DISCLOSURES

NO CONFLICTS OF INTEREST TO DECLARE

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OBJECTIVES

01. A Case
02. Background on 3D Printing and Surgery
03. 3D printing in Anesthesia/Interventional
04. Our 3D Printing Experience: A case study
05. Lessons and Summary

01. A CASE

POTENTIAL FOR 3D IMAGING AND PRINTING
History of 3D Printing

1984-8
Charles Hull
3D Printing technology

2000
Human Bioprinting

2009
3D Printing in Medicine

Projected Growth of 3D Printing

Concept Modelling
Functional Prototyping
Manufacturing

End Use Parts
Finishing
Potential Uses of 3D Printing in Pediatric Anesthesia

**Medical Devices**
- implants
- prostheses
- braces
- guides and templates
- cannulas
- nasogastric tubes
- catheters
- DRIs
- biopsy
- anyone can print medical devices
- unsterile devices
- sterile devices
- basic materials

**Bioprinting**
- a subcategory of 3D printing
- may have different regulations
- different policies may apply

**04. Our 3D Printing Experience**

**Pragmatic approach**
Lesson
Identification of appropriate CT scans
- Retrospective evaluations limiting usable CTs
- Inadequate C-spine levels included in the CT scan
- Low dose CT scans used for children limiting voxel resolution.

Cost of Software
- Open-source software is of varied quality
- Licensed software is expensive and requires key licences
- Identifying patients with enough time to get consent for use of images can be challenging

Image processing
- Ill-defined borders seen between cartilaginous structures and soft tissues (i.e. thyroid cartilage and epiglottis compared with surrounding muscle and fat)
- Likely due to low dose scanning

Lesson
Materials
- Modulus of elasticity
- Behaviour with a finite element analysis of the baseline airway used for segmentation
- Deformation of applying force on the airway in 3 dimensions

Standards
- Nomenclature for anaesthesia

Summary
- E1. 8 Case
- E2. Background on 3D Printing and Waxtry
- E3. 3D printing in Biomedical/Medicine
- E4. Our 3D Printing Experience - Tool and Equipment
- E5. Lessons and Summary