

CASO CLÍNICO

Vol. 40. No. 3 Julio-Septiembre 2017
pp 226-229

Anesthetic management of a pregnant woman diagnosed with Wolff-Parkinson-White syndrome with subarachnoid block

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Received for publication: 23-01-2017

Accepted for publication: 03-07-2017

Este artículo puede ser consultado en versión completa en
<http://www.medigraphic.com/rma>

SUMMARY

Patients with diagnosed Wolff-Parkinson-White syndrome have an accessory pathway, so they present different arrhythmia types (atrioventricular tachycardias, atrial fibrillation or flutter). Perioperative management of this disease is challenging because incorrect treatment is ineffective, can cause rapid clinical deterioration and reach cardiac arrest. We describe a successful intraoperative management with subarachnoid block in a pregnant woman with a known history of the syndrome for emergency cesarean section.

Key words: Wolff-Parkinson-White Syndrome, pregnant woman, spinal anesthesia.

RESUMEN

Los pacientes afectados por un síndrome de Wolff-Parkinson-White tienen una vía accesoria, de manera que presentan distintos tipos de arritmias (taquicardias auriculoventriculares, fibrilación auricular o flutter). El manejo perioperatorio de esta enfermedad es problemático porque el tratamiento incorrecto es inefectivo, puede causar un deterioro clínico rápido y desencadenar hasta una parada cardíaca. Describimos el manejo intraoperatorio exitoso con un bloqueo espinal en una gestante con una historia conocida del síndrome para una cesárea de emergencia.

Palabras clave: Síndrome de Wolff-Parkinson-White, gestante, anestesia espinal.

INTRODUCTION

The Wolff-Parkinson-White syndrome is characterized by paroxysmal tachycardia associated with suggestive findings of pre-excitation in the electrocardiogram, such as short PR interval (less than 120 milliseconds during sinus rhythm in adults), slurring of the initial portion of the QRS complex (Delta wave), QRS complex greater than 120 milliseconds in adults and secondary changes in the T wave and ST segment^(1,2).

We report the case of a pregnant adult woman with a known history of this disease, which was scheduled for an emergency

cesarean section. We declare that consent of the patient and the Hospital Ethics Committee were obtained for publication.

CASE DESCRIPTION

Preoperative evaluation was performed to a 26-year-old patient with 37 weeks' gestation by last menstrual regime. Among the surgical record, she manifested that eleven years before the interview was underwent curettage for treatment of incomplete spontaneous abortion, which was performed under intravenous sedation. In addition, seven years earlier, the patient had a previous cesarean section for dysfunctional

labor, which was performed under spinal anesthesia without any complications.

Regarding her medical record, she expressed that she suffered episodes of paroxysmal supraventricular tachycardia since twelve years, treated in acute episodes with intravenous verapamil or amiodarone and chronically with oral verapamil. However, only two years earlier than preoperative evaluation, she had been diagnosed with a syndrome of pre-excitation type Wolff-Parkinson-White, as she presented a clinical profile of chest pain radiating to the left arm, palpitations and an electrocardiogram with the presence of paroxysmal tachycardia with regular and narrow QRS complex together with Delta waves. She started treatment with oral Amiodarone; likewise, an echocardiogram was conducted, which concluded that the patient had a normal cardiac morphology and motility, valve function without changes, absence of pulmonary hypertension and preserved left ventricle ejection fraction.

Compliance of oral antiarrhythmic regime was irregular, presenting several episodes of tachycardia, but no symptoms of hemodynamic instability, which ceded with the administration of intravenous verapamil and sometimes only with vagal maneuvers such as carotid sinus massage and Valsalva maneuver.

During pregnancy she received antiarrhythmic therapy with oral propranolol 5 mg q.d. She was hospitalized in a referral hospital for delivery attention and management of the cardiac arrhythmia. She had noninvasive blood pressure of 100/60 mmHg, heart rate of 90 beats per minute (bpm) and a respiratory rate of 17 breaths/minute. Laboratory tests showed mild anemia (hemoglobin 10.6 g. per deciliter and hematocrit of 31.7%). The simple urine test was pathological (showing lots of leukocytes per field, microhematuria and abundant amount of bacteria). The remaining tests (glucose, urea, creatinine, blood coagulation tests) were within normal values.

One day after admission, she was scheduled for emergency cesarean due to the diagnosis of altered fetal wellbeing (ICD-10 O68.8) and a history of a previous cesarean section. She entered the operating room with the following vital functions: noninvasive blood pressure 106/58 mmHg, heart rate 95 bpm, respiratory rate of 18 breaths/ min and pulse oximetry with 100% saturation with an inspiratory oxygen fraction of 21%. Previous hydration was conducted with 500 ml of colloid solution of succinylated gelatin 4% (GELOFUSINE), then in a sitting position, a spinal block in L2-L3 intervertebral space level with a needle Quincke No. 26 was performed. Ten milligrams of isobaric Bupivacaine were injected. The patient was placed supine with a left lateral tilt of 10° to the operating table. A blockade at the sixth thoracic dermatome level was obtained. The surgery started and after 12 minutes a male newborn was born with an Apgar score of 9 points to the first and fifth minutes of life. Thirty units of oxytocin were administered in intravenous infusion in 1,000 mL of saline. A

total volume of 1,200 mL of physiological saline was infused during surgery. There were no severe changes in heart rate or noninvasive blood pressure, ending surgery without using any vasopressor or antiarrhythmic drug. At the end of the surgery the patient's vital signs were noninvasive blood pressure of 119/60 mmHg, heart rate of 110 bpm, without variation in oxygen saturation.

DISCUSSION

Patients with this pre-excitation syndrome have an accessory pathway in addition to the system of regular atrioventricular conduction, hence they present in 80% of cases atrioventricular re-entrant tachycardias (with orthodromic and antidromic conduction) and the remaining 20%, atrial fibrillation or flutter⁽³⁾.

Arrhythmias are among the most common cardiac complications during pregnancy, thus exacerbations of pre-existing arrhythmias may appear or an arrhythmia may manifest for the first time. The precise mechanism of this increased incidence during pregnancy is unclear, but probably it is due to a combination of autonomic, hemodynamic and hormonal changes. Also, the incidence is increasing because more women with repaired congenital heart disease survive to reproductive age and a growing group postpones pregnancy until after the third or fourth decade of life⁽⁴⁻⁶⁾.

The two most common sustained cardiac arrhythmias during pregnancy are the supra-ventricular reentrant tachycardia mediated by an accessory pathway and the atrioventricular nodal reentrant tachycardia⁽⁷⁾. In the first case are the patients with Wolff-Parkinson-White, who are more likely to have arrhythmias during pregnancy, and have in most cases an oscillating orthodromic atrioventricular tachycardia^(4,8,9). The importance of the management of this pathology is that the wrong treatment can cause rapid clinical deterioration and reach the cardiac arrest⁽³⁾.

The patient of this case reached the cesarean section with this syndrome already diagnosed, which was treated from a year before pregnancy and during pregnancy, with prophylactic antiarrhythmic drugs.

In the antiarrhythmic treatment of this syndrome, it is described the antiarrhythmic drugs of Ia class according to the classification of Vaughan-Williams (such as quinidine and procainamide), class IC (such as flecainide and propafenone) and Class III (such as amiodarone, sotalol and dofetilide) slow conduction over the accessory pathway. The best first-line drug to treat this pathology is procainamide, which slows conduction in the accessory pathway; followed by amiodarone, which decreases the conduction in this path and also in the atrioventricular node. An additional advantage of amiodarone unlike procainamide is that it is available in many institutions⁽³⁾.

In the context of pregnancy, the safest antiarrhythmic drug for the chronic prevention in these patients is sotalol, because it belongs to the category B of the classification of the FDA⁽³⁾. However, in this case the patient received chronic treatment with Propranolol, which, although it may be used during pregnancy except for the first trimester, belongs to the category C of the FDA⁽¹⁰⁻¹²⁾. Also, beta-blockers are preferred with selective properties β_1 because they interfere with lesser intensity with the peripheral vasodilatation and uterine relaxation⁽¹⁰⁾. It is also important to note that adverse effects have been reported after use during pregnancy such as fetal hypotonia, neonatal respiratory depression, low birth weight and hypoglycemia; so, it is recommended to discard low weight and glucose monitoring in the first 24-48 hours of neonatal life^(4,12).

The radiofrequency ablation therapy is the best method as definitive therapy⁽³⁾, but it is usually contraindicated during pregnancy, being it considered only in cases of tachyarrhythmias poorly tolerated and refractory to pharmacological treatment⁽⁶⁾.

When there is no presence of hemodynamic instability (hypotension, heart failure, angina, altered state of consciousness) drug treatment can be provided. Tachycardia due to orthodromic atrioventricular reentrant (OAVRT) that occurs in the perioperative period of a patient with a known history of this arrhythmia, shows in most cases a QRS complex, narrow and regular (when there is no prior or related to the heart rate, branch block). In the treatment are included: adenosine, verapamil, procainamide and intravenous beta-blockers (propranolol, metoprolol). However, when a regular tachycardia is seen, but with wide QRS complex, the distinction between a pattern of antidromic atrioventricular reentrant tachycardia (AAVRT) and ventricular tachycardia is not possible taking into account only a twelve lead electrocardiogram. Unfortunately, if the drugs for treating OAVRT were used in a patient with ventricular tachycardia and no AAVRT, arrhythmia can turn into ventricular fibrillation and cardiac arrest. For this reason, drugs that slow conduction through the atrioventricular node such as adenosine, beta blockers, calcium channel blockers and digoxin must be avoided. Antiarrhythmic drugs of choice for treating tachycardia with these characteristics are procainamide and amiodarone^(3,10,11). If there were hemodynamic instability, a synchronized cardioversion with 50-200 Joules of biphasic current should be carried out. If synchronization is not possible, defibrillation with 200 joules of biphasic current should be performed. In both cases, advanced CPR must be started without delay^(3,4,6,7).

Regarding the anesthetic management of pregnant women with Wolff-Parkinson-White syndrome, there are reports that suggested that the use of a regional anesthetic technique could be beneficial because it prevents sympathetic stimulation triggered by laryngoscopy and also the use of drugs for reversing neuromuscular blockade such as neostigmine (which may trigger fatal arrhythmias by changes in cardiac conduction)⁽¹³⁻¹⁷⁾. In two of these case reports were chosen

successfully combined spinal-epidural techniques^(13,14); however, our hospital did not have the required set for combined technique. In another report, the patient received continuous epidural anesthesia, which would have been a good election in our case, but the necessity for starting urgently the emergency cesarean section made that the chosen technique was subarachnoid anesthesia, since it has a faster onset than epidural anesthesia⁽¹⁵⁾. Nonetheless, there is also a report of a pregnant woman with this disease undergoing cesarean section with epidural anesthesia where supraventricular tachycardia was triggered at the end of the procedure, without being able to determine with precision what the trigger factor of it was⁽¹⁸⁾.

A key perioperative objective of the anesthetic management of patients with this disease should be to find a balance between vagal and sympathetic tone, extreme, because both can be pro-arrhythmic. In a pregnant woman undergoing cesarean section under spinal anesthesia, the difficulty is that the hypotension induced by anesthesia is the most important adverse effect, which may require the use of drugs such as ephedrine, epinephrine or atropine (if bradycardia is present) that induce tachycardia. On the other hand, if an incomplete spinal block is obtained, it may cause pain and anxiety, which may also trigger tachycardia^(3,19,20).

In the pregnant woman of this study, there was no incomplete sensory block where additional adjuvants drugs would have been needed to use, nor hypotension that would have required the use of vasopressors drugs. Nonetheless, if she had had hypotension requiring vasopressor use, the choice would have been phenylephrine, since it has no effect on the conduction and has been used as antiarrhythmic^(3,21). It is also noteworthy that the preload with a colloid may have prevented hypotension more effectively regarding a crystalloid⁽²²⁾.

In conclusion, pregnant patients with diagnosed Wolff-Parkinson-White and with an antiarrhythmic treatment set may have cesarean section under spinal anesthesia, implementing the factors that prevent cardiovascular depression as are the use of a conservative dose of local anesthetic, preloading with one colloid solution and optimization of prior drug treatment. In addition, antiarrhythmic drugs of choice and a defibrillator in case of hemodynamic instability should be available.

Acknowledgements

Assistance with the case: the authors would like to express their gratitude to Joe Pingo More, MD, for his help for reviewing the patient's medical record; and to Nelly Curo Zapata, for her help to achieve the home interview of the patient. Likewise, to Gregorio Tume Palacios for translating the article from Spanish to English.

Conflicts of Interest

The authors declare no conflicts of interest.

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