472052 - ECHOCARDIOGRAPHIC ASSESSMENT OF LEFT VENTRICULAR FILLING DURING ELECTIVE CESAREAN SECTION UNDER SPINAL ANESTHESIA

George Dumitrascu, MD, Ashraf Fayad, FRCPC,, Nasser Tawfeeq, MD
Anesthesiology, Ottawa University, Ottawa, ON, Canada

Introduction: Modern understanding of the hemodynamic changes during puerperium is based on investigations from 1969(1) and 1979(2). These studies evaluated changes in intracardiac pressures and described a state of relative hypervolemia with an increase in cardiac output up to 75% above predelivery values. No recent studies have addressed the changes in hemodynamics following delivery through elective cesarean section.

Methods: This is a prospective study, examining the left ventricular volume pre and post delivery in healthy parturients undergoing elective cesarean sections. Once approval from the Ethics Board was obtained, 18 patients were consented for the study. All patients received an identical spinal anesthetic and were positioned supine with left uterine displacement. Once the sensory block reached a T4 level, a transthoracic echocardiography (TTE) was performed. Through an apical view, the left ventricular end-diastolic volume (LVEDV) and left ventricle end-systolic volume (LVESV) were determined using Simpson's apical biplane rule. Stroke volume (SV) and cardiac output (CO) were subsequently calculated.. The transmitral flow patterns were also recorded. A second TTE exam was conducted after placental delivery and visual confirmation of adequate uterine contraction. All studies were performed by the same, certified, echocardiographer and were saved on compact discs. The TTE images were analyzed, and the above mentioned parameters were calculated. Mean and standard deviation were obtained for the pre and post delivery values (Table 1).

Results: Four patients were excluded from the study secondary to technical difficulty in obtaining apical TTE images. Table 1 (Mean $\pm$ standard deviation): LVEDV (mL): pre 112.7 ± 15 post 91.3 ± 10 LVESV (mL): pre 44.1 ± 13 post 28.4 ± 12 SV (mL): pre 68.3 ± 10 post 64.9 ± 11 EF (%): pre 62.0 ± 8 post 69.5 ± 7.9 HR (/min): pre 80 ± 13 post 85 ± 15 CO (L/min): pre 5.4 ± 1.2 post 5.4 ± 1 E (m/s): pre 0.96 ± 0.28 post 1.10 ± 0.3 A (m/s): pre 0.58 ± 0.1 post 0.68 ± 0.1 E:A ratio : pre 1.6 ± 0.31 post 1.7 ± 0.48 DT : pre 215 ± 48 post 184 ± 42

Discussion: Post delivery (immediately after autotransfusion) values for LVEDV, LVESV, and SV were found to be, surprisingly, lower when compared to their pre delivery counterparts, contradicting as such the accepted view of the puerperium as a state of relative hypervolemia. The analysis of the transmitral flow pattern showed an improvement in diastolic function, consistent with findings reported recently in the literature (3). These empirical observations bring into question our understanding of the hemodynamic changes accompanying cesarean sections under neuraxial blocks. Echocardiography allows us a glimpse into these complex mechanisms.

References: 1) Ueland K, Hansen JM. Maternal cardiovascular dynamics. Am J Obstetrics Gynecology 1969; 103:8-18 2) Kjelsen J. Hemodynamic investigations during labor and delivery. Acta Obstet Gynecol Scand. 1979; 89:1-252 3) Fok WY. Left

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