

Unexpected Intra-operative Events that Prompt Discontinuation of Pediatric Spinal Deformity Surgery

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Background



SRS 2006 Morbidity and Mortality Report

Complications in spinal deformity surgery have been extensively studied, with a prevalence of about 5% in anterior or posterior spinal fusion and about 10% in combined approach spinal fusion in adolescents.





Background

Complications in 4369 Posterior Instrumentations and Fusions for AIS

Complication Type	No.	Incidence
Wound infection	59	1.35%
Other	59	1.35%
Pulmonary (not pulmonary embolus)	42	0.96%
Implant related	28	0.64%
Neurologic	14	0.32%
Dural tear	8	0.18%
Nonfatal hematologic	6	0.14%
Deep venous thrombosis	2	0.05%
Pulmonary embolus	1	0.02%
Blood loss (fatal)	1	0.02%
Air embolus (fatal)	1	0.02%

SRS 2006 Morbidity and Mortality Report





Intra-operative Monitoring

- Neuro-monitoring serves to monitor in real time the spinal cord, cauda equina, nerve roots and peripheral nerves
 - Somatosensory evoked potentials (SSEP)
 - Motor evoked potentials (MEP)
 - Electromyography (EMG)
- Other forms of monitoring include cardiopulmonary techniques to control blood pressure, blood loss, and respiratory distress





Methods

- Single-center, retrospective study.
- Clinical records from Cerner Powerchart[®] and radiographs from Synapse[®] were reviewed.
- Intra-operative neuro-monitoring records were also queried
- Root cause analysis (RCA) was used to provide a structured approach to each discontinued case



Results

Over 5 year period (2006-2011), 561 pediatric spinal fusion cases were reviewed of which 11 (2%) were discontinued after induction of anesthesia

> Etiology for Discontinuation of Posterior Spinal Fusion and Instrumentation Surgery







Results

•Seven of the 11 (64%) discontinued patients developed abnormal **neuromotor** potentials

- •Subsequent diagnoses:
- •One patient with Charcot-Marie-Tooth Type 1
- •One patient with medial pedicle wall expansion
- •One patient with spinal cord bruising

•Three of the 11(27%) discontinued patients developed intra-operative **anaphylactic** reactions

- •2 with cardiopulmonary instability to inhaled anesthesia
- •1 with hives and dyspnea after platelets transfusion and was later diagnosed with IgA deficiency

• One (9%) case was terminated following an unresolved neurological monitoring equipment malfunction.



Results

Two patients required multiple surgical interventions to address wound dehiscence or pulmonary dysfunction before they underwent completion of spinal fusion with instrumentation.

- All discontinued cases were safely completed at a later date.
- At two year follow up, 3 (27%) patients with discontinued surgery had developed a deep surgical site infection
- There were no permanent neurologic injuries





Conclusions

- Unresolved intra-operative neurological, medical, or equipment events can prompt case discontinuation. Families should be explained of this possibility during the informed patient consent discussion.
- RCA suggests that a spinal cord that is tightly approximated to a narrow apical pedicle was at risk for a neurologic event. Consider not placing a pedicle screw this location in a pediatric patient.
- Discontinued surgery may raise the risk of infection .





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