

FENTANYL DOSE AND OUTCOME IN PRETERM INFANTS UNDERGOING PDA CLOSURE

José L. Martinez, MD* ,Annie Janvier, MD, FRCPC* * ,Josée Lavoie, MD, FRCPC* .
Departments of Anesthesiology* and Neonatology * * ,Montreal Children's Hospital, McGill
University Health Centre, 2300 Tupper, Montreal, Quebec, H3H 1P3

INTRODUCTION

Patent Ductus Arteriosus (PDA) is currently the most common congenital heart disease presenting in preterm infants. As a result of the increased survival of premature infants, surgical closure of PDA is performed more frequently. The aim of this study was to assess the impact of the anesthetic technique on outcome.

METHODS

After obtaining IRB approval, a retrospective cohort study was conducted using anesthetic records and medical charts of infants who underwent surgical closure of PDA between September 2001 and June 2003. Patient demographics, preoperative status, anesthetic technique and postoperative course were evaluated. The reviewer was blinded to outcome. Unstable Postoperative Respiratory Course (UPRC) was defined as respiratory instability requiring an increase in $FiO_2 > 25$, or an increase in pulmonary inspiratory pressure > 3 cm H_2O compared to preoperative baseline, or requirement for manual ventilation with 100% oxygen. The total fentanyl dose used for general anesthesia was compared against UPRC. Differences were assessed using a T-test.

RESULTS

Thirty-nine patients underwent surgical closure of PDA during the study period. The mean post-conceptual age was 29.5 ± 1.8 weeks and mean weight was 1.031 ± 0.287 kg. All patients received intraoperative opioids. The mean dose of fentanyl administered was 18.4 ± 16.2 $mcg \cdot kg^{-1}$. Eight patients presented UPRC. Mean fentanyl doses were 5.3 ± 2.6 $mcg \cdot kg^{-1}$ for patients with UPRC vs. 22.6 ± 16.6 $mcg \cdot kg^{-1}$ for patients without UPRC ($p = 0.004$). Both groups were similar with regards to demographics and preoperative status. Applying the receiver-operator characteristic curve, a dose of 10.5 $mcg \cdot kg^{-1}$ of fentanyl was the cut-off value that discriminated and identified patients who experienced UPRC. Patients who presented UPRC all received less than 10.5 $mcg \cdot kg^{-1}$ of fentanyl.

DISCUSSION

These findings suggest that a minimum dose of at least 10.5 $mcg \cdot kg^{-1}$ of fentanyl promotes postoperative respiratory stability in preterm infants undergoing PDA closure. These results are in agreement with previous studies that report decreased stress response¹ and improved postoperative protein metabolism² with fentanyl doses of 10 and 15 $mcg \cdot kg^{-1}$ respectively in the same patient population.

REFERENCES

1. Lancet, January 10, 1987; 1(8524): 62-66
2. Journal of Pediatric Surgery, 35:1277-1281