Wolff-Parkinson-White syndrome (WPW) is a congenital syndrome with an increased risk of malignant tachyarrhythmias and sudden cardiac death [1]. Inappropriate treatment of this syndrome peri-operatively can quickly cause clinical deterioration[2]. Unfamiliarity with this rare condition (0.1–0.3% of population)[3] and difficult resuscitation in the prone position could further worsen outcomes. WPW poses a significant risk of adverse cardiac outcome. In a patient undergoing major surgery with limited physical access for resuscitation, conscientious preparation and a clear, succinct treatment algorithm could make the difference.

Methods/Results:

In accordance with local institutional guidelines, we obtained signed parental informed consent for the publication of this case report.

We report a 16 year-old girl with WPW and Down syndrome who underwent scoliosis surgery. She was subjectively asymptomatic after the first episode of tachyarrhythmia, had no electrophysiologic study done, and was not on antiarrhythmics. Her parents were counseled on the risk of tachyarrhythmias requiring electrical cardioversion and cardiopulmonary resuscitation. Adenosine and procainamide were made readily available pre-operatively. We instituted invasive haemodynamic monitoring post-induction and defibrillation pads were applied prior to prone positioning. Excessive increases in sympathetic or vagal tone were prevented. Surgery proceeded uneventfully. She had an uneventful recovery in the paediatric intensive care unit.

Discussion:

There have been case reports describing the peri-operative management of WPW, and American College of Cardiology-American Heart Association 2015 guidelines on the management of tachyarrhythmias in these patients. However, we were unable to find a succinct guide to intra-operative arrhythmias in WPW. These resources do not address the unique circumstance of our patient needing prolonged major surgery in the prone position. Unfamiliarity with WPW impacted the anaesthetic plan, a concern mirrored in a survey we conducted in our institution. We thus crystallized information in the literature
to formulate an easy reference guide, and find that it would be useful to share our experience.

References:


151130 - 3D-PRINTED PEDIATRIC DIFFICULT AIRWAY FOR TEACHING INTUBATION

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Introduction:
The management of congenital difficult airways in children poses unique challenges to anesthesiologists and their trainees. These cases are often by very experienced anesthesiologists who use advanced technics including flexible fiberoptic intubation (FBI) and are still presented with challenging clinical scenarios. A small proportion of these patients have required ‘crash’ tracheotomies due to failed mask ventilation or even failed fiberoptic intubation. We sought to use a case to create a 3D print of a difficult airway to evaluate for education.

Method:
After obtaining patient and parental consent we used old images previously obtained from a 3D helical CT at 2.5 mm of the pediatric airway from apex of skull to C5. Segmentation was done with Amira Visualization RT using Thresholding and Gaussian techniques for the initial 3D model creation. Smoothing done both manually and with embedded Smoothing algorithms. Isolation of the upper airway and hyoid was accomplished resulting in a printable model of a difficult airway.

Results
We have successfully created a 3D printed model of a difficult airway in a pediatric patient (See Fig 1). The model is real life size and allows for practice of fiberoptic bronchoscope. We have also created a novel algorithm and process for the creation from CT/MRI of 3D model of the airway.

Discussion
The creation of virtual 3D models is feasible and needs more work to identify processes that can efficiently replicate the process to yield good models for both virtual 3D and 3D printing. Our work will aim to create a library of 3D airways for use in future prospective studies assessing teaching/clinical outcomes from the use of these models. We have identified challenges from this case report and will use the data to inform future prospective studies.
References:

THE EFFECTS OF GOAL-DIRECTED FLUID THERAPY IN CHILDREN UNDERGOING SCOLIOSIS REPAIR

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Introduction: Scoliosis surgery is a major procedure with potential for significant blood loss and difficult blood pressure management. Currently, intra-operative administration of fluid is variable and primarily guided by hemodynamic parameters. The volume of intra-operative fluid administered in adults is known to affect post-operative outcomes. Historical data from our institution (2006-2009) shows a 14% incidence of acute kidney injury (AKI) following scoliosis surgery. Goal directed fluid therapy (GDT), using algorithms guided by cardiac output measurement, has the potential to improve outcomes.

The aim of this pilot study was to compare the effect of GDT against standard practice on intra-operative hypotension, post-operative AKI, and any concerns with intra-operative spinal cord monitoring.

Methods: With REB approval and written informed consent, we recruited adolescents undergoing single-stage posterior spinal instrumentation and fusion surgery for idiopathic scoliosis, excluding any patients with kidney disease or coagulopathy. Participants were randomized to intervention (GDT) or control protocols. Following induction of a standardized total intravenous anesthetic, a CardioQ TED probe (Deltex-Medical, Chichester, UK) was inserted into the patient’s esophagus, with prone baseline measurements then taken. In the control group, fluid was administered using boluses of 2.5ml/kg plasmalyte at the anesthesiologist’s discretion. In the GDT group, 2.5ml/kg boluses were administered when either MAP dropped 20% or stroke volume dropped 15% from baseline. Neurophysiologic monitoring was performed in all patients using motor and somatosensory evoked potentials (MEP/SSEP). For AKI detection, hourly urine outputs were recorded intra-operatively, serum creatinine obtained at baseline and
on POD1 and 3, and urine neutrophil gelatinase-associated lipocalin (NGAL) biomarkers were collected at baseline, intra-operatively at 4 hrs and procedure end, and daily in the mornings of POD1 and 2.

**Results:** Preliminary results from 14 patients, with median (range) age 16 (12.7-18) years and BMI 19.7 (15.5-31.6) are presented. No significant difference was found in administered fluid volumes: median 2.75L in GDT and 2.45L in control group (p=0.75). Similarly, no difference was found for postoperative fluid balance (p=0.16). Vasopressor use was higher in the GDT group (57% vs. 29%). Four GDT participants had MEP changes, at which point the GDT protocol was abandoned; only 1 control participant had MEP changes. No incidence of AKI was observed, based on NGAL biomarkers or serum creatinine (Figure 1). However, one participant had AKI on POD1, based on low urine output.

**Discussion:** The study was stopped prematurely following difficulties with protocol compliance. Specifically, when encountering MEP changes, surgeons requested supra-physiologic blood pressure increases and, in the control arm, anesthesiologists preferred administering fluid continuously instead of as boluses per protocol. Future work includes revising the protocol and simplifying the endpoints.

**References:**