

Bezold-Jarisch Reflex after Bone Cement Application during Total Hip Replacement

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Editor,

The Bezold-Jarisch Reflex (BJR) responds to noxious ventricular stimuli within the left ventricular wall by inducing hypotension, bradycardia, and coronary artery dilatation. BJR has its origin in cardiac receptors with non myelinated, type C vagal fibres constituting the afferent limb of the reflex which causes reflexively increasing parasympathetic tone and decreasing sympathetic tone. Although it is a transient episode in many cases, it could give rise to cardiac arrest. The BJR is an inhibitory reflex induced by type C vagal fibres in cardiac chambers causing triad of bradycardia, systemic vasodilatation and profound hypotension. Stimulation could be chemical or mechanical. In this reflex, hyperstimulation of the myocardium paradoxically leads to profound bradycardia or asystole [1]. Bone cement application during total hip replacement might lead to this reflex due to release of cement monomer into the circulation [2].

A 35-year-old male came to the Department of Orthopaedics with chief complaint of left sided groin pain that was exacerbated by weight bearing. On Magnetic Resonance Imaging (MRI) hip bone, diagnosis of Avascular Necrosis (AVN) of head of left femur was established. There was a history of recent trauma but no cause of non traumatic AVN was found like steroid use, autoimmune disease, sickle cell, alcoholism, tobacco use or connective tissue disorders etc. Surgeon decided to do left sided total hip replacement. Preoperatively, all the routine investigations including chest x-ray and electrocardiography were found to be within normal limit. On the day of surgery, under all aseptic precautions, subarachnoid block was given with 27-G Quincke's spinal needle. After 10 minutes, adequate anaesthesia (T10) level was obtained. Patient was positioned in right lateral position. Patient was well conscious oriented and haemodynamically stable before and after spinal anaesthesia. After one hour of surgery, medullary reaming was completed and bone cement was applied. On application of bone cement with gun, severe bradycardia (Heart Rate (HR) around 25-30 beats per minute) along with hypotension (blood pressure 80/40 mmHg) was noted on the monitor without any respiratory distress (oxygen saturation 100%). Patient was well oriented to time, place and person. Bradycardia (HR 25-30 bpm) lasted for around 20-30 seconds that was recognised by residents on monitor until inj. atropine and inj. mephentermine 6 mg intravenously was given. Haemodynamics reestablished with the quick intervention of

anaesthesiologist and surgery went uneventful further. Patient was stable in postoperative period and discharged after four days of hospital stay.

The BJR is often imply as a cause of bradycardia or hypotension in neuraxial anaesthesia. However, its role in cases of neuraxial anaesthesia induced cardiac arrest remains uncertain [3-5]. Hypotensive episodes and cardiac arrest have been reported during cement insertion as a complication of Bone Cement Implantation Syndrome (BCIS). Signs and symptoms of BCIS may include hypoxia, hypotension, cardiac arrhythmias, increased Pulmonary Vascular Resistance (PVR) and cardiac arrest [6,7]. The development of isolated severe BJR is reported during shoulder arthroscopy under interscalene block [8] but with bone cement implantation it is either not reported or confounded with BCIS. Mostly it is a self-resolving phenomenon but sometimes requires restoration of heart rate with venous return. All patients should be treated promptly and investigated to rule out potentially fatal underlying causes in case of cardiac arrest.

In practice, this is the first case in knowledge where this type of haemodynamic change was observed without respiratory distress during total hip replacement in a healthy young patient. These severe but rare cases remind the potential complications and importance of close monitoring at the time of bone cement implantation. BJR should be considered during arthroplasty and must be treated efficiently.

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