

Scope of Ambulatory Anaesthesia for Premature Infants

Garima Agrawal¹, Raksha Kundal²

Abstract

Aim: Case report on Ambulatory anesthesia for a premature infant scheduled for laser treatment for retinopathy of prematurity

Methods: Selection of patient, general anesthesia with multimodal analgesia followed by intensive monitoring.

Keywords: Ambulatory care, Premature Infants, Anaesthesia.

Authors' Addresses: ¹Department of Anesthesia and Critical Care, Lady Hardinge Medical College, New Delhi 110001, India. ²All India Institute of Medical Sciences, Jammu, India.

Corresponding Author: Dr Garima Agrawal, Professor, Lady Hardinge Medical College, New Delhi, India. Email: garima2396@gmail.com

Results: Successful discharge on the same day.

Declaration: This case report was presented as poster in the 14th International IAAS congress 2022, Bruges, Belgium

Introduction

Prematurely born babies presenting for surgical procedures that require general anaesthesia are more prone to have episodes of apnoea and cardio respiratory events in the post-operative period due to their immature physiology and anatomy than their full term counterparts¹ and more so if the post conceptual age (PCA) at the time of surgery is less than 60 weeks. Therefore ambulatory anaesthesia does not have wide acceptance in this particular age group. However, considering the peculiar situation of COVID 19 pandemic, requests for early discharge from health care facility had risen. Retinopathy of prematurity is a condition that requires intervention in the initial weeks of birth for a favourable outcome. We present a case report of a premature infant presenting for laser treatment of retinal detachment due to ROP performed under general anaesthesia who was successfully discharged home the same day.

Methods

An infant with premature birth at 30 weeks with birth weight 950 grams and current weight 1125 grams presented for laser treatment for retinopathy of prematurity at PCA of 42 weeks. Detailed pre-anaesthetic examination revealed history of NICU stay for some days after birth where she had received oxygen supplementation via nasal cannula. There was no documented comorbidity and the child was thriving well.

Written informed consent was obtained from the guardians and adequate fasting period was ensured. On being shifted to operation theatre, the baseline values of oxygen saturation (SpO₂=96%), heart rate (HR=136/min), non-invasive blood pressure (NIBP=70/50mmHg), and respiratory rate (26/min) were recorded. The child was induced with 6%–8% sevoflurane with Fio₂ up to 0.4 (minimum O₂ to maintain SpO₂ of >90%) and an intravenous line was secured. An injection fentanyl 1 µg/kg was given. The airway was secured with supraglottic airway device of appropriate size and was put on pressure-controlled ventilation. Anaesthesia was maintained with O₂/air/ sevoflurane keeping end-tidal minimum alveolar concentration of one. Before submitting the child for the procedure, bilateral peribulbar block was performed with 0.3 ml/kg of a 1:1 mixture of 0.5% bupivacaine and 2% lignocaine with 5 IU/ml hyaluronidase injected into the peribulbar space through the inferior eyelid at the junction of the lateral third and medial two-thirds of the inferior orbital rim.

An intra-operative period of ninety minutes remained uneventful. At the end of the procedure, sevoflurane was switched off and the LMA was removed once the child was adequately responding.

Injections of paracetamol 15–20 µg/kg and Inj. ondansetron 0.1 µg/kg were administered and once the child was awake she was shifted to the post-anaesthesia care unit. Recovery from anaesthesia was satisfactory with modified Aldrete recovery score of 9/10 at 4 hours. Vigilant post-operative monitoring was done for another 6 hours and no episodes of apnoea, bradycardia, hypoxia or excessive crying were observed. The baby accepted feed and was discharged home the same evening with appropriate instructions to parents.

Discussion

Children are considered as ideal patients for day-care management because they usually have little co-morbidity and common paediatric operations are well suited for day care surgery. The major advantages of day care surgery consist of lessening psychological stress for children and parents and the reduction in hospital costs, frequency of nosocomial infections and length of surgical waiting lists. Usually a surgical procedure lasting less than 120 min with negligible risk of post-operative bleeding or excessive post-operative pain is managed on an ambulatory basis.

Post-operative cardio-respiratory complications are the main concerns for preterm infants scheduled for surgery under general anaesthesia (2). Multiple studies have reported postoperative apnoea with routine doses of anaesthetics and its association with gestational age less than 37 weeks or PCA under 60 weeks at the time of surgery (3). In one of the studies, the incidence of postoperative apnoea after ROP surgery was found to be only 5.36% (2), which is less than reported incidence of 20-30% (4) after herniotomy procedure in preterm infants.

Apnoea in premature infants is associated with many complications such as bradycardia, cyanosis, brain damage, hypotension, hypotonia, hydrocephalus, neurologic complications, and even death (5). The main cause of apnoea and respiratory problems in premature infants is an incomplete development of respiratory centres. Anemia⁶ and a prior history of apnoea have been reported as the highest risk factors for post-operative apnoea. Other factors, such as low gestational age and birth weight, complicating neonatal diseases (4) early fatigability of the diaphragm, airway obstruction, hypothermia, residual effects of muscle relaxants, infections, sepsis, metabolic and cardiac diseases

and anaemia have shown to be associated with apnoea in these infants (3).

Guidelines on paediatric day surgery of the Italian societies of paediatric surgery and paediatric anaesthesiology (7) suggests that ex-premature infants less than 60 weeks post-conception age must be excluded from day care procedures. We decided to conduct the laser treatment for ROP under general anaesthesia as a day care procedure since there was no history of apnoea reported by the parents and the child was not anaemic. Consideration was given to the request by parents for early discharge in view of high risk of nosocomial COVID 19 infection.

Caffeine and spinal anaesthesia alone have shown to decrease the risk of apnoea and bradycardia in preterm infants undergoing general anaesthesia (7). We avoided muscle relaxants, used low dose opioids supplemented with regional anaesthetic techniques and non-opioid systemic analgesics such as acetaminophen to reduce the risk of apnoea and related complications in the post-operative period.

In a retrospective study of 191 infants undergoing inguinal herniorrhaphy, most episodes of apnoea were found to occur during the first four hours after the surgery and the risk of postoperative apnoea/bradycardia was 8.8% in ex-premature infants after inguinal herniorrhaphy (8). Previous authors have recommended that children younger than 46 weeks PCA should be monitored for at least 12 hours after surgery (9). We monitored the child intensively in the post-operative ward adjoining the theatre for 10 hours with ECG, SPO₂, respiratory rate and NIBP. Child was comfortable and was able to accept mothers feed after 4 hours.

Presence of a responsible adult, preferably both parents, must be there to transport the child and to provide assistance and care to the infant in the post-operative period at home. We ensured that parents had the means to contact us in case of emergency and a primary hospital with paediatric care facilities was accessible in their vicinity

Result and Conclusion

Ambulatory procedures may be considered in premature infants with PCA less than 60 weeks ensuring no comorbidity pertaining to cardiorespiratory system and utilising multimodal anaesthesia techniques in the presence of appropriate logistic support.

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