

Anesthetic Management of Children with Tetralogy of Fallot Undergoing Craniotomy and Evacuation of Brain Abscess



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Introduction

- Intracranial abscess is one of the most serious complications of uncorrected congenital heart disease (CHD) in children
- Major anesthetic concerns for craniotomy and evacuation are hemodynamic instability, cyanotic spells, coagulation disorders, electrolyte imbalances, and raised ICP
- However, there is paucity of literature regarding anesthetic management of children with tetralogy of Fallot (TOF) undergoing craniotomy for brain abscess

Aims and Objectives

- To analyze the anesthetic techniques utilized and the pre-operative complications encountered during craniotomy and evacuation of cerebral abscess in children with TOF.

Materials and Methods

- Approval from institutional ethics committee was taken
- Study period: Apr 2011 - Mar 2013 (One year)
- All children with TOF who underwent craniotomy and evacuation of cerebral abscess were included.
- The perioperative data from the anesthesia notes and patients medical records were collected

Anesthetic Technique

- Standard monitors connected:** ECG, SpO₂, NIBP
- Proxygenation:** 100% O₂ for 3 minutes
- Induction:** Fentanyl 1-2 µg/kg + ketamine/ thiopentone/ propofol / sevoflurane
- Tracheal Intubation:** facilitated with rocuronium 1mg/kg
- Maintenance:** Sevoflurane in O₂ - Air (40:60) mixture; MAC 0.8 -1.0
- IV fluids** were given according to the fasting guidelines and maintenance requirement.
- Intraoperative hypotension:** managed with fluid and mephentermine boluses
- Extubation:** after reversal of residual NMB with neostigmine and glycopyrrolate.

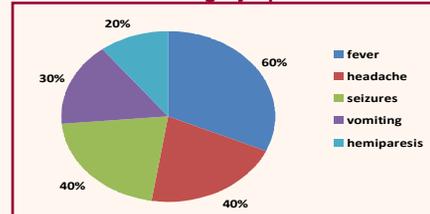
Results

- Medical records of 10 children who fulfilled the study criteria were reviewed
- ECHO finding: ASD (Two children); TGA (one child)
- One child underwent Blalock Taussig shunt one year back
- 3 children underwent surgery for recurrent abscess
- Four patients were on propranolol previous to surgery
- Electrolyte abnormality : 3 children
- Coagulopathy : 3 children
- Preoperative metabolic acidosis: 2 (corrected prior to surgery)
- Surgery: Burr hole craniotomy and evacuation of abscess (one child underwent flap craniotomy)
- All, except one, children were successfully extubated in OR
- One child had intraoperative cyanotic spell and was in sepsis
- ICU stay: 24- 48 hrs (70% of children)
- Mortality was 10%

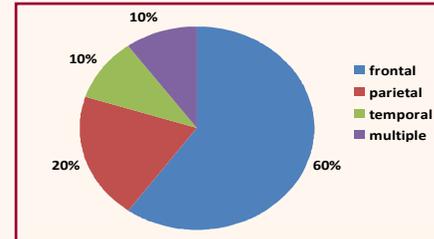
Demographic Data

Variables	Mean	Range
Age	4.5 Yrs	1 mo- 9yrs
Hemoglobin	15.2	11.6- 20.9
Platelet count	3.9* 10 ³	75000 - 7.25* 10 ³
Duration of Surgery	88 min	45 min - 3 h
Duration of ICU Stay	43 h	13 h- 5 days

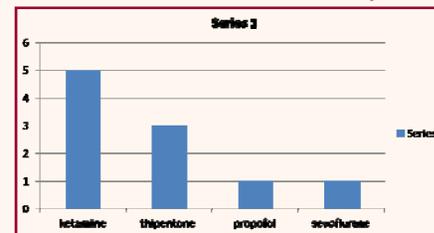
Presenting Symptoms



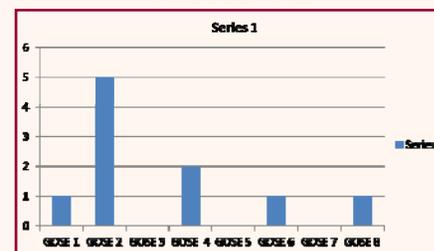
Location of Abscess



Anesthesia Induction Technique

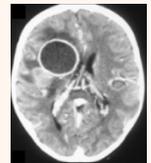


GOSe Peds Score



Discussion

- Anesthetizing children with cyanotic CHD is a major challenge as the use of a technique appropriate for both the brain and heart is required
- Avoidance of hypoxemia, hypercapnia, and acidosis and simultaneously, maintaining the ICP are the major goals
- According to our study, induction with ketamine was safe, but, it might have associated with increased ICP
- However, recent studies challenge this concept
- A carefully administered anesthetic with controlled ventilation and advanced monitoring with the target for early extubation remains the technique of choice.



CT scan of brain showing brain abscess in the right frontoparietal region with midline shift and mass effect

Conclusion

- IV induction was the preferred technique anesthetic induction of children with TOF undergoing craniotomy and evacuation of brain abscess
- The incidence of hypercyanotic spell was 10% in this series
- The presence of anastomotic shunts does not prevent occurrence of brain abscess.

Reference

- Matson DD, Salam M. Brain abscess in congenital heart disease. Pediatrics 1961;27: 772-89
- Bar-Joseph G, Guilburd Y, Tamir A, Guilburd JN. Effectiveness of ketamine in decreasing intracranial pressure in children with intracranial hypertension. J Neurosurg Pediatr 2009;4:40-6

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