

USE OF KETAMINE-BASED TOTAL IV ANESTHETIC IN A PEDIATRIC PATIENT WITH COMPLEX CARDIAC HISTORY TO AUGMENT DECREASED BASELINE MOTOR EVOKED POTENTIALS DURING URGENT SPINE SURGERY COMPLICATED BY SEVERE POSTOPERATIVE DELIRIUM

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Introduction

- There is an increased incidence of vertebral anomalies in patients with congenital heart disease¹. With improving long-term survival following congenital cardiac surgery, increasing numbers of these patients are presenting for spine surgery.
- We present a satisfactory perioperative outcome for a patient with a history of Tetralogy of Fallot and Atrioventricular Canal defect, status post repair and CRT pacemaker placement for complete heart block, scheduled for urgent spine surgery.
- A team-based approach with good communication and careful preoperative planning, a flexible intraoperative plan with the ability to adapt as intraoperative events unfold, and a detailed postoperative care plan with preestablished goals are essential for optimal surgical outcome.

Preoperative Evaluation

12 year old, 39kg female with complex congenital heart disease s/p repair and severe congenital kyphoscoliosis who presented with worsening lower extremity myelopathy due to spinal cord compression. The patient was scheduled for urgent T2-T12 posterior spinal fusion, hemivertebrectomy and spinal cord decompression.

Past Medical History;

- Tetralogy of Fallot and complete AV canal defect s/p repair
 - mitral valve repair, tricuspid valve repair, pulmonary valve replacement, VSD closure
- Complete heart block and reduced cardiac function due to cardiac dyssynchrony s/p cardiac resynchronization therapy pacemaker (DDD paced 60-180)
- Returned to OR 8/2017: tricuspid valve repair for severe regurgitation, RV-PA conduit replacement, pacemaker replacement

Echo: Normally functioning pulmonary valve prosthesis with trivial regurgitation and no stenosis; moderate flow acceleration across right AV valve (mean grad 9mmHg); mild right AV valve regurgitation; no left AV valve stenosis; mild left AV valve regurgitation; mild LV dilation; mild-moderate globally reduced LV systolic function (EF 45%); normal RV function

EKG: Atrial sensed, ventricular paced, HR 105

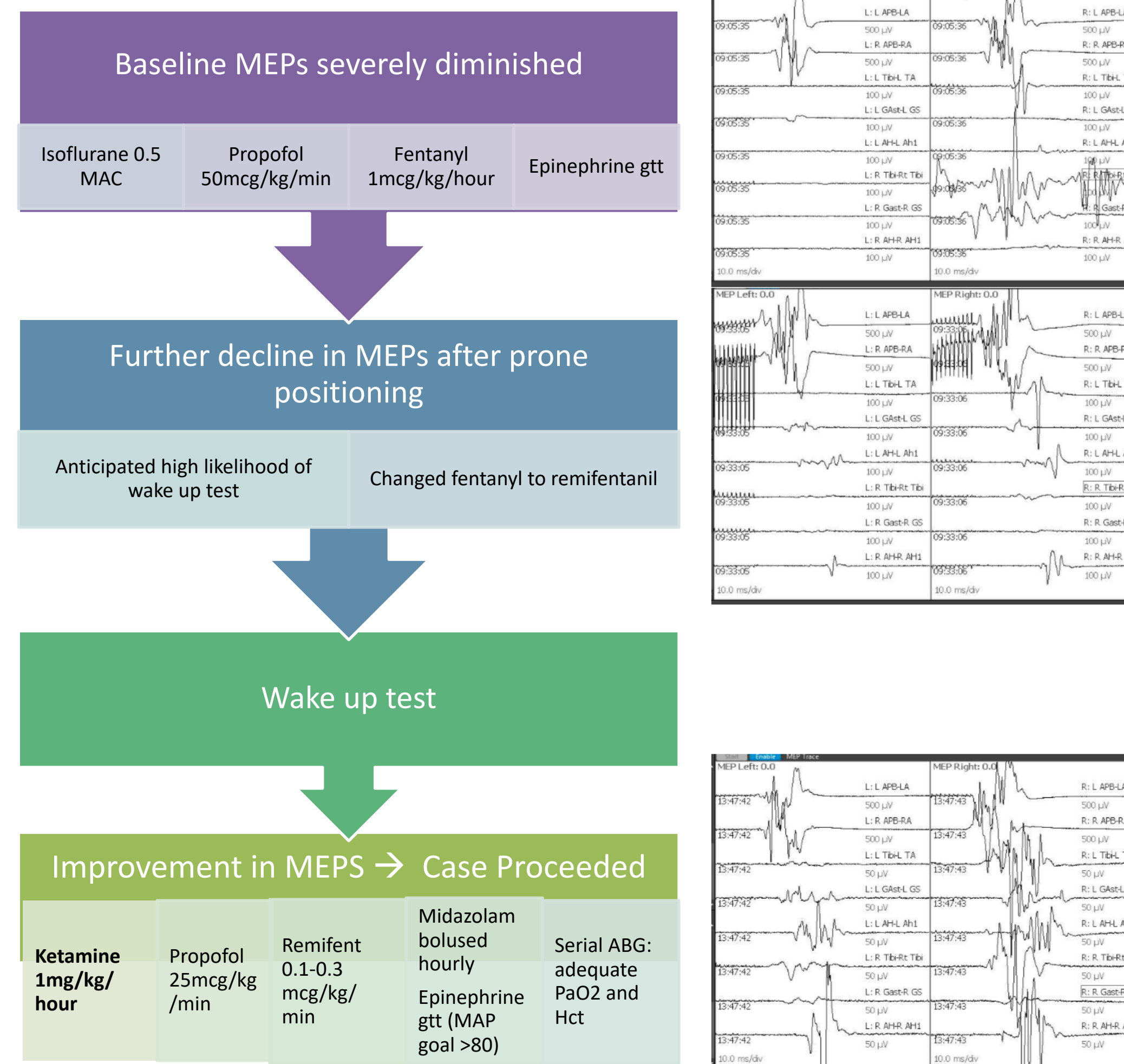
Intraoperative Course

Preoperative holding

- No existing IV
- Refusing oral premedication
- Cardiology reprogrammed pacemaker from DDD to DOO @ 80

Induction

- Attempted inhalational induction with gradual titration of sevoflurane, however, patient developed marked hypotension
- Intravenous access rapidly obtained and patient stabilized with epinephrine bolus
- IV induction
 - 1mg/kg ketamine
 - 0.5mcg/kg fentanyl
 - 0.5 mg/kg propofol
 - intermittent epinephrine.
- Easily intubated with 6.5 cuffed ETT
- Lines: CVL, Aline, 2 large bore PIVs



Postoperative Course

- Extubated in the OR
 - Able to move all extremities on command.
 - Received toradol and additional boluses of fentanyl for pain control
- In PACU, she developed severe postoperative delirium likely due to the ketamine and was treated with IV diazepam and dexmedetomidine
- PICU: neuro checks, hemodynamic monitoring, and pain control
 - Pain control : Morphine PCA, ketorolac, gabapentin, dexamethasone, acetaminophen and PRN diazepam

Summary and Conclusions

Anesthesiologists play an important role in coordinating the perioperative care for optimal outcomes in complex spine surgeries. The modification of the anesthetic plan in communication with the neuromonitoring team and surgeons along with the ability to tailor the anesthetic for the eventuality of a wake-up test and maintenance of optimal hemodynamics is crucial. The choice of low dose ketamine and remifentanyl infusions allowed for satisfactory monitoring of evoked potentials throughout the surgery^{2,3}. There is increased perioperative morbidity in children with congenital heart disease undergoing noncardiac surgery⁴. This morbidity is further increased in the event of emergent surgery. The goals of anesthetic management in such patients scheduled for posterior spinal fusion have to be modified to maintain neural pathway integrity to allow for evoked potential monitoring without compromising the cardiac function.

References

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