Environmental Impact of Radiation Oncology on Adverse Events, A Report from Wake Up Safe, the Pediatric Anesthesia Quality Improvement Initiative

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Introduction/Study Question

- Radiation therapy in pediatric patients often requires anesthesia
- The environment presents challenges to anesthetic care
  - Isolated treatment location in hospital
  - Physical barriers to prevent radiation exposure
  - Remote monitoring
  - Patient isolation
- Individual institutions have reported outcomes
- This case series aims to:
  - Review a multicenter registry of significant adverse events (SAE)
  - Make recommendations for improved care

Methods

- Data extracted from The Wake Up Safe Pediatric Anesthesia Quality Improvement Initiative
- Criteria:
  - SAE in radiation oncology during anesthetic care
  - Patient age < 18 years
- Additional data: Patient demographics, comorbid conditions, contributing events, management details, outcomes

Results

- Four SAE identified
  - Medication administration errors (2)
  - Laryngospasm (2)
    - Unanticipated intubation (2)
    - Cardiac arrest (1)
- Overall unable to determine incidence of complications due to generic billing codes

Discussion

- Impact of treatment environment:
  - Remote monitoring of the patient and equipment via camera may have delayed recognition of medication administration errors
  - Prolonged, unmonitored patient transport to the recovery area may have affected prompt detection and treatment of laryngospasm
  - Facial mask for radiation therapy may have concealed copious secretions and/or restricted access to the airway, precipitating a laryngospasm
- Recommendations:
  - Orient cameras to include the patient, monitors and infusion pumps to reduce medication administration errors
  - Continuously monitor oxygenation and/or ventilation throughout treatment, transport and recovery
  - Recover patients in a nearby area to limit transport time as patients may be emerging from anesthesia
  - Take care during radiation therapy mask creation to maintain airway patency and access

Table 1:

<table>
<thead>
<tr>
<th>Case</th>
<th>Narrative</th>
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<tbody>
<tr>
<td>1</td>
<td>6yo, ASA 3 for CT simulation with LMA. At the end, CT sim mask removed and patient had copious clear secretions. Complication: Laryngospasm. Management: Oxygen, positive pressure mask ventilation, succinylcholine, chest compressions, intubation, albuterol. Hospital course: Extubated and admitted to PICU, stridor requiring IV steroid therapy.</td>
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<tr>
<td>2</td>
<td>2yo, ASA 4 undergoing radiation therapy with natural airway and propofol infusion. En route to PACU, the patient became dusky and was found to be in laryngospasm. Complication: Hypotension. Management: Ephedrine and IV fluid bolus. Hospital course: Uncomplicated.</td>
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<td>3</td>
<td>3yo, ASA 3 for CT simulation with LMA. At the end, the mask was removed and patient had copious clear secretions. Complication: Laryngospasm. Management: Oxygen, positive pressure mask ventilation, succinylcholine, intubation, albuterol. Hospital course: Admitted to PICU.</td>
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<tr>
<td>4</td>
<td>2yo, ASA 4 undergoing radiation therapy with natural airway and propofol infusion. The patient received a propofol overdose from a pump programmed for mg/kg/min instead of mcg/kg/min. Recognized when patient became alarmed almost empty. Hypotension treated with ephedrine and IV fluid.</td>
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References