

CASE REPORT

SUCCESSFUL ANAESTHETIC MANAGEMENT OF A PATIENT WITH PARADOXICAL VENTRICULAR SEPTAL MOTION (PVSM) POSTED FOR MODIFIED RADICAL NECK DISSECTION WITH RADIAL FREE FLAP

Amruta Hippalgaonkar¹, Dattatraya Gangurde²

HOW TO CITE THIS ARTICLE:

Amruta Hippalgaonkar, Dattatraya Gangurde. "Successful Anaesthetic Management of a Patient with Paradoxical Ventricular Septal Motion (PVSM) Posted for Modified Radical Neck Dissection with Radial Free Flap". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 17, April 27, 2015; Page: 2616-2619.

ABSTRACT: BACKGROUND: Patients with paradoxical ventricular septal motion are a challenge to anaesthesiologist due to risk of perioperative myocardial ischaemia and sudden cardiac arrest.

CASE DESCRIPTION: We present anaesthetic management of a 45year old lady with a diagnosed case of carcinoma left buccal mucosa with paradoxical ventricular septal motion posted for modified radical neck dissection with radial free flap. **CONCLUSION:** Although clinical manifestations of this cardiac condition may be mild, there is certainly associated pathology of direct relevance, which carries importance in the anaesthetic management in the peri-operative period. Patients with paradoxical ventricular septal motion of any etiology are more prone for perioperative myocardial ischaemia and sudden cardiac arrest, because if cardiac conduction is not maintained properly then it may result in further increase in the paradoxical ventricular septal motion.

KEYWORDS: Paradoxical ventricular septal motion, perioperative myocardial ischaemia, cardiac conduction.

INTRODUCTION: Management of patients with paradoxical ventricular septal motion involves detailed preoperative cardiac assessment for functional status, valvular function, infective endocarditis, myocardial ischaemia and conduction abnormalities. We present successful anaesthetic management of a 45y old lady with a case of carcinoma left buccal mucosa with paradoxical ventricular septal motion who underwent modified radical neck dissection with radial free flap.

CASE DESCRIPTION: A 45year old housewife presented with an ulcer over the left buccal mucosa since 6 months and diagnosed as carcinoma buccal mucosa on biopsy. She also had history of progressive worsening of fatigue and shortness of breath which began two years prior to admission. There had been no history of heart disease or murmur. There was no history of previous surgeries and drug allergies. She was moderately built and nourished. Physical examination revealed an irregularly irregular pulse with apex pulse deficit and blood pressure of 90/60mmHg in right in supine position. Her systemic examination including a thorough cardiovascular examination did not reveal any dysfunction. Airway examination showed that the mouth opening was 1 finger; thyromental distance 60 mm and a mallampati class-IV. Neck, temporo-mandibular joint movements and the teeth were normal. The baseline electrocardiogram

CASE REPORT

(ECG) showed ventricular premature complexes interspersed with an irregularly irregular rhythm at a heart rate of 60 beats/min and left axis deviation. The preoperative echocardiogram reported an LV ejection fraction (LVEF) of 45% with paradoxical ventricular septal motion with mitral valve prolapse, trivial TR and MR and moderate RV dilatation with no pulmonary hypertension. Her haemoglobin was 9.3g% with PCV of 27.3 vol%. All other preoperative investigations including serum electrolytes were within normal limits. Cardiology consultation suggested no active cardiac management preoperatively with a close watch on conduction abnormalities perioperatively. Patient was taken up for surgery under ASA grade III. Two units of packed red cells were reserved in view of anaemia and undue blood loss during surgery. She was given tab. Alprazolam 0.25mg and tab. Ranitidine 150mg on the evening prior to surgery. NBM status was maintained according to standard guidelines. General anaesthesia with awake fiberoptic intubation was planned. On the morning of surgery patient was wheeled in the operation theatre. An intravenous line was secured on right upper limb with 18G and IVF in the form of ringer lactate started at 100ml/hr. Standard monitoring included electrocardiogram, pulse-oximetry, noninvasive blood pressure and capnography. For pre-medication inj. Glycopyrrolate 0.2 mg, inj. Ondansetron 4mg, inj. Fentanyl 50ug and inj. Midazolam 1mg were used. The upper airway was anaesthetised topically with viscous gargles and transtracheal and superior laryngeal nerve blocks. Trachea was intubated with cuffed 6.5mm I.D tracheal tube mounted over a fiberoptic bronchoscope followed by inj. Etomidate 15mg as an induction agent and inj. Vecuronium 4mg as a muscle relaxant. Following an uneventful induction CVP line was secured in right upper extremity. Anaesthesia was maintained on O₂ + N₂O + Sevoflurane + intermittent inj. Vecuronium on closed circuit on controlled mechanical ventilation. Intraoperatively the patient was haemodynamically stable with a blood pressure in the range of 90/60 mmHg to 110/70mmHg, but there was an interplay between the ventricular premature beats, heart rate and rhythm. Though occasional VPC's were present throughout the procedure their number increased when the heart rate went below 60beats/min or above 100beats/min. As also the normal sinus rhythm was maintained between heart rate of 60-80 beats/min and changed to nodal rhythm with heart rate below 50 beats/min or above 100 beats/min. To maintain heart rate above 50 beats/min inj. Glycopyrrolate 0.2mg was given twice intraoperatively. In spite of all these alterations in rate and rhythm, patient was haemodynamically stable throughout the surgery. Duration of surgery was 6 hrs, with blood loss of 600ml and urine output of 400 ml. 3 crystalloids and 1 PRC were infused throughout the procedure with a close watch on central venous pressure. At the end of surgery, anaesthesia reversal was achieved by injecting inj. Neostigmine 2mg and inj. Glycopyrrolate 0.4mg and patient shifted to ICU with ETT in situ and extubated 24 hrs later keeping difficult airway cart ready. Analgesia was maintained intraoperatively with intravenous inj. Fentanyl and inj. Paracetamol and postoperatively with fentanyl patch.

DISCUSSION: Ventricular septum normally moves away from the sternum and toward the posterior left ventricular free wall during systole. In abnormal septal motion the ventricular septum moves anteriorly, toward the sternum, during systole. This pattern of motion has been termed "paradoxical".¹ Thus paradoxical interventricular septal motion (PVSM) is systolic movement of interventricular septum towards right ventricle despite normal thickening.² Causes of PVSM

CASE REPORT

include left ventricular dysfunction,³ left bundle branch block (LBBB),^{4,5} mitral valve prosthesis,⁶ constrictive pericarditis.⁷ The heart contracts symmetrically toward its centre of mass, so that the position of the ventricular septum within the heart at end-diastole determines both the direction and the magnitude of septal motion during systole. This hypothesis is based on several assumptions: 1) that the ventricular myocardium is activated normally and contracts during ventricular systole in a symmetric, sequential fashion, 2) that the ventricular muscle and ventricular blood pool have essentially uniform mass, and 3) that motion of the mid-septum (which lies exactly halfway between right and left septal surfaces) most accurately reflects motion of the septum as a whole.¹ It has been regarded as the hallmark of right ventricular volume overload which means right ventricular dilatation due to atrial septal defect, anomalous pulmonary venous drainage, severe pulmonary insufficiency, tricuspid regurgitation.⁸ It has also been stated that the interventricular septal motion is normal in patients with pure right ventricular pressure overload. This abnormal finding may be dependent on the ratio of the two ventricular chamber sizes and independent of either right ventricular volume or pressure overload.¹ The major component in the production of the paradoxical interventricular septal motion with right ventricular dilatation may result from a change in the configuration of the left ventricle and the interventricular septum during diastole. During ventricular systole, the left ventricle returns to its normal relatively circular shape. This change in shape from diastole to systole thus results in a paradoxical net motion of the septum anteriorly toward the right ventricle.⁸ Other theories involved in causation of PVSM include i) transient ischaemia which alters septal motion and ii) operation on heart which alters the degree to which it is restrained by the pericardium and chest wall.² Also it has been confirmed that echocardiography is a convenient method for recording motion of ventricular septum as compared to angiography.^{9,10} From above it was evident that our patient had progressive worsening of fatigue and breathlessness, an irregularly irregular pulse with ECG demonstrating ventricular premature complexes and left axis deviation. Of interest her echocardiography reported an LV ejection fraction (LVEF) of 45% with paradoxical ventricular septal motion with mitral valve prolapse, trivial TR and MR and moderate RV dilatation, all of which help in arriving to the conclusion that probably the pathology concerned was due to right ventricular volume overload.

CONCLUSION: We conclude that in a patient of PVSM, the cardiac conduction should be maintained to normal and perioperative ischaemia should be prevented. As imbalance in either factor may aggravate the pathology. It is therefore important to have a working knowledge of the pathology concerned, so that a systematic approach can result in rational perioperative management.

REFERENCES:

1. Pearlman AS, Clark CE, Henry WL, Morganroth J, Itscoitz SB and Epstein SE; Determinants of Ventricular Septal Motion: *Circulation* 1976 July; Vol 54, No 1.
2. Reynolds HR, Tunick PA et al; Paradoxical septal motion after Cardiac Surgery: A review of 3292 cases: *Clin. Cardiol.* 2007; Vol 30(12): 621-3.

CASE REPORT

3. Hagan AD, Francis GS, Sahn DJ et al; Ultrasound evaluation of systolic anterior septal motion in patients with and without right ventricular volume overload: Circulation 1974; 50: 248-254.
4. Abbasi AS, Eber LM, Mac Alpin RN et al; Paradoxical motion of interventricular septum in LBBB: Circulation 1974; 49: 423-427.
5. Dillon JC, Chang S, Feiganbaum H; Echocardiographic manifestation of LBBB: Circulation 49: 1974; 876-880.
6. Miller HC, Gibson DG, Stephens JD; Role of echocardiography and phonocardiography in diagnosis of mitral paraprosthetic regurgitation with Starr- Edward prosthesis: Br Heart J. 1973 Dec; 35(12): 1217-1225.
7. Gibson TC, Grossman W, Mc Laurin LP et al; Echocardiography in patients with constrictive pericarditis: Circulation 1974; 50(suppl 3): 86.
8. Zee-Chenc CS, Gibbs HR; Paradoxical Ventricular Septa1 Motion with Right Ventricular Dilatation as a Manifestation of Pure Pressure Overload Due to Pulmonary Venocclusive Disease: Clin. Cardiol. 1985; 8: 603-606.
9. Resilets DT, Kadiel BM, Ruttenberg HD, Goldberg SJ; Angiographic demonstration of ventricular septum: Radiology 91: 1968; 329.
10. Popp RL, Wolfe SB, Hirata T, Feigenbaum H; Estimation of right and left ventricular size by ultrasound. A study of the echoes from the interventricular septum. Am J Cardiol. 24 1969: 523-530.

AUTHORS:

1. Amruta Hippalgaonkar
2. Dattatraya Gangurde

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Anaesthesiology, Government Cancer Hospital, Aurangabad.
2. Assistant Professor, Department of Anaesthesiology, Government Cancer Hospital, Aurangabad.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Amruta Hippalgaonkar,
Plot No. 707, Sahyadri Nagar,
N-5, CIDCO, Aurangabad,
Maharashtra-431003.
E-mail: h.amruta1@gmail.com

Date of Submission: 11/04/2015.
Date of Peer Review: 13/04/2015.
Date of Acceptance: 16/04/2015.
Date of Publishing: 27/04/2015.