International Journal of Scientific Reports
Patel KB et al. Int J Sci Rep. 2016 Feb;2(2):41-43
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164

DOI: http://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20160502

Case Report

Successful resuscitation despite prolonged cardiac arrest in a patient with undiagnosed intracranial lesion: a case report

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Received: 13 December 2015
Accepted: 06 January 2016

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ABSTRACT

Perioperative cardiac arrests represent the most serious complication of anesthesia and surgery. It is believed that the incidence and mortality of cardiac arrest has declined because of advanced and increased surgical acuity and patients with extremes of age. We described a case of 31 year old male who had deterioration of cardiorespiratory and hemodynamic status in half an hour period after giving spinal anesthesia for hydrocoele operation. After half an hour of giving spinal anesthesia, patient developed supraventricular tachycardia followed by ventricular tachycardia progressed to cardiorespiratory arrest in a fraction of 2 to 3 minutes. He was unconscious and convulsing. Fortunately, this patient was successfully resuscitated with timely and appropriate measures in form of endotracheal intubation, cardiac defibrillation, antiarrythmic and inotropic cardiac medications and anticonvulsant drugs. Patient was shifted to ICU with ionotropic support and anticonvulsant infusion. Patient had apparently no previous cardiorespiratory or neurological complaints. Post-operative MRI report showed right cerebello-pontine angle cistern lesion suggestive of epidermoid cyst.

Keywords: Antiarryhthmic and inotropic drugs, Cardiopulmonary arrest and defibrillation, Intracranial space occupying lesion, Spinal anaesthesia, Ventricular tachyarrythmias

INTRODUCTION

Cardiac arrest during anesthesia and perioperative period is a matter of grave concern for any anesthesiologist. Occasionally, unexpected bradycardia and asystole may develop during the administration of spinal anesthesia in apparently healthy and young patients.[1] The incidence and causes of perioperative cardiac arrests related to anesthesia have been studied over last two decades by many authors. This period has seen the introduction of new anesthetic agents, improvements in anesthetic and monitoring techniques, optimization of patients' condition prior to surgery, adoption of medical practice guidelines and implementation of quality standards in the healthcare service. This has led many researchers to believe that the frequency of anesthesia related cardiac arrests have declined.[2-5] This case is concentrating over the unexpected undiagnosed asymptomatic neurological condition which may or may not affect the peri-operative cardiac arrest.

CASE REPORT

Thirty one years old, male patient weighing sixty kg was admitted in surgery department with chief complain of scrotal swelling of 2 months' duration. He was diagnosed as a case of hydrocele and Jaboulay's procedure was planned. During pre-anesthetic evaluation, there was no significant past medical and surgical history. His heart rate (HR) was 68/min and blood pressure (BP) was 130/70 mm of Hg with normal respiratory and cardiovascular systems examination. His routine investigations were within normal limits.

Pre-operatively, written and informed consent was taken. Intravenous line with large bore no. 18 gauge cannula was secured and preloading with 10ml/kg ringer lactate

over 20 minutes was done. Patient was pre-medicated with ondensetron 4 mg intravenously. On operation table, ECG, NIBP and pulse oximetry (SpO_2) were applied. Spinal anesthesia with bupivacaine hydrochloride 0.5% heavy 3.5 ml was given after free and clear flow of CSF in sitting position through midline approach with 23 gauge Quinke spinal needle under full aseptic and antiseptic precaution in L3-4 space. Sensory blockade up to the level of T10 was achieved and surgery was started. Oxygen was supplemented with ventimask.

Suddenly, after half an hour of starting surgery, patient complained about chest pain, breathlessness. ECG showed supraventricular tachycardia which was immediately converted to ventricular tachycardia. Peripheral pulse was absent and patient went into circulatory collapse and developed central cyanosis. Patient became unconscious and started convulsing with tight jaw and flexor rigidity of both arms. Immediately patient was ventilated with face mask with 100% O_2 followed by intubation with 8.5 mm cuffed endotracheal tube and ventilation again with 100% O_2 via Bain circuit. amiodarone 150 mg diluted in 10 cc normal saline was injected intravenously followed by cardiac defibrillation with DC shock of 300 joule energy and cardiac massage started. Ventricular rhythm reverted to sinus tachycardia. BP and peripheral pulses were unrecordable so noradrenaline i.v. infusion at 20 ml/hr was started. Heart rate returned to 190/min., BP-86/60 mm Hg, and SPO2-100%. amiodarone 300 mg in 100 ml saline was continued over 20 min and elective ventilation maintained with 100% O_2. ABG showed metabolic acidosis which was corrected with sodium bicarbonate 60 meq/l i.v. stat and continued i.v. infusion of 60 meq/l in 100 ml of normal saline. Patient improved hemodynamically but started convulsing frequently with flexor spasm. Diazepam 20 mg intravenously and phenytoin sodium 800 mg in 500 ml of normal saline i.v. infusion was started. Hydrocortisone 200 mg i.v., dexamethasone 8 mg i.v. and furosemide 20 mg given intravenously. Patient was semiconscious. We shifted the patient to ICU for ventilator support with SIMV + PSV mode and continued noradrenaline infusion and phynetoin sodium infusion.

Next day patient was conscious and followed verbal command with HR 72/min, BP 123/87 mm Hg and SpO_2 99% with normal ABG report but troponin-I level was significantly high. After 24 hours patient was extubated and put on ventimask. Noradrenalin infusion was tapered and omitted on 2nd day. Postoperative MRI showed lesion in right cerebello-pontine angle cistern suggestive of epidermoid cyst. Patient was shifted to ward and discharged thereafter.

DISCUSSION

Preoperative cardiac arrests may be due to patient disease/condition, surgical factors, or to adverse events related to anesthesia. This report highlights occurrence of arrhythmia and repeated asystole during surgery for a hydrocele in an undiagnosed case of cerebellopontine angle lesion. Occurrence of arrhythmia, not described previously, may be an early warning sign of impending asystole. In addition, rapid progressively slowing HR, immediately before the cardiac arrest, suggests their supraventricular origin. The rate of anesthesia related mortality has been stable over the past decade at approximately 1 death per 13000 anesthetics.[6] Sprung J and et al suggest that the incidence of cardiac arrest is 8.3-fold higher in general than in neuraxial(spinal and epidural) anesthesia.[7] Auroy Y, et al did a survey of cardiac arrest incidence during neuraxial anesthesia and reported 2.7 cardiac arrests per 10000 anesthetics.[8] which is comparably lower. This improvement is mainly due to better knowledge of neuraxial block physiology and use of new local anesthetic drugs with fewer side-effects associated with more routinely used cardiac and oxygen monitoring.

In our case, we give spinal anesthesia to the patient as considering patient to be normal physiologically and it is considered to be a safe procedure. However, this technique can result in few complications among which the most dreaded though rare is cardiopulmonary arrest.[1] Although, the mechanism through which spinal anesthesia induced bradycardia or asystole is not completely known, it is established that the final pathway is the absolute or relative increase in activity of the parasympathetic nervous system.[9] Cardiac arrest has been reported within 12-72 min of spinal anesthesia, while cardiovascular side effects have been reported as late as hours after administration of spinal anesthesia.[10] Complication occurred after half an hour in our case.

Higher neuraxial blockade resulting in hypoxia or hypercarbia can cause profound peripheral vasodilatation leading to significant decrease in venous return and poor atrial filling. The sympathetic blockade decreases venous return and unopposed parasympathetic activity may produce significant degree of bradycardia and hypotension resulting in cardiac arrest.[11,12] The physiological augmentation of these activities can be attributed to blockade of T8-L1 fibers thus leading to decreased catecholamine secretion as a result of blockade of suprarenal glands which can produce refractory cardiac arrest.[13] Limited dosing of spinal anesthetic might have decreased the chance of precipitating cardiac arrest. Higher doses of local anesthetic are associated with higher levels of block and a higher risk of cardiovascular collapse.[14] There was no high level established in our case. Aggressive treatments during CPR including intravenous administration of amioderone, nor adrenaline, rapid hydration were effective in this case. Cardiac arrest is more common in young individuals with an established fact that vagal tone is greater in these patients and increase in parasympathetic activity further enhances exaggerated vagal tone.[15] Regional anesthesia may result in increased arrythmogenecity by causing a sudden decrease in atrial filling pressure due to

sympathetic blockade.[16] Hemodynamic changes due to trigeminocardiac reflux (TCR) if remain persistent, may progress to ventricular arrhythmia and in some cases may be severe enough to necessitate cardiopulmonary resuscitation.[17]

Regional anesthetic techniques CSE can be safely used for cesarean section in patients with intracranial space occupying lesion (ICSOL) without severe neurological deficit.[18] Lumbar puncture in patients with space occupying lesions is a well-recognized risk factor for development of transtentorial herniation. Eerola et al reported a case of fatal uncal herniation after spinal anesthesia in a patient with no intracranial process. The time that elapsed between dural puncture and the onset of mental status changes may reflect the size of the dural puncture and the magnitude of the CSF loss. Although a CSF volume loss can lead to neurological deterioration even in patients without a brain mass.[19] Post operative accidental finding of right cerebello pontine angle tumour suggestive of epidermoid cyst in MRI may or may not have relation with intra operative complication as patient had no neurological symptoms and signs of raised intracranial tension and tumour itself in pre operative check up as well as patient recovered completely.

CONCLUSION

In conclusion, we described a patient with sudden cardiac arrest during spinal anesthesia for lower abdominal surgery which illustrates a potential risk of cardiac arrest superimposed on neuraxial anesthesia. Careful history taking, preoperative evaluation, early recognition of patient complaint and heart rhythm by vigilant monitoring and prompt treatment of hemodynamic collapse are important clues for successful outcome.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Patel KB, Vyas MS, Sharma AS, Engineer S. Successful resuscitation despite prolonged cardiac arrest in a patient with undiagnosed intracranial lesion: a case report. Int J Sci Rep 2016;2(2):41-3.