

Introduction

- ❖ Emergency manuals & crisis checklists are increasingly becoming a topic of discussion in anesthesia
- ❖ It has been estimated that for every 10,000 surgical operations, there are 145 OR crises per year
- ❖ Approximately 50% of adverse events that occur in the OR are avoidable errors
- ❖ Utilization of cognitive aids during life & death situations in the OR proves to be a valuable resource in improving patient outcomes and preventing adverse events
- ❖ Many practitioners choose not to utilize these aids during emergency situations
- ❖ Evidence suggests simulation training utilizing a cognitive aid enhances proper management of a crisis, leading to their increased use and maximized positive outcomes for emergent situations
- ❖ Simulation-based training incorporating cognitive aids will enhance utilization of these tools in future emergency situations in the operating-room

Background & Significance

- ❖ Anesthesia providers are often faced with new responsibilities & alterations in patient management
 - ❖ High stress conditions impair clinicians' ability to elicit evidence-based courses of management in an organized & timely manner
 - ❖ Recall & prospective memory of even the most experienced providers' declines during stressful situations
- ❖ Clinicians are expected to make important decisions quickly, while providing well-coordinated & precise care
- ❖ Time, efficiency, & execution of vital actions can be the distinction between life or death in OR emergencies
- ❖ Emergency manuals introduced in anesthesia have improved compliance to guidelines during emergencies and improves patient outcomes
- ❖ Practitioners who are introduced to cognitive aids during simulation training are more likely to use these checklists in a real emergency

Problem Statement

- ❖ Although evidence supports EM use, there are several barriers to their adoption & implementation
 - ❖ Lack of awareness & knowledge of the benefit of EMs
 - ❖ Lack of uniformity in introducing & implementing EMs with hospital staff
 - ❖ Practitioner pride
- ❖ If SRNAs & CRNAs are educated about EMs & their efficiency is reinforced through simulation, both SRNAs & CRNAs will be more likely to utilize the EMs in professional practice

Methodology

Design

- ❖ Qualitative research design
- ❖ CRNAs & SRNAs will be presented with a Stanford Anesthesia Emergency Manual
- ❖ A presentation will be held, followed by 2 simulations of emergencies, 1 without & then 1 with the use of the EM
- ❖ An immediate pre-survey, immediate post-implementation survey & follow-up survey will be given to assess participants likeliness & actual implementation into clinical practice

Setting

- ❖ Implementation was held at Rutgers University Newark Campus on September 16th & September 23rd 2019 in the simulation lab on the 10th floor
- ❖ An additional implementation was held at the New Jersey Association of Nurse Anesthetists (NJANA) fall meeting on October 4th & 5th, 2019 which was located at the Renaissance Woodbridge Hotel in Iselin, New Jersey

Study Population

- ❖ Volunteer CRNAs & SRNAs who attend the NJANA fall meeting
- ❖ Volunteer SRNAs who are currently enrolled in the doctoral nurse anesthesia program at Rutgers University
- ❖ Exclusion criteria: SRNAs who are not yet in clinical & CRNAs who are no longer practicing
- ❖ Total Population: 45 SRNAs from Rutgers University & 100 CRNAs/SRNAs at the NJANA fall meeting
- ❖ Sample Population: 54 volunteer CRNAs & SRNAs

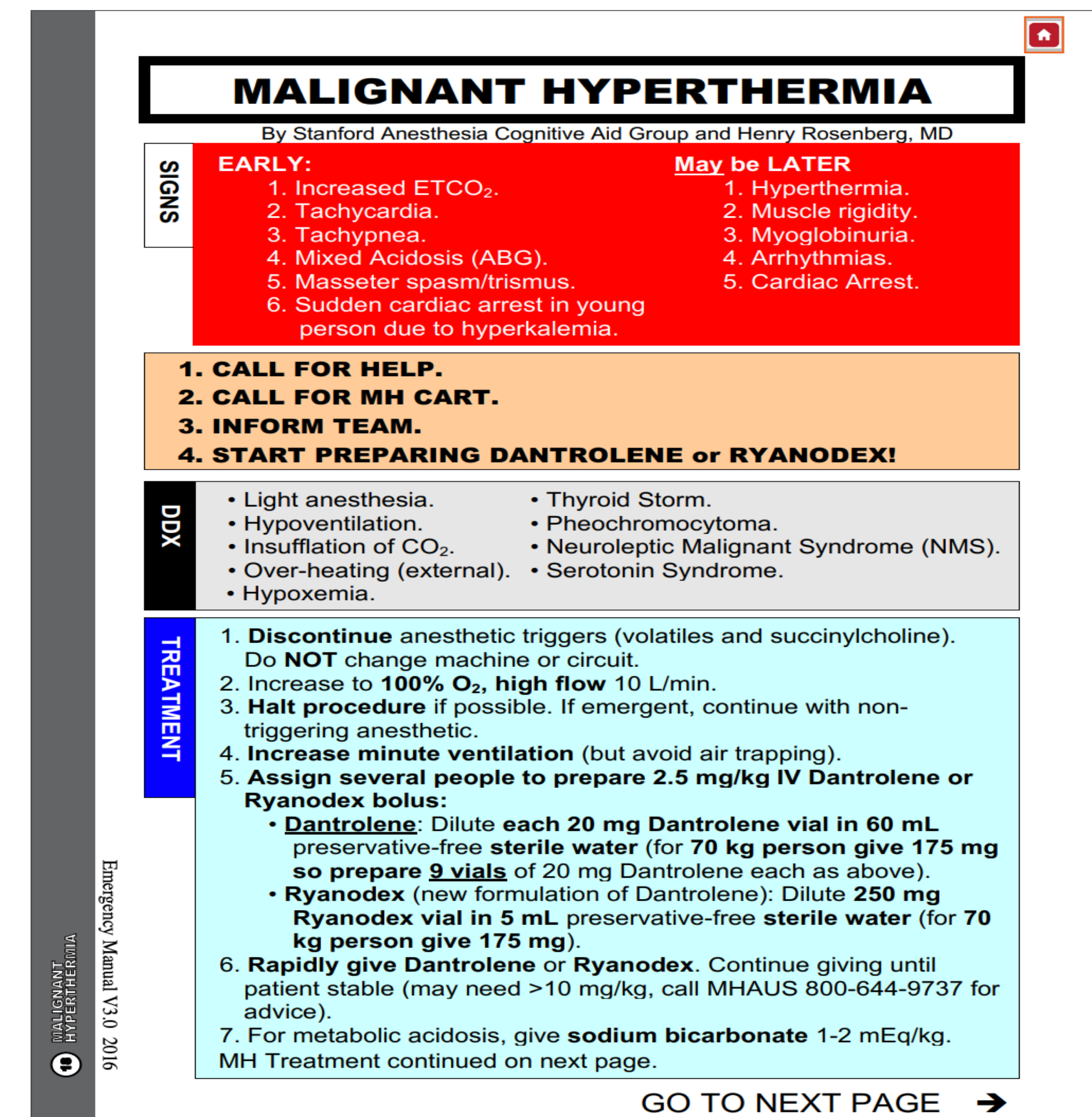
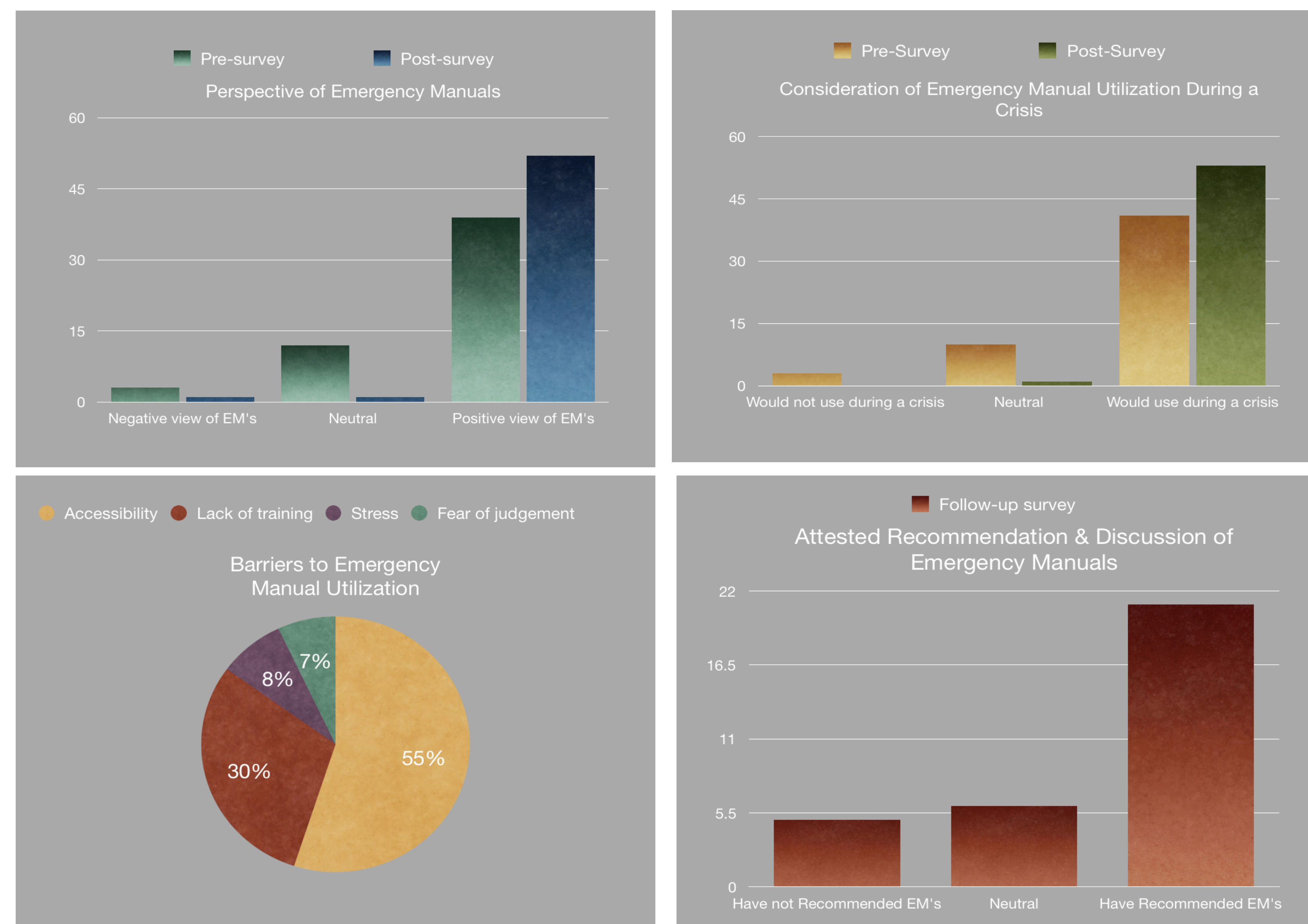
Measures

- ❖ Data collected from the pre-surveys, post-surveys, & follow-up surveys
- ❖ The pre-survey ascertains a baseline assessment on participants knowledge & use of EM in their current clinical experience. It also provides the participants opinions on the usefulness of EMs and if they would consider actual use in practice.
- ❖ The post-survey given after the presentation and simulations will collect the same data, which will be useful in evaluating the intervention.
- ❖ The follow-up survey will assess the continued acceptance and utilization of EMs in the clinical area, which further supports the intervention.

Analysis

- ❖ Convenience sampling to achieve a statistically significant sample size
- ❖ Descriptive statistical analysis was performed to interpret the data

Results



MALIGNANT HYPERTHERMIA
By Stanford Anesthesia Cognitive Aid Group and Henry Rosenberg, MD

SIGNS

EARLY:

1. Increased ET CO_2 .
2. Tachycardia.
3. Tachypnea.
4. Mixed Acidosis (ABG).
5. Masseter spasm/tetanus.
6. Sudden cardiac arrest in young person due to hyperkalemia.

May be LATER

1. Hyperthermia.
2. Muscle rigidity.
3. Myoglobinuria.
4. Arrhythmias.
5. Cardiac Arrest.

1. CALL FOR HELP.
2. CALL FOR MH CART.
3. INFORM TEAM.
4. START PREPARING DANTROLENE or RYANODEX!

DOX

- Light anesthesia.
- Hypoventilation.
- Insufflation of CO_2 .
- Over-heating (external).
- Hypoxemia.
- Thyroid Storm.
- Pheochromocytoma.
- Neuroleptic Malignant Syndrome (NMS).
- Serotonin Syndrome.

TREATMENT

1. **Discontinue** anesthetic triggers (volatiles and succinylcholine).
2. **Do NOT** change machine or circuit.
3. **Increase to 100% O_2 , high flow 10 L/min.**
4. **Halt procedure** if possible. If emergent, continue with non-triggering anesthetic.
5. **Increase minute ventilation** (but avoid air trapping).
6. **Assign several people to prepare 2.5 mg/kg IV Dantrolene or Ryanodex bolus:**
 - **Dantrolene:** Dilute each 20 mg Dantrolene vial in 60 mL preservative-free sterile water (for 70 kg person give 175 mg so prepare 9 vials of 20 mg Dantrolene each as above).
 - **Ryanodex** (new formulation of Dantrolene): Dilute 250 mg Ryanodex vial in 5 mL preservative-free sterile water (for 70 kg person give 175 mg).
7. **Rapidly give Dantrolene or Ryanodex.** Continue giving until patient stable (may need >10 mg/kg, call MHAUS 800-644-9737 for advice).
7. For metabolic acidosis, give **sodium bicarbonate** 1-2 mEq/kg. MH Treatment continued on next page.

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Discussion

- ❖ An increased amount of critical steps were carried out when using the EM than when utilizing memory alone, during crisis simulations.
- ❖ Study interventions seemed to increase the willingness of future use of EMs during real OR emergency situations, as per survey responses
- ❖ Implications for Clinical Practice: utilizing EMs in real OR crisis situations will improve efficiency & management of patient care, thus leading to improved patient outcomes & decreased incurred hospital costs
- ❖ Implications for Healthcare Policy: Support & policies from both anesthesia & nursing administration/ leadership will be needed to support the continued use of EMs during crises.
- ❖ Implications for Education: Simulations, although hard to coordinate in large institutions, may prove to be beneficial to maintain EM use over time.
- ❖ Implications for Quality/Safety: Debriefing after crises should occur with discussions of EM use. Management should be included, so they can learn ways to improve future use of EMs.

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