Research Article
Volume 12:11, 2022

Clinical Case Reports

ISSN: 2165-7920 Open Access

Continuous Spinal Anesthesia: An Anaesthetic Technique for Caesarean Section in Patients with Congenitally Corrected Transposition of the Great Arteries

Masad Ilyass[1]*, Meskine Amine[1], Bensghir Mustapha[1], Baite Abdelouahed[1], El Ghadbane Abdeddaime Hatim[1], Elwali Abderrahmane[1] and Drissi Mohamed[2]

[1]Department of Anesthesiology and Intensive Care, Military Hospital Mohammed V, Mohammed V University, Rabat, Morocco
[2]Department of Anesthesiology and Intensive Care, head of the cardio vascular surgery intensive care unit of The Mohamed V Military Training Hospital, Faculty of Medicine And Pharmacy of Rabat, Mohammed V University, Rabat, Morocco

Abstract

Population of adults with congenital heart disease (CHD) has increased over the years; double discordance is an anatomically complex condition that accounts for 0.5 to 1% of congenital heart disease. We report the case of a 27-year-old patient, primigravida, presenting for elective caesarean section for intrauterine growth retardation, whose pre-anaesthetic evaluation revealed a corrected great vessel transposition. We review the continuous spinal anesthesia during cesarean section in a pregnant patient with incidental discovery of congenital heart disease.

Keywords: Congenital heart disease • Spinal anesthesia • Maternal hypotension

Introduction

Population of adults with congenital heart disease (CHD) has increased over the years, due to improvement in pediatric cardiology, and improved surgical and anesthetic techniques [1,2].

CHD can complicate pregnancy; hence accurate pre anesthetic evaluation seems necessary, implying that a correct plan of anesthesia with adequate preparations, such as precise titration of drugs and maintaining hemodynamic stability, would lead to better outcomes and assembling a safe anesthesia procedure.

Formerly called corrected great vessel transposition, double discordance is an anatomically complex condition that accounts for 0.5 to 1% of congenital heart disease. Its mode of discovery is variable ranging from antenatal life to adulthood [3].

Few reports have described the use of epidural analgesia/anesthesia for vaginal or cesarean delivery in parturients with double discordance, but none have used continuous spinal anesthesia [4-6]. In this report, we review the continuous spinal anesthesia during cesarean section in a pregnant patient with incidental discovery of congenital heart disease.

Materials and Methods

We report the case of a 27-year-old patient, primigravida, height=165cm, weight=73 kg, at 35 weeks of amenorrhea of an unmonitored pregnancy, presenting for elective caesarean section for intrauterine growth retardation. On clinical examination, patient cyanotic, heart rate was 75 beats / min with regular rhythm and blood pressure (BP) was 110/70 mmHg. arterial oxygen saturation at 82% no murmur on heart auscultation and breath sounds were normal. A biological assessment was carried out returning without anomaly.

The electrocardiogram (ECG) showed regular sinus rhythm, axis of the heart in DIII, biatrial hypertrophy, hypertrophy of the right ventricle (Figure 1).

In addition, a transthoracic echocardiography was performed which found:

1. Atrio-visceral situs solitus, levocardia.
2. Normal systemic and pulmonary venous return
3. Thin and compliant inferior vena cava.
4. Normal caliber coronary sinus
5. Good atrioventricular concordance.

Ventriculo-Arterial Discrepancy

Discordance of transposition of the great vessels with commissural malalignment, anterior and right aorta, leaves the right ventricle in tricuspido-aortic discontinuity, it measures 33mm in its initial portion, describes its arch on the left, with normal flow in the isthmic aorta and flow pulsating in the abdominal aorta; the transvalvary anterograde aortic flow is at 1m/s.

Posterior and left pulmonary artery, leaves the left ventricle in mitro-pulmonary continuity; the pulmonary arterial pathway is harmonious with

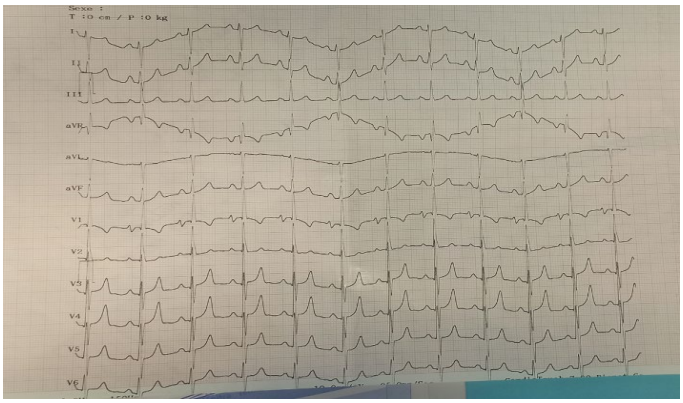

Figure 1. Electrocardiogram.

***Address for Correspondence:** Masad Ilyass, Department of Anesthesiology and Intensive Care, Military Hospital Mohammed V, Mohammed V University, Rabat, Morocco, Tel: 212676040767; Email: ilyass.masad@gmail.com; doc.conane@gmail.com*

Received: 02 November, 2022; Manuscript No. jccr-22-84185; **Editor Assigned:** 03 November, 2022; PreQC No. P-84185; **Reviewed:** 14 November, 2022; QC No. Q-84185; **Revised:** 19 November, 2022, Manuscript No. R-84185; **Published:** 26 November, 2022, DOI: 10.37421/2165-7920.2022.12.1539

pulmonary artery trunk dilated to 38 mm, and fine pulmonary branches, the pulmonary flow is at 2 m/s. Minimal pulmonary leak estimating PAPd at 6 mmHg and PAPm at 19 mmHg. PAPS is estimated at 32 mmHg.

Hypertrophied right ventricle, well adapted (basal right ventricle end-diastolic diameter=49mm), right ventricle systolic function parameters are correct (TAPS=29 mm / Wave S tric: 15 cm / s). Left ventricle curiously relatively quite well preloaded, a little deconditioned (Basal LV DTD=44mm, septal wall: 5.4 mm, posterior wall: 7mm). Right ventricle pressure much higher than the left ventricle (117 mmHg). Ostium secundum interauricular communication measured at 21 mm, non-restrictive, bidirectional shunt. Permeable arterial canal measured at 4mm, with restrictive shunt at 4.4m/s.

After explaining to the patient, we decided to use a continuous spinal catheter; with ECG monitoring, pulse oximetry and non-invasive arterial BP (Figure 1 and 2). Patient placed in a seated position, identification of the L3-4 space, a IntraLong spinal catheter system (PAJUNK) with 21G 90 mm Sprotte needle and 25G spinal catheter was used (Figure 3). After verification of the cerebrospinal fluid, placement of the spinal catheter, we proceed to the intrathecal injection of Bupivacaine hyperbaric 2.5 mg (0.5 ml 0.5%) and fentanyl 25 μg.

The patient then lies down in a head-up position with left lateral inclination, and the surgery begins after 5 min when the upper anesthetic level assessed by prick reaches T4. A healthy male baby with a weight of 3200 g was born after 6 min of skin incision, with Apgar scores of 8 and 10 at 1 and 5 min, respectively (Figure 4). Then syntocinon 5 IU as an intravenous (IV) bolus was administered followed by 10 IU as an infusion over 1 hour. After 30 min of intrathecal injection, reinjection of 2.5 mg of Bupivacaine *via* the catheter.

Ringer lactate 1000 ml was administered for 1 hour after intrathecal injection. Maternal hypotension (systolic BP <80% of baseline) occurred twice (6 and 10 min post spinal) and was treated with IV boluses of ephedrine 3 mg. The surgery was completed 50 minutes post-spinal anesthesia and the catheter was removed immediately postoperatively. During the surgery the patient remained respiratory stable with a saturation between 92 and 94% under oxygen flow rate 6l/min. The post-partum course was unremarkable and the subarachnoid catheter was removed 6 h after the surgery. The patient was monitored in the intensive care unit for 24 hours, with a multimodal analgesia protocol. The patient was transferred to a regular floor on postoperative day two, and discharged home on postoperative day four. She did well in the post-partum period.

Results and Discussion

Approximately 20% of CHD produce life–threatening symptoms, including; arrhythmia, syncope, myocardial infarction, and sudden death [7]. The coincidence of these rare congenital heart anomalies with pregnancy is very unique and presents a potential anesthetic risk. Additionally, management is quite complex and the anesthetist needs to make an individualized anesthetic plan [8].

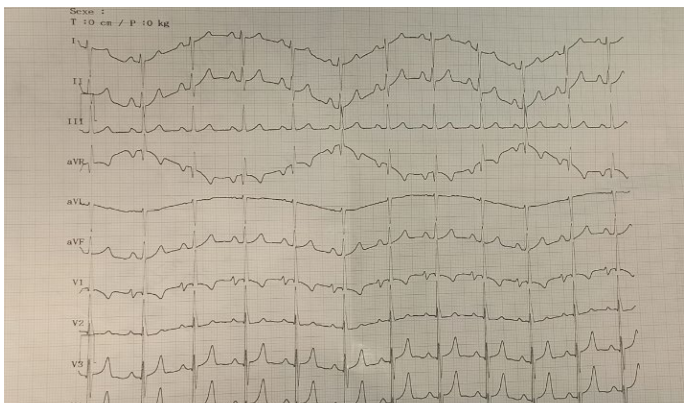

Figure 2. Intraoperative monitoring.

Figure 3. The continuous spinal anesthesia catheter.

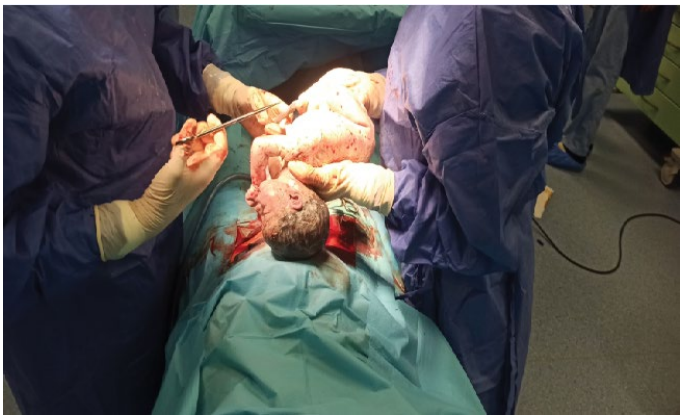

Figure 4. Healthy male baby with a weight of 3200 g was born after 6 min of skin incision.

From an anatomical point of view, it is an atrioventricular discrepancy i.e. the right atrium empties *via* the mitral valve into the left ventricle (LV) and the blood from the veins lungs flow to the left atrium and then the right ventricle (RV) through the tricuspid valve (Figure 1). There is also a ventriculo-arterial discrepancy with a sub-pulmonary left ventricle and a sub-aortic systemic right ventricle. The vessels are malposed with two parallel vessels, the aorta being in front and to the left of the pulmonary artery which is posterior. The situs is most often solitus, that is to say normal with an inferior vena cava to the right of the aorta, but the situs can be inversus (mirror image of the normal). The rate of dextrocardia is not negligible: 20% of cases and can be a reason for discovery in adults. It is the right coronary which provides vascularization to the systemic right ventricle [3] (Figure 5).

The evolution depends on the function of the systemic right ventricle and associated abnormalities. Most often the discovery is made in childhood in front of a murmur due to an associated malformation. Survival into sometimes advanced adulthood is frequent in the absence of associated anomalies [9]; Echocardiography is the key to a positive diagnosis. The analysis of the heart must be segmental to find the double discrepancy. This is the case of our patient, the discovery was during pregnancy at the time of the pre-anaesthetic consultation by ultrasound.

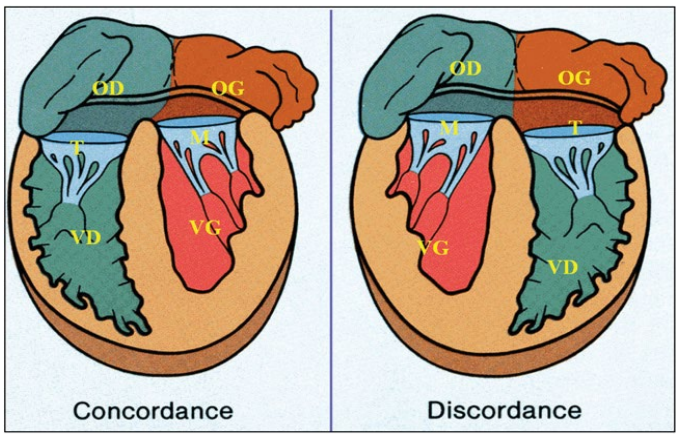

Figure 5. Diagram of the double discrepancy right ventricle (RV), mitral valve (M), tricuspid valve (T), left ventricle (LV).

Pulmonary hypertension (PH) is defined by a mean pulmonary pressure (PAPm) greater than 25 mmHg at rest, normal PAPm being around 15 mmHg. The old definition which took into account PAPm on exertion was abandoned in 2008. A distinction is made between pre-capillary PH which is associated with an occlusal pulmonary arterial pressure (PAPo) < 15 mmHg and the post-capillary PH which corresponds to a PAPo > 15 mmHg [10]. The effects of anesthetic drugs on the heart and shunt, fluid management, respiratory changes on shunts and how to avoid pulmonary hypertension are important factors during cesarean section.

There are no specific recommendations for the conduct of locoregional anesthesia for caesarean section in a patient with PH. Nevertheless, single injection spinal anesthesia should be avoided because of the extent and brutality of the sympathetic block [11]. Locoregional anesthesia is preferred because general anesthesia is probably associated with excess mortality.

This illustrates the case of our patient, whose pre-anaesthetic evaluation revealed significant PH. Hence the choice of continuous spinal anesthesia technique given its advantages, particularly in terms of maintaining hemodynamic stability.

Potential disadvantages of this technique include the risks of postdural puncture headache and cauda equina syndrome. Rates of other complications associated with CSA are low. In 2016, Cohn et al. reported on the complications associated with 761 short-term IT macrocatheters in obstetric patients over 12 years period [12]. There were no serious complications, including meningitis, epidural or spinal abscess, hematoma, arachnoiditis.

We used a 25-gauge spinal catheter for the CSA for several reasons. First disponibility in our hospital. Secondly, the patient, monitored in the intensive care unit postoperatively, was not expected to ambulate immediately. The use of a larger catheter allows for more rapid injection and better mixing of anesthetic drug with the CSF. Furthermore, more effective aspiration of CSF becomes easier to confirm proper catheter placement, initially and throughout the case. Finally, the intrathecal catheter was left in place several hours postoperatively for postdural puncture headache protection, as described in the literature [13,14].

We believe that CSA can be successfully employed for patients with CHD in cesearean section. This technique should be considered an anesthetic option especially in patients with pulmonary hypertension.

Conclusion

The anesthetist-resuscitator has an important role to play in the case of CHD. The prepartum evaluation must be early in order to assess the functional capacities of the patient, the impact of her pathology and the optimization of her treatment. A precise strategy for childbirth and for the postpartum period must be collectively decided.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. Harris, Ian S. "Management of pregnancy in patients with congenital heart disease." *Prog Cardiovasc Dis* 53 (2011): 305-311.
2. Cannesson, Maxime, Vincent Collange and Jean-Jacques Lehot. "Anesthesia in adult patients with congenital heart disease." *Curr Opin Anesthesiol* 22 (2009): 88-94.
3. Hornung, Tim S and Louise Calder. "Congenitally corrected transposition of the great arteries." *Heart* 96 (2010): 1154-1161.
4. Cordone, M, A. Wolfson, N. Wolfson and D. Penning. "Anesthetic management of labor in a patient with congenitally corrected transposition of the great arteries." *Int J Obstetric Anesth* 17 (2008): 57-60.
5. Schabel, Joy E and Ronald C. Jasiewicz. "Anesthetic management of a pregnant patient with congenitally corrected transposition of the great arteries for labor and vaginal delivery." *J Clin Anesth* 13 (2001): 517-520.
6. Arendt, Katherine W, Heidi M. Connolly, Carole A. Warnes and William J. Watson, et al. "Anesthetic management of parturients with congenitally corrected transposition of the great arteries: three cases and a review of the literature." *Anesthesia & Analgesia* 107 (2008): 1973-1977.
7. Yuki, Koichi, Alfonso Casta and Shoichi Uezono. "Anesthetic management of noncardiac surgery for patients with single ventricle physiology." *J Anesthesia* 25 (2011): 247-256.
8. DiNardo, James A. "Grown-up congenital heart (GUCH) disease: An evolving global challenge." *Ann Cardiac Anaesth* 11 (2008): 3.
9. Beauchesne, Luc M, Carole A. Warnes, Heidi M. Connolly and Naser M. Ammash, et al. "Outcome of the unoperated adult who presents with congenitallycorrected transposition of the great arteries." *J Am Coll Cardiol* 40 (2002): 285-290.
10. Galiè, N, M. Humbert, Jean-Luc Vachiery and S. Gibbs, et al. "Joint task force for the diagnosis and treatment of pulmonary hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS)." *Eur Respir J* 46 (2015): 903-975.
11. Hemnes, Anna R, David G. Kiely, Barbara A. Cockrill and Zeenat Safdar, et al. "Statement on pregnancy in pulmonary hypertension from the Pulmonary Vascular Research Institute." *Pulm Circul* 5 (2015): 435-465.
12. Cohn, Jennifer, Daria Moaveni, J Sznol and Jayanthie Ranasinghe. "Complications of 761 short-term intrathecal macrocatheters in obstetric patients: A retrospective review of cases over a 12-year period." *Int J Obst Anesth* 25 (2016): 30-36.
13. Malov, Stanislav S. "Intrathecal catheter as a secondary prophylaxis of postdural puncture headache." *Anesth Analgesia* 89 (1999): 538.
14. Dennehy, Kevin C and Ola P Rosaeg. "Intrathecal catheter insertion during labour reduces the risk of postdural puncture headache." *Canadian J Anaesth* 45 (1998): 42-45.

How to cite this article: Ilyass, Masad, Meskine Amine, Bensghir Mustapha and Baite Abdelouahed, et al. "Continuous Spinal Anesthesia: An Anaesthetic Technique for Caesarean Section in Patients with Congenitally Corrected Transposition of the Great Arteries." *Clin Case Rep* 12 (2022): 1539.