Diastolic Dysfunction - Anaesthesiologist's Dilemma!

Amarja Nagre[1]

Left ventricular systolic dysfunction is well recognized and ably managed by anesthesiologists. Left ventricular diastolic function needs to be reckoned as well, every single time anaesthesia is planned in a patient with cardiac disease. This article emphasizes why one should take cognizance of diastolic dysfunction during perioperative anaesthesia management.

Diastolic dysfunction(DD) is the inefficiency of the left ventricle to allow filling at lower atrial pressures [1]. In other words, it is the abnormal relaxation during diastole along with the reduction in left ventricular compliance which culminates into higher filling pressures of the left ventricle [2]. It is associated with comorbid conditions such as hypertension, diabetes and atrial fibrillation. Oftentimes it is asymptomatic at rest but can manifest in stress-induced circumstances such as acute severe hypertension, tachycardia, overzealous fluid administration or arrhythmias especially atrial fibrillation [3]. Various reciprocal changes occur over time within the systolic function due to long-standing diastolic dysfunction. Also, mild to moderate diastolic dysfunction forms an independent predictor for the risk of mortality in addition to the established risk of hypertension, diabetes, coronary artery disease and advanced age [4]. It is also an independent predictor of major adverse cardiac events (MACE) [5]. Most of the patients in whom anaesthesia is given for various surgical procedures have comorbidities like hypertension, diabetes, dyslipidemia, atrial fibrillation and ischemic heart disease which endure high risk for DD. They may have associated heart failure with preserved ejection fraction (HFpEF).DD can contribute to postoperative heart failure [6] and is associated with various complications in the postoperative period [2]. The act of administration of anaesthesia, mechanical ventilation and intraoperative events like tachycardia, hypertension, inordinate fluid therapy along with the overall surgical stress, may affect the loading conditions, the preload and afterload of the left ventricle which can elevate the left atrial pressures to precipitate pulmonary edema in the patients with diastolic dysfunction [3]. The patients with diastolic dysfunction have a notably narrow therapeutic margin for fluid supplementation. The fluid management protocol should concentrate on reducing the LV pressures so as to maintain optimum preload. Perhaps, the preload has to be adequate enough so as to avoid the low cardiac output state. In patients with DD extra precautions should be practised during perioperative fluid management. Overzealous fluid administration needs to be deterred to avoid postoperative HF and pulmonary edema [6] as it leads to a persistent increase in left ventricular filling pressures which eventuates pulmonary edema [2]. Thence, the anaesthetic implications in DD are judicious fluid administration policy, avoidance of stress response, invasive monitoring like central venous pressure, pulmonary artery pressure monitoring, cardiac output monitoring and echocardiography besides meticulous comprehensive anaesthesia management. Regional anaesthesia comprising of various ultrasound-guided techniques with plexus blocks and fascial plane blocks barely interfere with the physiology and haemodynamics therefore prove to be an asset in these patients.

[1]Department of Anaesthesia, Kamalnayan Bajaj Hospital, Aurangabad, Maharashtra, India.

Address of Correspondence
Dr. Amarja Nagre,
Consultant Cardiac Anaesthesiologist, Kamalnayan Bajaj Hospital, Aurangabad, Maharashtra, India.
Email: dramarja.1@gmail.com

Dr. Amarja Nagre

2021 © Journal of Anaesthesia and Critical Care Case Reports| Available on www.jaccr.com | ISSN 2454-7174 | DOI: 10.13107/jaccr.2021.v07i01.164

References

1. R. Pirracchio, B. Cholley, S. De Hert, A. Cohen Solal, A. Mebazaa, Diastolic heart failure in anaesthesia and critical care, BJA: British Journal of Anaesthesia, Volume 98, Issue 6, June 2007, Pages 707–721.
2. Jun IJ, Kim J, Kim HG, Koh GH, Hwang JH, Kim YK. Risk factors of postoperative major adverse cardiac events after radical cystectomy: implication of diastolic dysfunction. Sci Rep. 2019;9(1):14096.
3. George EP Godfrey, BM PGcertCU, Marcus JE Peck, MRCP FRCA EDIC FFICM, Diastolic dysfunction in anaesthesia and critical care, BJA Education, Volume 16, Issue 9, September 2016, Pages 287–291.
4. Smith KS. Anesthetic Management of a Patient with Severe Diastolic Dysfunction for Umbilical Hernia Repair,A Case Report.AANA Journal 2019 Aug; 87:43.
5. Fayad A, Ansari MT, Yang H, Ruddy T, Wells GA. Perioperative Diastolic Dysfunction in Patients Undergoing Noncardiac Surgery Is an Independent Risk Factor for Cardiovascular Events: A Systematic Review and Meta-analysis. Anesthesiology. 2016 Jul;125(1):72-91.
6. Higashi, M., Shigematsu, K., Tominaga, K. et al. Preoperative elevated E/e' (≥ 15) with preserved ejection fraction is associated with the development of postoperative heart failure in intermediate-risk non-cardiac surgical patients. J Anesth 34, 250–256 (2020).

Conflict of Interest: Nil
Source of Support: None

How to Cite this Article

Nagre A | Diastolic Dysfunction - Anaesthesiologist's Dilemma! | Journal of Anaesthesia and Critical Care Case Reports | January-April 2021; 7(1): 02-03.