Use of Noradrenaline during Caesarean Delivery in a Woman with Left Ventricular Non-Compaction Cardiomyopathy: A Case Report

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Introduction

Left ventricular non-compaction cardiomyopathy (LVNC) is a rare genetic disorder which remains difficult to diagnose and investigate during pregnancy. The main features are left ventricular trabeculae and deep intertrabecular recesses on cardiac magnetic resonance imaging. We report the management of a woman with decompensated LVNC during pregnancy and emergency caesarean delivery. To our knowledge, this is also the first report of using noradrenaline for the management of hypotension after neuraxial anaesthesia in a patient with signs of heart failure secondary to decompensated LVNC. This case report was published with the written consent of the patient.

Case Report

- A 29-year-old gravida three, para one woman with history of familial LVNC.
- Admitted at 32 weeks gestation with significant symptoms of heart failure.
- Obstetric history consisted of an uncomplicated emergency caesarean delivery at term eight years previously under epidural top up.
- Serial echocardiograms (see Table 1) showed a reduction in left ventricular ejection fraction (LVEF) throughout pregnancy.
- Urgent caesarean delivery at 33 weeks, one day gestation due to unfavourable placental blood flow.
- Following establishment of invasive blood pressure monitoring, we performed combined spinal-epidural anaesthesia. After injection of the intrathecal component, infusion of noradrenaline (6µg.ml^{-1}) was started peripherally through a 16 Gauge cannula at 30ml.hr^{-1} (0.031µg.kg^{-1}.min^{-1}).
- Noradrenaline infusion remained at fixed rate throughout the operation as systolic blood pressure was maintained at starting values. At the end of surgery, it was weaned off incrementally and stopped prior to transfer to the post-anaesthesia recovery unit.

Table 1. Echocardiographic assessment coupled with clinical symptoms during pregnancy.

Gestation	LVEF (%)	Symptoms
12+6	40	Asymptomatic
19+6	40	Asymptomatic
27+6	35-40	Asymptomatic
31+6	20-30	Fatigue; Palpitations; Shortness of breath at rest



Image 1. Echocardiogram image demonstrating features of LVNC - prominent trabeculations in both ventricles and deep intertrabecular recesses.[5]

Discussion

- LVNC is an incompletely defined condition which may not be entirely pathological and may represent physiological processes in the development of the human heart.
- LVNC has an arrhythmogenic potential, which can have poor prognosis due to left ventricular failure, thrombotic complications, and sudden cardiac death.
- In the term parturient, the mechanisms that compensate for the reduced systemic vascular resistance associated with neuroaxial anaesthesia are impaired, as cardiac output is already increased to meet the metabolic demands of the foetal circulation.
- Reduction in maternal heart rate and cardiac output would have a direct effect on uterine blood flow and the resulting maternal hypotension could be arrhythmogenic in the presence of LVNC.
- Phenylephrine is the recommended vasopressor for counteracting hypotension induced by spinal anaesthesia in obstetrics[1], however, increasing phenylephrine infusion rates can lead to maternal bradycardia. Noradrenaline may reduce the incidence of this due to its β-adrenergic activity[2].
- Low concentration noradrenaline infusion has been found to have a lower incidence of bradycardia and atropine administration than phenylephrine[3]. This may make it more appropriate for maintaining maternal blood pressure and cardiac output, especially where compensatory mechanisms are already impaired due to cardiomyopathy.
- Noradrenaline is usually administered at a higher concentration (80µg.ml^{-1}) via a central venous catheter. However, it appears to be safe when used peripherally at more dilute concentrations[4].
- In this case report, we have demonstrated the safe use of peripheral noradrenaline as an antihypertensive during an emergency caesarean delivery in a woman with a rare cardiac disorder.

References
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