrolyte, biocimic).

**Intraoperative assessment for delirium risk:** Medications that were used for anesthesia, local anesthesia or epidural/spinal, what kind of muscle relaxants were used, hemodynamic changes, respiratory levels, SaO<sub>2</sub> possible decrease, blood loss etc.

**Post-operation assessment for delirium risk:** Blood count, biocimic, electrolytes, pain, hemodynamic. Post operator used medications, such as anti-inflammatory, corticosteroid, morphine, anxiolytic, atropine, diuretics, antihistamin H1 and H2, Immunosuppressor, insulin, and hypoglycemic oral, antihypertensive and other cardiac medication, anticonvulsant, antimicrobics etc.

Table nr.1. General data

Age in years	Patient Nr.	F	M
65-70	1052 (36.4%)	23 (2.2%)	1029 (87.8%)
71-80	1519 (52.6%)	12 (0.8%)	1507 (99.2%)
>81	319 (11.0%)	2 (0.6%)	317 (99.4%)

## Results

Postoperative Delirium was noted only on males but it was not statistically significant as per female number was small. Was found that this complication increases with age and was noted on 543 patients (19%) of patients when incidence as per age was respectively to patient of ages 65-70 years old. Almost 168 patients (16%) on the age group 71-80 years old was found on 302 patients

(11%) of all patients, but 19% ( $\chi^2 = 206.9$   $p < 0.01$ ) of patients of this age group. and on age group  $>81$  years old was found on 73 patients (2.5%) of all patients and 23% ( $\chi^2 = 1.3$   $p = 0.5$ ) of patients of this age group. So as we see on those statistic data this complication is very closely related with age and increases with age. Respectively 16%, 19% and 23%. On the first age group 65-70 years old this complication was noted only to patients intropoperatively that had abnormal hemodinamic levels, which received blood transfusion or received adrenalin and atropin. There was difference between spinal anesthesia or endotracheal anesthesia. On the age group 71-80 years old this complication was not only seen on the patients that had abnormal blood count intraoperatore, but had preoperator comorbidity and used some medication, had anemia preoperatively and related with other pathologies that they had undergone the surgery on the first place. They had urinary catheter. On the age group  $>81$  years old only 7 patients needed blood transfusion and 12 patients needed to use adrenalin and atropin intra-operatively on the meantime Delirium was seen on 73 patients.

**Table nr.2 Post-operativley Delirium Incidence**

Age	Patients nr	% for each age-group	% total
65-70	168	16%	23%
71-80	302	19%	11%
$>81$	73	23%	2.5%

Seams like it has lower incidence on the age group  $>81$  years old, but is not statistically significant, I think because patients' number was not the same on all age groups (It is lower on this age group). So I think it is very important to take in consideration the percentration of delirium inside the group.

### Conclusions

Delirium incidence postopeatively on elderly is associated with physiological changes of the brain and with previous comorbidity also with biochemic disequilibrium, hormonal, hemodinamic. The presence of some of those factors together not only makes it possible for delirium to accur but increase the incident as well.

### References

1. Brown TM, Boyle MF.: Delirium. BMJ 2002;325 (7365):644-7.
2. Marcantonio ER, Flacker JM, Michaels M., et al.: Delirium is independently associated with poor functional recovery after hip fracture. J Am Geriatr Soc 2000; 48(6):618-24.
3. Rudolph JL, Jones RN, Rasmussen LS, et al.: Independent vascular and cognitive risk factors for postoperative delirium. Am J Med 2007;120(9):807-13.
4. Edelstein DM, Aharonoff GB, Karp A., et al.: Effect of postoperative delirium on outcome after hip fracture. Clin Orthop Relat Res 2004;422:195-200.
5. Zakriya K., Sieber FE, Christmas C., et al.: Brief postoperative delirium in hip fracture patients affects functional outcome at three months. Anesth Analg 2004; 98(6):1798-802.
6. Lundstrom M., Olofsson B., Stenvall M., et al.: Postoperative delirium in old patients with femoral neck fracture: a randomized intervention study. Aging Clin Exp Res 2007;19(3):178-86.
7. Norkiene I., Ringaitiene D., Misiuriene I., et al.: Incidence and precipitating factors of delirium after coronary artery bypass grafting. Scand Cardiovasc J 2007; 41(3):180-5.
8. Olofsson B., Lundstro"m M., Borss\_en B., et al.: Delirium is associated with poor rehabilitation outcome in elderly patients treated for femoral neck fractures. Scand J Caring Sci 2005;19 (2): 119-27.
9. Bo"hnner H, Hummel TC, Habel U., et al.: Predicting delirium after vascular surgery. A model based on pre- and intraoperative data. Ann Surg 2003;238(1):149-56.
10. Bucerius J., Gummert JF, Borger MA, et al.: Predictors of delirium after cardiac surgery delirium: effect of beating-heart (off-pump) surgery. J Thorac Cardiovasc Surg 2004;127(1):57-64.
11. Edlund A., Lundstro"m M., Lundstro"m G., et al.: Clinical profile of delirium in patients treated for femoral neck fractures. Dement Geriatr Cogn Disord 1999;10(5):325-9.
12. Dupplis GS, Wikblad K.: Cognitive function and health-related quality of life after delirium in connection with hip surgery. A six-month follow-up. Orthop Nurs 2004;23(3):195-203.
13. Lundstro"m M., Edlund A., Bucht G., et al.: Dementia after delirium in patients with femoral neck fractures. J Am Geriatr Soc 2003;51(7):1002-6.
14. Bowman AM. Sleep satisfaction, perceived pain and acute confusion in elderly clients undergoing orthopaedic procedures. J Adv Nurs 1997;26(3):550-64.
15. Breitbart W., Gibson C., Tremblay A.: The delirium experience: delirium recall and delirium-related distress in hospitalized patients with cancer, their spouses/caregivers, and their nurses. Psychosomatics 2002;43(3):183-94.
16. Department of Health and Human Services. 2004 CMS Statistics. CMS publication no. 03445.

- Washington, DC: Department of Health and Human Services; 2004. Postoperative Delirium 679.
17. **Leslie DL, Marcantonio ER, Zhang Y, et al.:** One-year health care costs associated with delirium in the elderly population. *Arch Intern Med* 2008;168(1):27-32.
18. **Mussi C., Ferrari R., Ascari S., et al.:** Importance of serum anticholinergic activity in the assessment of elderly patients with delirium. *J Geriatr Psychiatry Neurol* 1999;12(2):82-6.
19. **Uchida K., Aoki T., Ishizuka B.:** Postoperative delirium and plasma melatonin. *Med Hypotheses* 1999; 53(2):103-6.
20. **Balan S., Leibovitz A., Zila SO, et al.:** The relation between the clinical subtypes of delirium and the urinary level of 6-SMT. *J Neuropsychiatry Clin Neurosci* 2003; 15(3):363-6.
21. **Lewis MC, Barnett SR.:** Postoperative delirium: the tryptophan dysregulation model. *Med Hypotheses* 2004;63(3):402-6.
22. **Nakamura J., Yoshimura R., Okuno T., et al.:** Association of plasma free-3-methoxy-4-hydroxyphenyl (ethylene)glycol, natural killer cell activity and delirium in postoperative patients. *Int Clin Psychopharmacol* 2001;16(6):339-43.
23. **Karlidag R., Unal S., Sezer OH, et al.:** The role of oxidative stress in postoperative delirium. *Gen Hosp Psychiatry* 2006;28(5):418-23.
24. **Rudolph JL, Ramlawi B., Kuchel GA, et al.:** Chemokines are associated with delirium after cardiac surgery. *J Gerontol A Biol Sci Med Sci* 2008;63A(2):184-9.
25. **de Rooij SE, van Munster BC, Korevaar JC, et al.:** Cytokines and acute phase response in delirium. *J Psychosom Res* 2007;62(5):521-5.
26. **Hala M.:** Pathophysiology of postoperative delirium: systemic inflammation as a response to surgical trauma causes diffuse microcirculatory impairment. *Med Hypotheses* 2007;68(1):194-6.
27. **Plaschke K., Hill H., Engelhardt R., et al.:** EEG changes and serum anticholinergic activity measured in patients with delirium in the intensive care unit. *Anaesthesia* 2007;62(12):1217-23.
28. **Yokota H., Ogawa S., Kurokawa A., et al.:** Regional cerebral blood flow in delirium patients. *Psychiatry Clin Neurosci* 2003;57(3):337-9.
29. **Inouye SK.:** Predisposing and precipitating factors for delirium in hospitalized older patients. *Dement Geriatr Cogn Disord* 1999;10(5):393-400.
30. **Inouye SK, Charpentier PA.:** Precipitating factors for delirium in hospitalized elderly persons. Predictive model and interrelationship with baseline vulnerability. *J Am Med Assoc* 1996; 275 (11):852-7.
31. **Inouye SK.:** The dilemma of delirium: clinical and research controversies regarding diagnosis and evaluation of delirium in hospitalized elderly medical patients. *Am J Med* 1994;97(3):278-88.
32. **Eriksson M., Samuelsson E., Gustafson Y., et al.:** Delirium after coronary bypass surgery evaluated by the organic brain syndrome protocol. *Scand Cardiovasc J* 2002;36(4):250-5.
33. **Leung JM, Sands LP, Vaurio LE, et al.:** Nitrous oxide does not change the incidence of postoperative delirium or cognitive decline in elderly surgical patients. *Br J Anaesth* 2006; 96 (6): 754-60.
34. **Frederick E. Sieber.** Postoperative Delirium in the Elderly Surgical Patient *Anesthesiology Clinics*. September 2009 (Vol. 27, Issue 3, Pages 451-464).
35. **Anita S. Bagri, Alex Rico, Jorge G. Ruiz:** Evaluation and Management of the Elderly Patient at Risk for Postoperative Delirium *Thoracic Surgery Clinics*. August 2009 (Vol. 19, Issue 3, Pages 363-376).