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Case Report

Anaesthesia Section

LBBB with History of Complete Atrioventricular Dissociation Underwent Bipolar Hemiarthroplasty

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ABSTRACT

A 70-year-old female patient, known case of hypertension and incomplete Left bundle branch block (LBBB), posted for bipolar hemiarthroplasty. A geriatric patient with LBBB and systemic hypertension is a fatal combination; it may precipitate into complete AV dissociation during anaesthesia and surgical stress. We are reporting this interesting case as our patient had developed complete Atrioventricular (AV) dissociation when scheduled earlier for surgery and got postponed. We had given combined spinal epidural anaesthesia and managed successfully without any complication.

Keywords: Left bundle branch block, AV dissociation, Combined spinal epidural anaesthesia

CASE REPORT

This case was done in orthopaedic department, BYL Nair Hospital and TNMC, Mumbai. A70-year-old, 50 kg female patient was admitted with history of fall and diagnosed with transcervical fracture of right neck femur. She was known hypertensive on oral tab Amlodipine 5mg OD. Her 2D-echocardiography (ECHO) and other biochemical investigation were within normal limit. Her electrocardiogram (ECG) showed incomplete left bundle branch block (LBBB) with T-wave inversion in lead V1-V6. She had history of complete atrioventricular (AV) dissociation, when she was posted for bipolar hemiarthroplasty earlier. Her ECG showed complete AV dissociation with no p wave and heart rate of 36 beats per minute. Therefore the procedure was postponed and she was shifted to Intensive cardiac care unit (ICCU) for further management. She was put on Holter monitoring and tabs Amlodipine 5mg BD and Hydrochlorthiazide 12.5 mg were added to control her consistent high blood pressure. Her AV dissociation got resolved. In the ICCU, negative troponin test and normal cardiac enzymes ruled out the presence of acute myocardial infarction (MI).

Informed written high risk consent and starvation were confirmed on the day of surgery. Multipara monitor was attached, and defibrillator was kept ready. Cardiologist was available for intravenous pacemaker insertion, if required. On the day of surgery, her pulse rate was 88/min, regular rhythmic normovolumic, BP-160/90 mmHg, ECG showed alternate incomplete LBBB and sinus rhythm with ST depression. Intravenous access was secured with18 G intracath on left upper limb and peripherally inserted central catheter in right cubital basilic vein. CVP was 4-5 cm of water. Ideally invasive blood pressure monitoring should be done but due to unavailability of the module we monitored BP through non-invasive method. She was preloaded with 500ml of ringer lactate and Midazolam 1 mg was injected.

Combined spinal epidural was planned for the case. In the sitting position 16G epidural catheter was put at L4-L5 space under all aseptic precaution. A 3ml test dose of 2% adrenalized lidocaine was administered. Low dose spinal anaesthesia (1.5ml Bupivacaine with 25 µg Fentanyl total 2ml volume) was injected via 23G spinal needle at L5-S1 space. Spinal level T8 was achieved and right lateral position was given to the patient. Spinal level was maintained with epidural top ups 3ml 2% plain lidocaine twice. A 4 l/min Oxygen was given through the polymask throughout the procedure. Her vital parameter, ECG, oxygen saturation and respiration were monitored. The total intraoperative blood loss was 700 ml and was managed with 1500 ml crystalloids (RL) and 500ml colloid. Injection Hydrocortisone 100mg was administered just before the cementing, hypotension (BP 70mmHg) was encountered at the time of cementing which was managed with fluid and single shot of 6mg inj Ephedrine. Surgery was uneventful and duration was 3hours. Patient was shifted to Post anaesthesia care unit for further observation. Postoperative analgesia was provided with top ups of 50mg tramadol eight hourly through epidural catheter. She was started on prophylactic dose of low molecular weight heparin along with external pneumatic compression against the deep vein thrombosis. She was discharged after 10 days and was advised to attend cardiology out-patient department for follow-up.

DISCUSSION

LBBB is usually a marker of a slowly progressive degenerative disease of the conduction system. Progression of LBBB to complete heart block is rare but electrocardiographic evidence of bilateral bundle branch block (BBBB) may develop into complete heart block in response to surgical and anaesthetic stress [1]. LBBB in contrast to right bundle branch block (RBBB) has more ominous clinical implication. LBBB is often associated with ischemic heart disease, left ventricular hypertrophy accompanying chronic systemic hypertension or cardiac valvular disease. The appearance of LBBB has to be observed during anaesthesia, particularly during hypertensive or tachycardic episode and there may be sign of myocardial infarction. Progression of LBBB to complete AV dissociation is rare unless and until there is existence of underlying cardiac disease or causative factor.

Intrinsic impairment of conduction in either of right or left bundle system leads to prolongation of QRS. With complete bundle branch block the QRS>120 ms and with incomplete QRS 100-120ms. LBBB alters both early and later phase of ventricular depolarisation. The major QRS vector is shifted to left and posteriorly. LBBB generates wide predominantly negative qs complexes in lead V and entered positive 'r' complexes in V6. Sudden developed new bifasicular block with acute anterior wall MI has greater risk of developing complete heart block, while chronic bifasicular block in a symptomatic patient is associated with a relatively low risk of developing complete AV block. Presence of either right or left bundle branch block alternatively in same patient is an indication of trifasicular disease. Intraventricular conduction delay can also be caused by extrinsic (toxic) factor that slows ventricular conduction e.g.: hyperkalaemia, drugs (class I antiarrythmics, TCA, phenothiazines) [2].

AV dissociation exists whenever the atria and ventricles are under the control of two separate pacemakers. It may develop with an

AV junctional rhythm in response to reverse sinus bradycardia. Therefore removal of the offending cause of sinus bradycardia (discontinuation of digitalis, b-blocker or CCB) or accelerating the sinus node by vagolytic agent or insertion of pacemaker is helpful if escape rhythm is slow and results in symptoms. AV dissociation can be caused by an enhanced lower (junctional or ventricular) pacemaker that competes with normal sinus rhythm and frequently exceed it. Third degree AV block is present when no atrial impulse propagates to the ventricle. If QRS duration of escape rhythm is of normal duration at a rate of 40-55/min and it can be improved with atropine or exercise. If escape rhythm of QRS is wide and rate < 40/min, block is usually localized in or distal to his bundle and it mandates a pacemaker since the escape rhythm in this setting is unreliable.

Complex stress response may occur due to combined effect of operative procedure and the provision of anaesthesia. It is also related to amount of insult, duration of surgery and volume of intraoperative blood loss. Stress response along with acid-base and electrolyte imbalance may throw patient with BBBB into complete heart block.

Clark AL et al., reported the association of severity of left ventricular systolic dysfunction with QRS duration [3]. Friesinger GC et al., showed the incidences of LBBB with acute myocardial infarction in old age (2.7% <65years and 10.5%> 75-year-old) and concluded that these three factors are a vexing and lethal combination in terms of management [4].

A routine prophylactic temporary pacemaker is not advisable in case of an asymptomatic patient with complete LBBB, but it should be available in case of complete A-V block [5]. Hofer CK et al., reported the possible recurrence of an intraoperative complete atrioventricular blockade in an older patient without pre-existing conduction abnormalities and had only minor signs of heart disease, irrespective of the anaesthesia technique [6]. In case of recurrent A-V blockade transcutaneous pacemaker should be considered preoperatively.

In our case, the patient was optimized preoperatively with the drugs. Ideally she should have undergone coronary angiogram but it had been deleterious to her. A non-invasive three dimensional (3D) computed tomography would have been the better choice in place of coronary angiogram to know the coronary artery lesion, which was not available at our institute. The anaesthesia technique that alters the cardiac physiology, minimum, was planned. General anaesthesia carries a potential risk to these patients because both the inhalational and the intravenous agents alter the haemodynamics [7]. Bernards & Hymas reported a case in which first degree block was converted to second degree block due to blockade of cardiac sympathetic neurons induced by spinal anaesthesia [8]. This suggests that patients with pre-existing heart block may be at increased risk for development of higher grade block during spinal anaesthesia. There was a report saying the low dose spinal anaesthesia combined with epidural was safe and effective technique in heart block patients [9]. In present case, low dose spinal anaesthesia was used and maintained adequate level by giving intermittent epidural top ups. Doses of intrathecal bupivacaine between 5 and 7 mg are sufficient to provide effective anaesthesia [10]. Spinal level of T8 with 1.5ml of 0.5% hyperbaric bupivacaine along with 25µgm of fentanyl (total volume 2ml) was achieved in index patient. Kumar et al., also highlighted the advantage of bupivacaine-fentanyl combination in maintaining haemodynamic stability in a case of congenital complete heart block posted for elective caesarean section [9]. Spinal level at T8 was maintained which eliminated the risk of blocking cardiac sympathetic innervations T1-4. The cardiac status of the patient was monitored by HR, rhythm and blood pressure during intraoperative and in postoperative period.

CONCLUSION

Low dose bupivacaine with fentanyl in combined spinal epidural anaesthesia is safe and effective technique for heart block patient but we have to be vigilant throughout the perioperative period.

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