

Perioperative Atrial Fibrillation in Five Patients - Role of Anxiety

Sir,

Disturbances in heart rhythm may be associated with cardiac and non-cardiac causes. We describe five patients who developed atrial fibrillation (AF) in the perioperative period. Anxiety was thought to be the triggering factor in all of them. All the patients remained hemodynamically stable but none reverted to sinus rhythm on their own and required pharmacological treatment.

A 36-yr-old female, weighing 40 kg was scheduled for exploratory laparotomy for bilateral adnexal mass. She was operated for mitral valvotomy 12 years ago and was on regular medications of oral amiloride 5mg, furosemide 40 mg and digoxin 0.125 mg once a day. Her preoperative hematological, biochemical investigations, chest x-ray and electrocardiogram (ECG) were within normal limits. Echocardiography revealed mild mitral stenosis with a mitral valve area of 1.54 m², mild to moderate mitral regurgitation, trivial tricuspid regurgitation, ejection fraction of 50% and normal systolic function. Preoperatively she received antibiotic coverage for infective endocarditis and oral diazepam 10 mg the night before and in morning of surgery. When she was wheeled inside the operation room, she was very anxious despite preoperative anxiolytics. On attaching ECG in the operating room, her heart rate was observed to be irregularly irregular with varying heart rate between 95 to 170/min with no discrete "p" waves, suggestive of AF which was confirmed on 12 lead ECG. Surgery was deferred and patient was shifted to cardiac care unit for further evaluation and management. Thereafter oral digoxin was increased from 0.125 mg to 0.250 mg once a day and diltiazem 30 mg thrice a day was prescribed. Her cardiac rhythm and rate reverted back to normal next day. She was reassured and was rescheduled for surgery 2 weeks later with a regular and controlled heart rate of 80 beats/min. Her perioperative period was uneventful and she was discharged by a week, with an advice to regular follow up in cardiology clinics.

A 70-yr-old male weighing 60kg was scheduled for removal of ureteric stone. In the preoperative visit, he was very anxious being first operation in his life. He was a known hypertensive for 4 years and on oral ramipril and hydrochlorothiazide once a day. He also had regular oral alprazolam 0.25 mg twice a day, prescribed 15 days back, after an episode of uneasiness, which had revealed no ECG changes. On examination, his pulse rate was 82 beats/min and regular. Blood pressure was 128 /82 mm Hg. ECG and chest x-ray were within normal limits. His medications were continued as per schedule on morning of surgery. Serum electrolytes on the day of surgery were within normal limits.

Anesthesia was induced and maintained by standard protocol. Towards completion of surgery, surgeons required intravenous furosemide 10 mg to flush the kidneys. Surgery lasted 95 minutes. Intraoperative vitals were maintained. Residual neuromuscular blockade was reversed and proseal laryngeal mask airway removed. On waking up, the patient complained of severe urethral irritation by foleys catheter and was distressed by it. Simultaneously, irregular pulse was noticed and AF confirmed on 12 lead ECG. Patient was hemodynamically stable. Intravenous midazolam (2+1 mg), morphine (3+3 mg) and bladder instillation of xylocaine was administered. This calmed him down, but his AF persisted. His electrolytes revealed serum potassium of 3.3meq/L, which was replaced via a peripheral central line at a rate of 6-8meq/hr and corrected over a period of next 12 hours. However, AF persisted beyond 24 hours of surgery in spite of patient remaining asymptomatic and hemodynamically stable. Amiodarone 150mg was infused over 30 minutes twice followed by an infusion of 1mg/kg/hr. His rhythm reverted back to normal sinus rhythm in the next 4 hours and was discharged by 4th day along with prescription of tablet amiodarone 400mg for the next 2 weeks followed by 200 mg for the next 4 weeks and advice for regular follow up.

A 60-yr-old man was scheduled for therapeutic penetrating keratoplasty as an emergency surgery. He was a known hypertensive for the last 4-5 years, well controlled on amlodipine and atenolol orally. On examination pulse rate was 72 beats/min and regular. His preoperative investigations including chest x-ray and ECG were within normal limits. As it was an emergency case, he had not been premedicated with anxiolytics. In the operation theatre he was noticed to be very anxious. On attaching the ECG monitor, his heart rate was irregularly irregular varying between 130-170/min. Fentanyl (20+20 µg) and midazolam (2+1+1 mg) was administered intravenously to allay his anxiety but to no avail. A cardiology referral was sought and surgery postponed. However, he took leave against medical advice and was lost to follow up.

Two patients of age 42 and 58 years were scheduled for laparoscopy cholecystectomy and emergency laparotomy for strangulated inguinal hernia repair respectively. Both were hypertensive and controlled on regular medication. Preanaesthetic examination revealed a regular pulse rate of 94 and 102/min respectively. The 12 lead ECG and chest x-ray was normal. In the operation room, both the patients were very anxious and on attaching ECG were found to have AF. Repeat 12 lead ECG confirmed the AF. Serum electrolytes were normal. They were managed according to institutional protocol.

During the perioperative period, the onset of AF or faster rates of chronic AF maybe precipitated by acid base

disturbances, electrolyte abnormalities (in particular hypokalemia or hypomagnesemia), hypovolemia, myocardial ischemia and surgical manipulation within thorax or mediastinum.¹ AF, which is newly diagnosed in the perioperative period and is not associated with known precipitating factors, warrants full investigation including 12 lead ECG, echocardiography, serum chemistry screen including thyroid function tests and electrophysiological studies.² Thyroid profiles advised postoperatively in our patients were within normal limits.

A large proportion of patients with recent-onset AF experience spontaneous cardioversion within 24 to 48 hours.^{3,4,5} In literature, spontaneous conversion to sinus rhythm in almost 70% of patients presenting with AF of less than 72 hours duration has been reported.⁶ Chemical cardioversion in three of our patients reverted the heart rate to normal in less than 24 hours of initiating it.

Although the development of arrhythmias is common during anesthesia and surgery, onset of new AF and atrial flutter is less common.⁷ On search of literature on intraoperative AF, few cases are reported. A second dose of ondansetron was attributed to AF in a 47 year old female patient operated for lumpectomy of breast.⁸ The reason attributed was a probable inhibition of 5 HT3 receptor in the heart leading to unopposed action of other serotonin receptors leading to AF or other tachyarrhythmias. There is also a report of hyperkalemia induced conversion of chronic atrial fibrillation to normal sinus rhythm intraoperatively.⁹ Bertrand et al studied perioperative arrhythmias in 100 persons undergoing surgery under general anaesthesia with none of their patients developing AF or flutter.⁷

Stress has been attributed to acute cardiomyopathy called Tako-Tsubo or broken heart syndrome and has been attributed to catecholamine release during stressful period.¹⁰ Many studies have perceived psychological stress as the main inducer of atrial fibrillation in daily life.¹¹ Neurogenic AF is triggered by heightened vagal or adrenergic tone in susceptible patients. As originally described by Coumel¹¹ and subsequently verified by others, adrenergic AF is provoked by exercise or emotional stress with no gender differences. Scant data are available on neurogenic AF, which is relatively rare as a pure entity. It is also known that patients who undergo surgery experience acute psychological distress in the preoperative period as noted by STAI, APAIS, MBSS scales.^{12,13}

All the patients in our institute are premedicated by standard protocol and these cases occurred over a period of 2 years. Though some of our patients had cardiac lesion or hypertensive and are at risk of developing AF but one interesting feature present in all our patients was that they were very anxious. It would have been ideal if we could

have quantified the anxiety by preoperative anxiety scale. However, this is not a routine practice in our institute.

We suggest that if stress can induce AF in daily life, stress over surgery can also trigger AF in a selected group of patients who have an anxious personality and needs optimal non-pharmacological and pharmacological anxiolysis.

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