Haemodynamic stability of remifentanil patient-controlled analgesia during labour in parturients with cardiac disease

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Introduction

- Epidural analgesia is often recommended for parturients with cardiac disease to minimise the sympathetic surge and pain associated with labour.[1]
- Occasionally, in parturients with sepsis, on anticoagulants/antiplatelet medications or in those who refuse an epidural, alternatives may have to be considered.
- Remifentanil patient-controlled analgesia (Remi PCA) has been used effectively and safely in a wide range of labouring women.[2]
- Remi PCA could provide useful analgesia in parturients with cardiac disease, but limited data on its haemodynamic stability has been reported during labour in parturients with cardiac disease.

Methods

- Electronic records of 19 parturients with cardiac disease who had a vaginal birth and utilised Remi PCA for labour analgesia between 2015-2020 were reviewed. (See Figure 1/ Table 1)
- The heart rate (HR), mean arterial pressure (MAP), oxygen saturation (SpO_2) and respiratory rate (RR) prior to administration of Remi PCA were compared to post-administration till delivery or conversion to alternative analgesia.

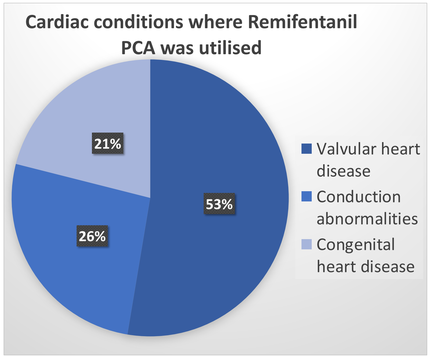


Figure 1

Results



- Mean age - 31 years.
- Mean body-mass index - 27 $kg.m^{-2}$.
- Multiparity reported in 13 (68.4%) patients.
- Mean gestational age - 37+4 weeks.
- Most (84.2%) patients had no cardiac symptoms at the time of delivery.
- Recent administration of anticoagulation and patient choice were the most common indications for the use of Remi PCA.
- A 20ug bolus regimen was utilised in 14 (74%) patients and 40ug regimen in five (26%) patients. All had a 3-minute (min) lock-out and oxygen supplementation if O_2sats fell below 95%.
- Mean duration of Remi PCA was 245 minutes (Range 17 – 505 mins).
- The haemodynamic parameters prior to administration of Remi PCA and whilst on Remi PCA during labour are highlighted in Table 2
- 94% (17/18) of neonates had a 5 - min APGAR score of ≥ 9 with one neonate requiring NICU admission for short term respiratory support following a suspected placental abruption (Foetal death reported in one patient)
- Nausea and vomiting with Remi PCA use was reported in four (21%) patients
- Of the patients with a documented follow-up post delivery (10/19) all reported acceptable pain relief and an overall patient satisfaction rating with Remi PCA of satisfactory or excellent

Valvular Heart disease	Conduction abnormalities	Congenital heart disease
• Mitral mechanical heart valve • Aortic mechanical heart valve • Bicuspid aortic valve	• Paroxysmal AF • Brugada syndrome • Complete heart block • Congenital long QT syndrome	• Marfan syndrome • Large ASD • Transposition of the great arteries – switch procedure • Family history of aorto-pathy /dissection

Table 1 – Specific cardiac conditions where Remifentanil PCA was utilised.

Table.2 Maternal haemodynamic and respiratory changes with use of Remi-PCA in labour

Variable	Pre-Remi PCA	On Remi PCA	Difference	Change (%)	P value
HR (min^{-1})	82.6 (12.01)	81.8 (11.28)	-0.9 (-4.8 to 3.1)	-1.1 (-5.8 to 3.7)	0.67
MAP (mm Hg)	94.5 (11.38)	90.5 (6.51)	-3.9 (-8.8 to 0.9)	-4.1 (-9.3 to 1.0)	0.11
SpO2 (%)	98 [95-100]	98 [96-100]	0.3 (-0.3 to 0.9)	0.3 (-0.3 to 0.9)	0.36
RR (min^{-1})	16.9 (1.54)	16.6 (1.60)	-0.3 (-1.2 to 0.6)	-1.8 (-7.1 to 3.6)	0.47

Data are mean (SD) and median [interquartiles]. Difference and change (%) with 95% confidence intervals were estimated using linear mixed models in Stata 17.0, Stata Inc., College Station, TX.

Discussion

- There were no statistically significant differences in the observed haemodynamic and respiratory parameters prior to and post commencing Remi PCA providing valuable evidence of haemodynamic stability with Remi PCA for labour analgesia in parturients with cardiac disease.
- Several limitations were identified :
  Due to the limited number of pregnant women suffering from cardiac disease and the majority of those using epidural analgesia our patient number is small.

  Although a wide range of cardiac pathology is included most of our patients were asymptomatic from their cardiac condition at the time of delivery.

  To allow early identification of hypoventilation monitoring of carbon dioxide would have been useful.
- Cardiac disease in pregnancy varies widely in disease process and severity, therefore, these results may not be generalizable to all parturients with cardiac disease especially those with more severe disease.
- Our study highlights that in targeted cardiac patients, Remi PCA may be a valuable cardio-stable alternative when labour epidural analgesia is contraindicated or refused.

References

1. Arendt K, Lindley K. Obstetric anaesthesia management of the patient with cardiac disease. International Journal of Obstetric Anaesthesia. 2019; 37: 73-85.
2. Melber A, Jelting Y, Huber M et al. Remifentanil patient-controlled analgesia in labour: six-year audit of outcome data of the RemiPCA SAFE Network (2010-2015). International journal of obstetric anaesthesia. 2019; 39: 12-21