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CASE REPORT

# Postoperative Delirium in a Patient Following Laparoscopic Cholecystectomy and Spinal Anesthesia

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## Abstract

Delirium is one of the postsurgical complications in the geriatric population. Its incidence was reported up to 65% following major operations, and it is accompanied with high cost, morbidity and mortality. A 65-year-old man candidate for laparoscopic cholecystectomy under spinal anesthesia. His hypertension was under control with captopril 50 mg daily. In the middle of the surgery, he had cardiac arrest and cardiopulmonary resuscitation was performed. Vital signs improved within 6 minutes, but he was unconscious after operation. Patient was transferred to ICU and was treated for metabolic changes, hemodynamic instability and midazolam or haloperidol for agitation and restlessness symptoms. Blood tests, ECG, brain scan, and MRI were reported normal. Patient had impaired consciousness for 8-9 days, and he was discharged from the hospital in good physical status and totally conscious state on day 12. Patient suffered chest pain and died 4 days later. Postoperative delirium can be predicted in this patient considering all risk factors; male gender, advanced age, cardiac arrest, hemodynamic disorder, and admission in ICU are some of the predisposing risk factors. Treatments included removing intensifying stressors, treating risk factors, limited use of tranquilizers, pain control and finally using antipsychotics like haloperidol for aggressive behaviors.

## Keywords

Delirium, Spinal anesthesia, Laparoscopic cholecystectomy

## Case Description

Patient was a 65-year-old man, 74 kg, with a history of abdominal pain and gallstones, candidate for laparoscopic cholecystectomy. Patient was conscious and answered properly to all the questions. He had no history of angina, obvious exertional dyspnea and cerebral vascular p attack. Past medical history - patient had just controlled hypertension with captopril 50 mg daily. Pre-operative laboratory tests, electrocardiography and chest X-ray were normal. Patient was monitored during the operation: Heart rate, non-invasive blood pressure, peripheral oximetry, and capnography through nasal cannula. Heart-rate was 64 beats/min and blood pressure was 142/82 mmHg before anesthesia induction. A vein catheter No = 18 was inserted in elbow vein and 200 ml ringer solution was administered. Due to the old age and for better control of post-operative pain and lower incidence of shoulder pain, spinal anesthesia was used. Patient received spinal anesthesia with a needle No = 24 in L3-L4 space in sitting position. 15 mg bupivacaine was administered and immediately patient put off to supine position. After T4 level anesthesia and blood pressure stability, surgery was started. Midazolam 1 mg was used after anesthesia stabilisation. Patient was lying down comfortably and praying, vital signs were stable until 15 minutes after the beginning of operation (heart rate = 60-76 beats/min, blood pressure = 105-124/68-80 mmHg, end-tidal $CO_2$ = 28-30 $cmH_2O$). At 15$^{th}$ minute, blood oxygenation decreased (86%), heart rate increased (114 beats/min), expiratory $CO^2$ decreased (15 $cmH_2O$), immediately the blood pressure decreased dramatically, and the patient had a cardiac arrest and asystole.

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The operation was stopped, intra-abdominal gas was removed, and cardiopulmonary resuscitation was performed. Cardiac massage, tracheal intubation, and mechanical ventilation with positive pressure were carried out and 0.1 mg epinephrine was administered. Ventricular fibrillation was observed after 3 minutes. Then patient received biphasic shock 150 Jules and 1 mg epinephrine, shock was repeated after 1 minute. Six minutes after cardiac arrest, sinus rhythm returned, and peripheral pulse was palpable. Patient had several PVC therefore 100 mg lidocaine was administered. After resuscitation and return of sinus rhythm, the patient's vital signs were as follows: Blood pressure = 200/110 mmHg, heart rate = 104 beats/min, expiratory $CO_2$ = 36 mmHg and SpO2 = 97%. Because the gallbladder was removed, but there was insufficient bleeding control and suturing, the laparoscopic surgery continued with 4 mg cisatracurium, and propofol infusion70 µg/kg/min. To control the blood pressure, 5 mg ephedrine was administrated twice. Neostigmine and atropine were administrated 25 minutes after the completion of the surgery, return of respiration and gag reflex, with blood pressure 150/90 mmHg and heart-rate 100 beats/min. Patient was transferred to ICU one hour later due to disordered consciousness.

At arrival to ICU, patient responded only to painful stimulation RASS = -3 (Richmond Agitation Sedation Scale). Physical examination was normal, and pupils were similar to normal light reflex. In early blood tests, the only abnormal finding was glucose 178, and early gasometry results were pH = 7.30, $PCO_2$ = 35.8, $HCO_3$ = 17.5, and $PO_2$= 67. For pain control and tranquilizing, 5 mg morphine and 2 mg midazolam were administered. After 18 hours, tracheal tube was removed considering appropriate protective reflexes, and adequate respiration. Patient was confused and became agitated in response to the stimulation and when he was called (RASS = +3). Patient received haloperidol and midazolam when he had severe agitation. ECG was normal, troponin was negative, CPK = 1236 and CPK MB = 122. CT scan of brain had been done after 24 hours and no signs of cerebral edema (hypoxic encephalopathy), local changes like bleeding and ischemia were observed, and the only findings were aging changes. Brain MRI was performed after 48 hours with no positive signs.

Psychiatric consultation was conducted with patient's family and non-important data had been found. Patient's consciousness improved after 8 days, agitation got better (RASS = -1) and on 9$^{th}$ day patient was transferred from ICU to hospital ward, and on day 12, was discharged from the hospital in good condition and totally conscious. On the last day, the patient was examined by a psychologist and was assessed by CAM (Confusion Assessment Method), no problem was detected. Four days after the discharge, the patient died with chest pain when he was being transferred to the hospital (with suspected, not approved myocardial infarction or pulmonary emboli).

## Discussion

Delirium is an acute cognitive disorder demonstrated as fluctuating changes of attention, problem in concentration, perception disorder, and sleep-awake disorder. This is a common complication in admitted and postsurgical patients. Its incidence was reported from 4% in cataract surgery [1] to 65% in patients with major orthopedic surgeries like hip or cardiac surgeries [2]. Postoperative delirium associated with prolonged hospital stay, increased postoperative complications, risk of early and long-term mortality, and more cost [3-6]. The diagnosis of delirium especially hyperactive type is still problematic for some anesthesiologists; therefore, we reported a case of prolonged delirium after laparoscopic cholecystectomy under spinal anesthesia.

Delirium is the most common behavior disorder in hospitalized surgical and medical patients which is presented as acute fluctuating changes of consciousness. Delirium is a syndrome characterized by acute changes for patient's ability to maintain attention and awareness. Its incidence in hospitalized elderly patients is 50% and 15-56% of patients with delirium are elders. Delirium hardly extends more than a week, in our case it also continued for a week. Diagnosis is based on CAM-ICU score [7]. In some classifications, delirium is divided into two types: Hypoactive and hyperactive. In hypoactive type patient is calm, with signs of drowsiness, lethargy and apathy. In hyperactive type patient is agitated, has hallucination and is aggressive. Hypoactive type is more common and has higher mortality rate and also is more difficult to recognize [8]. Postoperative delirium has many risk factors, its risk factors based on Inouye SK 2006 study are summarized in Table 1 [9]. Rosalia Patti study showed that beside elder patients, patients with history of previous delirium, alcoholic patients, patients with low blood albumin, and patients who had decrease of blood pressure during surgery, have higher risk for delirium [10]. Lee, et al. in his 2011 study stated that in addition to advanced age; male gender, obese, numerous physical diseases and surgery duration more than 2 hours, are risk factors for delirium [11]. Type of anesthesia (RA/GA) and hemodynamic condition were not related with delirium but excessive bleeding during operation, too much blood transfusion after operation, and HCT < 30% are associated with delirium [12]. Regarding operation type in descending order open heart surgeries and other elective thoracic surgeries have the most incidence of delirium. It must be considered that postoperative delirium is a multi-factorial condition and any extra stress increases its risk. Although it was mentioned that hemodynamic condition is not associated with delirium, but low cardiac output can still be a risk factor for delirium. In our patient, it seems that cardiac arrest was a stress factor for developing delirium. Brain damages lead to delirium included ischemic changes in

**Table 1:** Predisposing factors for delirium.

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|---|
| **Demographic characteristics** |
| • Age of 65 years or older |
| • Male sex |
| **Cognitive status** |
| • Dementia |
| • Cognitive impairment |
| • History of delirium |
| • Depression |
| **Functional status** |
| • Functional dependence |
| • Immobility |
| • Low level of activity |
| • History of falls |
| **Sensory impairment** |
| • Visual impairment |
| • Hearing impairment |
| **Decreased oral intake** |
| • Dehydration |
| • Malnutrition |
| **Drugs** |
| • Treatment with multiple psychoactive drugs |
| • Treatment with many drugs |
| • Alcohol abuse |
| **Coexisting medical conditions** |
| • Severe illness |
| • Multiple coexisting conditions |
| • Chronic renal or hepatic disease |
| • History of stroke |
| • Neurologic disease |
| • Metabolic derangements |
| • Fracture or trauma |
| • Terminal illness |
| • Infection with human immunodeficiency virus |

cortex and subcortex, acute stroke, carotid occlusion, hypertensive encephalopathy and SAH. In this patient neither was present and brain CT and MRI were normal. The most important damaging factors in medical delirium are vision impairment, severe disease, cognitive disorder, and dehydration; the key of delirium treatment is determining its risk factors and treating them.

The most common time of developing postoperative delirium is the third operation, and it usually improves by day post operation, but it may continue longer, and in elder patients it is possible that patient consciousness does not return to preoperative condition even after discharge from the hospital. Rockwood study in 1999 showed that elderly patients may demonstrate delirium criteria up to one year after operation [13]. The mortality of delirium is high in elderly patients; up to 75% of them passed away during hospitalization and 15% will die during next the 6 months [14].

The main goal of delirium treatment is total recovery of cognitive disorder but many patients show some degree of cognitive disorders when discharged from the hospital [15]. The effective factors in prevention and treatment are low use of tranquilizers (especially benzodiazepines), appropriate postoperative pain control, and use of anti-psychotics [16]. The main anti-psychotic is haloperidol which does not cause respiratory depression. Benzodiazepines are suitable for alcohol or sedatives withdrawal syndrome. Correcting sensory defects (eyeglasses and hearing aids), regular use of watch and calendar, and maintaining regular sleep-wake cycle may decrease delirium incidence but does not reduce its intensity after occurrence [17].

## Conclusion

In this patient advanced age, male gender, and hospitalization in ICU are some of the known risk factors for delirium, and cardiac arrest with hemodynamic disorder acted as an extra stressor. Delirium symptoms began immediately after the operation, and it continued more than a week, age was considered as a predisposing factor for prolongation.

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