ANESTHESIOLOGICAL MANAGEMENT OF THE PREGNANT PATIENT WITH SEVERE OBSTRUCTIVE HYPERTROPHIC CARDIOMYOPATHY: CLINICAL CASE

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ABSTRACT

***Background**: The authors describe a clinical case of a woman about to undergo surgery for severe obstructive hypertrophic cardiomyopathy. The condition causes altered ventricular compliance with consequent diastolic dysfunction and obstruction of part of the flow, and reduction of cardiac emission.*

***Methods**: The patient in her 38th week of pregnancy was a candidate for cesarean section and had multiple sclerosis, hence she could not undergo spinal anesthesia. General anesthesia was performed with spontaneous breathing using a laryngeal mask.*

***Results**: During surgery there were no significant hemodynamic or saturation abnormalities, so no hemodynamic pharmacological support was needed.*

***Conclusions**: The authors believe general anesthesia with a laryngeal mask and spontaneous breathing were a safer approach than positive pressure mechanical ventilation, which would worsen the degree of obstruction in the presence of obstructive hypertrophic myopathy.*

***Key words**: obstructive hypertrophic cardiomyopathy, cardiac decompensation, anesthesiological management, cesarean section.*

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Introduction

Hypertrophic cardiomyopathy is the most common inherited cardiac disease. It is an autosomal dominant condition, characterized by a thickening of the cardiac walls, often asymmetric, that primarily involves the inter-ventricular section. The usual microscopic presentation is disarray of the myocardial fibers, which lose their normal ordered distribution and become crossed, resulting in an increase of the fibrotic component. In addition, the blood vessels are thickened due to hyperplasia of the medium, which causes reduced myocardial oxygenation. Such anatomic abnormality leads to altered ventricular compliance that may cause diastolic dysfunction[1]. The sectional hypertrophy causes an obstruction of a section of blood flow in the left ventricle. The condition is present in approximately 30% of patients at rest, and in a higher percentage during physical effort. It is caused by thickening of the intra-ventricular wall that protrudes in the cone of the flow in the left ventricle, provoking a definite sub-aortic stenosis (under the aortic valve). Due to the Venturi effect, the systolic blood flow is dragged behind the anterior mitral tip, provoking what is called anterior systolic movement (ASM). This phenomenon may be responsible for mitral insufficiency, in addition to provoking ulterior obstruction of the arterial flow[2]. Depending on the severity of the symptoms, there are several drugs and other more or less invasive treatments. Symptomatic patients may have congestive cardiac insufficiency, angina, syncope, palpitations, and ventricular or atrium arrhythmias. The drugs normally used in hypertrophic myopathy are needed to decrease cardiac frequency and improve the filling capacity of the heart. Patients with obstruction need such drugs to reduce the internal pressure of the heart. The main drugs are beta-block-

ers, calcium antagonists (verapamil, diltiazem), and disopiramide. Some patients need diuretics. A few patients with obstruction of left ventricular flow remain very symptomatic despite the maximum medical therapy. In such patients surgery (myotomy/myectomy) is indicated, in which part of the hypertrophic muscle is removed, or ablation of the inter-ventricular section[3].

Materials and methods

In June of the current year a patient P.N. came to our anesthesia clinic, in the 38th week of her first pregnancy, a candidate for cesarean section. She was Caucasian, 36 years old, weight 94kg, height 171cm. The patient history included multiple sclerosis being treated with corticosteroids for 8 years, with the presence of plaque along the entire lumbar section of the medulla, cardiac decompensation with systolic function caused by congenital obstructive hypertrophic cardiomyopathy (NYHA Class III). Treatment consisted of verapamil 80mg, once in the morning and again in the evening. The ECG showed sinusal rhythm with a cardiac frequency of 61 beats/min, and a first degree atrium-ventricular block with alterations of the re-polarization at the anterior-lateral level from left ventricular overload. The ECG also showed severe hypertrophy of the left ventricle loading the inter-ventricular section that caused middle ventricular obstruction with a moderate-severe gradient, moderate mitral insufficiency, left atrium enlargement, and normal right sections. A few days later the patient underwent a C-section under general anesthesia. The stomach was emptied by means of nasal-gastro depletion, then a laryngeal mask (SupremeTM number 4) was positioned. Anesthesia induction consisted of propofol 220mg I.V. After the glottis device was introduced and its correct position verified, anesthesia was maintained through inhalation of sevofluorane 2%.

Results

Pulsometry showed oxygen values of 99%, arterial pressure and cardiac frequency were maintained within the range of normal values, and cardiac rhythm stayed sinusal revealing that the hemodynamic state was stable during the intra-operative and post-operative period without any need for pharmacological support.

Discussion

The guidelines of the American Society of Anesthesiologists (ASA) recommend the use of subaracnoid anesthesia in the management of pregnant patients with severe hypertrophic cardiomyopathy because the degree of obstruction is worsened by any maneuver that reduces the left ventricle volume such as positive pressure mechanical respiration and positive end-expiratory pressure (PEEP)[4]. Since our patient had multiple sclerosis we chose general anesthesia through spontaneous breathing[5]. The use of a laryngeal mask allowed us to keep the airways open more effectively, considering the reduced movement of the diaphragm in a pregnant patient and the greater protection in the case of possible regurgitation of gastric material[6]. We paid particular attention to the sinusal rhythm since the loss of it in a non-compliant ventricle may cause severe hypotension all the way to syncope[7]. Maintaining the sinusal rhythm is essential in such patients since atrium contraction contributes 30-40% of the tele-diastolic ventricular filling. In addition, we monitored the volume re-integration since obstructive hypertrophic cardiomyopathy patients are subject to transitory arterial hypotension in the intra-operative period, requiring more aggressive treatment by means of volume expansion through the use of vasoconstrictors such as ephedrine and phenylephrine[8].

Conclusions

The use of positive pressure mechanical respiration worsens the degree of obstruction in the presence of cardiac decompensation of obstructive origin, with a consequent reduction of the left ventricular volume. So the use of anesthesia that doesn't utilize mechanical respiration is advantageous. In our case general anesthesia by means of spontaneous breathing through a laryngeal mask proved to be an effective alternative to local or regional anesthesia.

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