Intubation Management and Optimization

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INTRODUCTION

- Control of and establishing a definitive airway in the emergent setting is central to the practice of Emergency Medicine and is a crucial step to every encounter in the emergency department (ED) that should be addressed prior to continuing further treatment and intervention.[1]
- Endotracheal intubation is the method most frequently used to establish control of the airway and is indicated in the settings of acute respiratory failure, inadequate oxygenation, inadequate ventilation, and airway protection in instances of depressed mental state, trauma, or airway obstruction.[1]
- Rapid sequence intubation, which includes sequential administration of an induction agent and neuromuscular blockade to facilitate placement of endotracheal tube, is most frequently used as the method to establish control of the airway in the ED.[1]
- Intubation has inherent risks for morbidity and mortality, ranging from complications related to difficult anatomy, traumatic injuries, or medical pathology.[2,3]
- Once intubation is completed, it becomes paramount that all measures are taken to idealize patient management and ensure that endotracheal tube remains in place, ensuring maintenance of airway control, including (1) physical equipment placement and radiologic studies to verify adequate tube location, as well as (2) pharmacologic treatments to include paralytic medication, sedation medications, and analgesic medications.[2-7]
- In the emergent setting, the incidental omission of some of these measures has the potential for serious and severe consequences to the patient.[2,6,8]
- We speculate that overall patient care may have been negatively influenced by orders not being entered in a timely fashion, leading to inconsistent and inaccurate medical records.

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GOAL and HYPOTHESIS

- GOAL: Create an Intubation Management order set in order to help ensure that appropriate and adequate orders would be centrally located and accessible to facilitate use following emergent airway management.
- HYPOTHESIS: Creation and implementation of this order set will lead to the optimization of management of patients in the post-intubation setting, and will demonstrate measurable improvement in this aspect of patient care.

PROJECT DESIGN/STRATEGY

Considerations for the order set:
- Pre-intubation
  - Checklist for consent, medications and equipment prior to procedure
- Intra-intubation
  - Appropriate and safe intubating conditions including back up equipment and supplemental therapy
- Post-intubation
  - Medications for sedation and analgesia
  - Patient positioning, Chest Xray

Education on order set:
- Handout of screenshots of the order set and each included dose administration that will be handed to potentially ordering providers in the emergency department and ICU during morning didactic conference.
- This order set can then be added to the individual providers' "favorites" list.

INITIAL MEDICAL RECORD REVIEW

After reviewing the medical records from 28 patient encounters between the months of March 2019 and March 2020, it was clear that the current method for placing these orders presented a challenge with regards to chart review and monitoring.

Patient Info	61 yo F: β-blocker Overdose	55 yo F: Intentional Seroquel Overdose	66 yo M: Acute Respiratory Failure, history of CHF	58 yo F: Altered Mental Status, Acute Respiratory Failure
Time of intubation	14:50	11:18	10:02	14:11
Medication given	Succinylcholine	Rocuronium and Etomidate	Rocuronium	Propofol
Time of administration (per documentation)	14:48	11:17	10:00	14:27
Time of order placement in medical record	16:58	15:49	14:54	15:30
Delay (in minutes)	130	272	294	63

EVALUATION of EFFECTIVENESS

Data will be collected on each patient including:
- Date of order set use
- Time patient is intubated
- Time orders are placed
- Time medications are implemented
- Time other interventions are initiated

These data points will be compared to those of charts from patients who have had paralytics ordered within a 6 month period.

OUTCOMES and LESSONS LEARNED

Detailed review of pertinent patient charts showed frequent instances of inconsistencies in pre- and post-intubation management and documentation. These most frequently involved timing of medication administration noted in nursing and physician documentation versus actual entry of orders in Electronic Health Record. Additional delays were seen in ordering radiologic studies and documenting adequate endotracheal tube placement. Placing these orders in one central location would ensure appropriate timing of all of these orders, ensuring appropriate and timely administration and documentation.

NEXT STEPS

Implement the order set in the Electronic Health Record and monitor for improvement of orders being placed and time from order placement to implementation.

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ORDER SET MOCK-UP

ED Intubation Management	
Preparation	
Signed Consent in Chart	
Suction to bedside	
Continuous EKG Monitoring	
Preoxygenation	
ED Oxygen Administration	
*Oxygen Delivery method	
- Drop Down menu: Nasal Canula, Mask, Venturi Mask, Non-Rebreather, Trach Collar, Bi-pap, Ambu-Bag	
Sedative Medications	
Etomidate	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 0.3 mg/kg	
Ketamine	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 1-2 mg/kg IV, 3-4 mg/kg IM	
Propofol	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 1 mg/kg IV	
Paralytic Medications	
Succinylcholine	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 1.5-2 mg/kg IV, 3-4 mg/kg IM	
Rocuronium	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 1-1.5 mg/kg IV	
Vecuronium	
DOSE IV ONCE Solution	
Edit	
- Recommended dose for intubation: 0.1 mg/kg IV	
Post Intubation Management	
CXR [Rad Chest 1 View AP/PA]	
Edit	
- Mode of Transportation: Portable	
- Is Patient Pregnant?	
- Reason for Exam: ET Tube placement	
Head of Bed Level	
AS DIRECTED	
- *Head of bed at: 30 degrees	
NG/OG tube insertion/maintain NOW	
Arterial Bld Gas (Lab Perform)	
*STAT	
Post Intubation Sedation and Analgesia	
Midazolam [Versed] 100mg/100mL NS IV Drip	
Edit	
- Starting rate: TITRATE	
- Frequency: AS DIRECTED	
- Titration Protocol: Midazolam	
- Protocol Text: Titrate to Ramsey of ###	
Fentanyl 1000mcg/100 mL NS IV Drip	
Edit	
- Starting rate: TITRATE	
- Frequency: AS DIRECTED	
- Titration Protocol: Fentanyl	
- Protocol Text: Titrate to Ramsey of ###	
Propofol 1000 mg/100 mL Premix IV	
Edit	
- Starting rate: TITRATE	
- Frequency: AS DIRECTED	
- Titration Protocol: Propofol	
- Protocol Text: Titrate to Ramsey of ###	
Lorazepam 20mg/200 mL IV	
Edit	
- Starting rate: TITRATE	
- Frequency: AS DIRECTED	
- Titration Protocol: Lorazepam	
- Protocol Text: Titrate to Ramsey of ###	
Cisatracurium 100 mg/500 mL NS IV; 200 mg/500 mL NS IV	
Edit	
- Starting rate: TITRATE	
- Frequency: AS DIRECTED	
- Titration Protocol: Cisatracurium	
- Protocol Text: Titrate to Train of 4 of ###	
Vasopressors	
Norepinephrine Drip: 4 mg/250 mL NS IV; 8 mg/250 mL NS IV; 16 mg/250 mL NS IV	
Edit	
- Starting rate: ****	
- Frequency: AS DIRECTED	
- PRN Reason: Blood Pressure	
- Titration Protocol: Norepinephrine	
- Protocol Text: Titrate to goal SBP of ###	