

CASE REPORT

Anesthetic management of a patient with atrial fibrillation posted for emergency exploratory laparotomy for perforation peritonitis: A review of literature

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ABSTRACT

Atrial fibrillation is very common cardiac arrhythmia which is encountered during the perioperative period. Atrial fibrillation in perioperative period may lead to haemodynamic impairment and thromboembolic events resulting into significant morbidity and mortality. So it is very crucial for an anesthesiologist to maintain the haemodynamic stability of the patient with atrial fibrillation and prevent further complications associated with it. Here we report a case of forty year old female patient posted for emergency exploratory laparotomy for perforation peritonitis with pre-existing atrial fibrillation.

Key words: Atrial fibrillation, perioperative, arrhythmia

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INTRODUCTION

Atrial fibrillation (AF) is one of the most common arrhythmias. Atrial fibrillation may be encountered preoperatively in patients posted for anesthesia and may occur during anesthesia or may occur or persist in postoperative period.¹ A rapid heart rate with loss of atrial systolic function and irregular ventricular response associated with impaired ventricular diastolic function may result into haemodynamic deterioration and reduced cardiac output. This is particularly detrimental in patients with poor cardiac reserve. There is also risk of thromboembolism due to decreased flow in atria and stroke further. Surgical patients may present with atrial fibrillation in different ways which may be either pre-existing AF, new onset AF or paroxysmal AF.² The patient should be examined and assessed for the common risk factors which are responsible for the onset of atrial fibrillation like sepsis, pulmonary embolism,

electrolyte and acid base disorders, ischemic heart disease, thyrotoxicosis, hypovolemia and hypoxia.³ Although atrial fibrillation is a common arrhythmia during the perioperative period as several cases were reported in literature but we want to highlight the fact that after reviewing the literature, we have given particular emphasis on avoidance of precipitating factors developing AF along with successful management using pharmacological intervention without electrical cardioversion simultaneously maintaining haemodynamic stability of the patient which was somewhat different in our case.

CASE REPORT

A forty year old female patient was admitted in our hospital with complaints of pain abdomen, recurrent vomiting, abdominal distension, palpitations, high grade fever with respiratory distress for last 3 days. After admission in emergency ICU, physical examination was done, her

heart rate (HR) was 160/min, irregularly irregular, blood pressure (NIBP) was 92/64 mm Hg and respiratory rate (RR) of 30/min, arterial oxygen saturation (SpO₂) of 88% with distended abdomen. X-ray and USG abdomen was suggestive of perforation peritonitis and surviving sepsis guidelines were followed to optimize the patient. Two intravenous lines were secured with 18G cannula. Fluid resuscitation was initiated and fluid challenge was given using 1000 ml of ringer lactate to restore adequate arterial pressure and organ perfusion to avoid further aggravation of acid base disorder and electrolyte abnormalities which may provoke arrhythmias. Opinion of cardiologist taken after 12 lead ECG, suggestive of atrial fibrillation. The 2D Echo was done and found to be normal. Arterial blood gas analysis (ABG) was done and it showed pH- 7.48, PO₂- 62 mm Hg, PCO₂- 32 mm Hg, HCO₃⁻-20 mmol/l. Serum electrolytes were K⁺- 3.6 and Na⁺- 138. Her haematological and biochemical investigations were within normal limits except increased total leucocyte count (>11000/cmm) and ECG showed AF with a ventricular rate of 142/min.

She was advised treatment as Digoxin 0.25 mg once a day intravenously (iv), Diltiazem 12.5 mg iv stat and then sos if no hypotension and Amiodarone 300mg iv over 10 min followed by infusion. She was initially given high flow oxygen with ventimask @ 10L/min and then put on non invasive ventilation after patient showed no improvement in oxygen saturation and to avoid hypoxemia due to probably sepsis induced acute lung injury. Her cardiac rhythm and rate not reverted back to normal despite aggressive treatment suggestive of persistent AF (more than 48 hours duration) but patient responded to fluid therapy and maintained haemodynamic status alongwith commencement of antibiotic therapy after sending blood and other cultures. So next day patient was posted for emergency exploratory laparotomy under general anesthesia.

The preoperative vitals of the patient were HR-140/min, irregularly irregular, NIBP-116/74 mm Hg, SpO₂-90% on O₂ mask @6L/min, RR-40 min, shallow, bilateral chest clear with reduced air entry. Patient was optimized as much as possible using fluid therapy, broad spectrum antibiotic therapy, pharmacological treatment preoperatively with concomitant administration of oxygen therapy (non invasive ventilation). Radial artery cannulation was done with 20G arterial cannula for invasive blood pressure monitoring and a central venous catheter was put to measure the central venous pressure and to guide fluid therapy intra and postoperatively. Ringer Lactate solution was started and defibrillator was kept ready. All standard monitors were attached to the patient (NIBP, SpO₂, EtCO₂, ECG). Patient was preoxygenated with 100% O₂ for 5 min using bain's circuit. Glycopyrrolate 0.1 mg iv and Ondansetron 4 mg iv given as premedication.

Induction was done using Fentanyl 100 µg (2µg/kg) iv slowly after proper dilution and Propofol 75 mg (1.5 mg/kg) iv slowly with cricoid pressure, Xylocard 50 mg iv and Succinylcholine 100 mg (2 mg/kg) iv with IPPV for 30 seconds and then intubated with cuffed endotracheal tube of internal diameter 7.0 mm. HR suddenly increased to 200/min, irregular and BP falls to 80/54 mm Hg. Defibrillator was kept ready for use. In the mean time, Esmolol 10 mg iv slowly given with concomitant administration of Mephentermine 12mg iv stat. The BP raised to 96/68 mm Hg with persistent tachycardia (180-200/min). Then Amiodarone 150 mg iv given over 10 min in 100 ml normal saline but no significant change in heart rate was observed. So again Amiodarone 150 mg iv repeated over next 20 min with Digoxin 0.25 mg iv slowly over 2 min and Diltiazem 12.5 mg iv slowly over 2 min. Then heart rate reduced to 140-150/min and systolic blood pressure was maintained in the range of 90-100 mmHg. One unit of hydroxyethyl starch was given concomitantly. After the control of HR, surgeon was allowed to proceed for surgery. Patient was maintained on sevoflurane, O₂, N₂O and Atracurium as muscle relaxant with IPPV. 1000 ml of ringer lactate and one unit of whole blood was transfused intraoperatively. Urine output was 300 ml. Intraoperative HR was within 90-100/min thereafter alongwith further bolus doses of diltiazem while avoiding hypotension. Blood pressure remained stable and required no further bolus of vasopressors and inotropic support. After completion of surgery, patient was shifted to intensive care unit for elective ventilation and monitoring with further cardiological evaluation. In ICU patient was given iv fluids guided by CVP and Amiodarone infusion was continued to maintain rate and rhythm. Postoperatively AF persisted up to next 24 hours and then reverted back to sinus rhythm. Patient remained hemodynamically stable in postoperative period with continuous monitoring and extubated on next day. Anticoagulation (low molecular weight heparin) was started postoperatively after cardiologist advise and continued uptill switch over to oral aspirin. After 3 days patient shifted to ward and discharged on 10th postoperative day.

DISCUSSION

Atrial fibrillation is a common arrhythmia frequently seen during the perioperative period in patients undergoing surgery. Usually new onset atrial fibrillation is uncommon during the perioperative period. The rapid rates of new onset AF or pre-existing AF may be precipitated by several factors including sepsis, electrolyte and acid-base abnormalities, pulmonary complications like pulmonary embolism, hypoxia, hypovolemia, myocardial ischemia etc.^{1,3} Roger et al reported that overall incidence of

perioperative management of atrial fibrillation

supraventricular tachycardia was estimated to be less than 1% and in those with an SVT, the incidence of AF and atrial flutter was 30% and 12%, respectively with only 20% of arrhythmias occurring intraoperatively.⁴

The aim of this particular case report is to review the management strategies of atrial fibrillation with particular attention given on the management of perioperative atrial fibrillation and prevent further complications. Atrial fibrillation is a common arrhythmia occurring in 0.4-5% of adult population and most of these are not associated with any cardiac disease.⁵ So particular emphasis was given on management of AF including the elimination of precipitating factors which might worsen the clinical condition of the patient, and treatment of arrhythmia itself with pharmacological intervention. In our case the precipitating factors were likely to be sepsis and acid-base disorders associated with persistent hypoxemia which might be due to sepsis induced acute lung injury. Oxygen therapy was given for hypoxemia to maintain adequate oxygenation and to improve or eliminate the above mentioned precipitating factors. The acute onset AF is usually treated by direct current cardioversion when patient is unstable but pharmacological agents can be used to achieve cardioversion. The patients with rapid and chronic AF, priority was given to control the ventricular rate using pharmacological interventions as we have done in our case.¹ The arrhythmias may develop again if precipitating factors were not removed or treated aggressively. Anticoagulation can be given to reduce the risk of thromboembolism. Platia et al⁶ compared the efficacy of esmolol and verapamil in the management of AF and concluded that the reduction in ventricular rate and the incidence of hypotension were similar. We have used esmolol, a selective beta blocker, titrated according to ventricular rate with concomitant administration of fluids to avoid hypotension. Amiodarone, a class 3 antiarrhythmic drug, can be used to convert acute onset AF to sinus rhythm or partially effective in some patients.^{7,8} Diltiazem, a calcium channel blocker, provides effective

control of ventricular rate but does not convert it into sinus rhythm. Diltiazem found to have better rate control than amiodarone but should be used cautiously because of associated hypotension.⁹ Digoxin is commonly used for rate control in persistent AF, but having no benefit in paroxysmal AF.⁹ Digoxin should be supplemented with other drugs due to its slow onset for better ventricular rate control. We have used all of these agents to control the rate and maintain sinus rhythm as per the recommended doses and thereby effectively managed the patient without using electrical cardioversion.

Bertrand et al¹⁰ reported in their study that out of 100 patients undergone surgery under general anesthesia, 84 patients developed supraventricular or ventricular arrhythmias which were associated with intubation or extubation. So in our case onset of faster rates of AF may be associated with induction and intubation. The other precipitating factors may develop AF before surgery were sepsis or acid-base disorders as patient had raised total leucocyte counts and had respiratory distress or shortness of breath with hypoxemia preoperatively.

CONCLUSION

During perioperative period, various important factors should be kept in mind before giving anesthesia to a patient with atrial fibrillation. The management of perioperative AF is very crucial for an anesthesiologist. All possible precipitating factors for AF should be identified and eliminated before and during anesthesia with effective treatment of arrhythmias to avoid further complications.

Conflicting Interest: Nil declared by the authors

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REFERENCES

1. Nathanson MH, Gajraj NM. The peri-operative management of atrial fibrillation. *Anaesthesia*. 1998; 53: 665-76. [PubMed] [Free full text]
2. Bajpai A, Rowland E. Atrial fibrillation. *Contin Educ Anaesth Crit Care Pain*. 2006;6(6):245-246. doi:10.1093/bjaceaccp/mk1055. [Free full text]
3. Thompson A, Basler JR. Perioperative cardiac arrhythmias. *Br J Anaesth*. 2004 Jul;93(1):86-94. [PubMed] [Free full text]
4. Rogers WR, Wroblewski F, Ladue JS. Supraventricular tachycardia complicating surgical procedures: a study of the contributing cases, course and treatment of this complication in the fifty patients. *Circulation* 1953 Feb;7(2):192-9. [PubMed] [Free full text]
5. Prabhakar H, Bhatnagar S, Mishra S, Narang R. Intraoperative atrial fibrillation of unknown etiology: A unique complication. *The internet journal of anaesthesiology* 2002 Volume 7 Number 2. [Free full text]
6. Platia EV, Michelson EL, Porterfield JK, Das G. Esmolol versus verapamil in the acute treatment of atrial fibrillation and atrial flutter. *Am J Cardiol*. 1989 Apr 15;63(13):925-9. [PubMed]
7. Pilati G, Lenzi T, Trisolino G, Cavazza M, Binetti N, Villecco AS, et al. Amiodarone versus quinidine for conversion of recent onset atrial fibrillation to sinus rhythm. *Curr Ther Res*. 1991;49:140-6.
8. Basler JR. The rationale use of intravenous amiodarone in the perioperative period. *Anesthesiology* 1997;86:974-87. [PubMed] [Free full text]
9. Fuster V, Reyde LE, Cannom DS, Crijns HJ, Curtis AB, Ellenbogen KA, et al. ACC/AHA/ESC 2006 Guidelines for the Management of Patients with Atrial Fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation): developed in collaboration with the European Heart Rhythm Association and the Heart Rhythm Society. *Circulation*. 2006;114:e257-354. Erratum in *Circulation*. 2007 Aug 7;116(6):e138. [PubMed] [Free full text]
10. Bertrand CA, Steiner NV, Jameson AG, Lopez M. Disturbances of cardiac rhythm during anaesthesia and surgery. *JAMA*. 1971 Jun 7;216(10):1615-7. [PubMed]

