Improve the Quality of Care Amongst Surgical Patients with Obstructive Sleep Apnea

Monica Lang, BSN, RN - Quinn Le, BSN, RN - Devon Reeves, BSN, RN - Hannah Fraley PhD, RN, CNE, CPH - Edward Waters, DNP, CRNA

Background

- Obstructive sleep apnea (OSA) affects about 29 million people in the U.S.
- Up to 80% of individuals with moderate to severe OSA remain undiagnosed
- Patients at risk for OSA are at increased risk for perioperative complications
- Anesthesia providers must identify patients with OSA to optimize and tailor their anesthetic
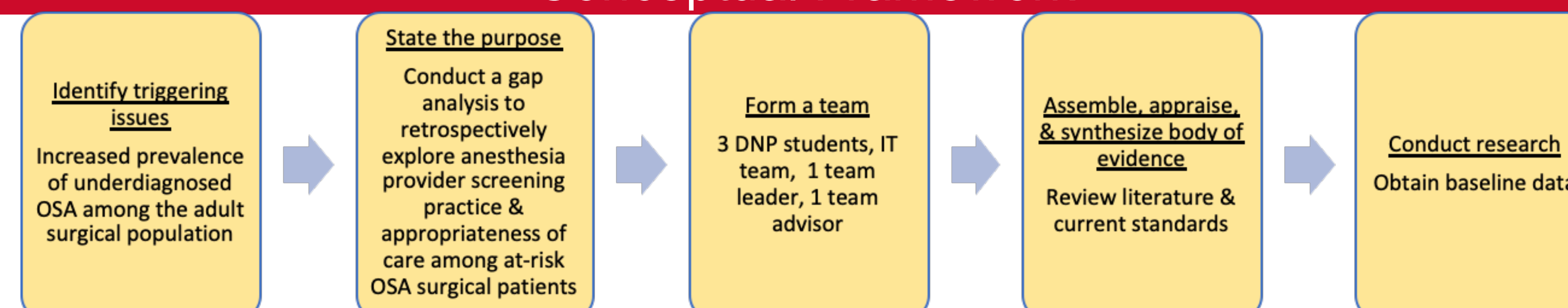
Purpose

The purpose of this project is to identify whether current management practices amongst the patient population with OSA are in accordance with ASA guidelines for OSA

Current Standards: ASA guidelines for OSA

Clinical Recommendations

- Follow a developed process whereby patients at risk for OSA are evaluated for OSA prior to the day of surgery
- "Cautious" use of benzodiazepines
- Multimodal analgesia approach
- Initial intubation attempt with video laryngoscopy
- Sugammadex vs neostigmine: promising respiratory profile with sugammadex, but no current recommendation

Conceptual Framework

Identify triggering issues
Increased prevalence of underdiagnosed OSA among the adult surgical population

State the purpose
Conduct a gap analysis to retrospectively explore anesthesia provider screening practice & appropriateness of care among at-risk OSA surgical patients

Form a team
3 DNP students, IT team, 1 team leader, 1 team advisor

Assemble, appraise, & synthesize body of evidence
Review literature & current standards
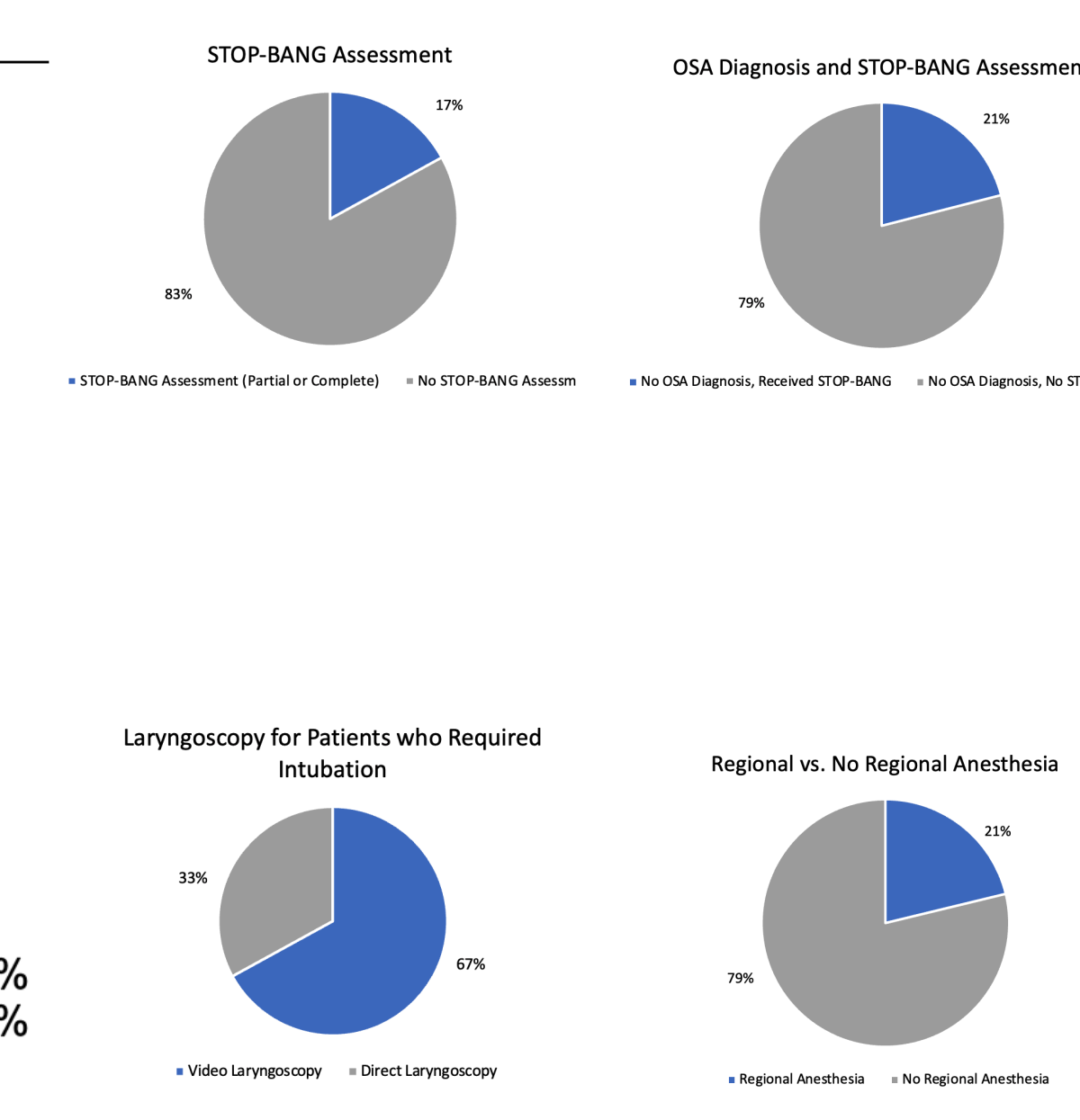
Conduct research
Obtain baseline data

Methods

- **Design**: Retrospective chart review of electronic health records
- **Setting**: Large Integrated Health System
- **Sample**: 100 adult patients at risk for OSA who underwent surgeries in the last quarter of 2019 (n = 100)
- **Measures**: Adherence to practice guidelines/current standards in the perioperative period
  1. Percentage of patients who received a STOP-BANG assessment
  2. Percentage of patients without a prior OSA diagnosis and received a STOP-BANG assessment
  3. Percentage of patients intubated with video laryngoscopy
  4. Percentage of patients who received preoperative sedation (midazolam, dexmedetomidine, ketamine)
  5. Percentage of patients discharged with multimodal analgesic medications versus opioids
  6. Percentage of patients who received regional anesthesia/analgesia
  7. Percentage of patients who received reversal agents (neostigmine vs. sugammadex)

Results

Characteristics of Study Subjects

Baseline characteristic	All patients
n	100
ASA class	
I	0
II	13
III	83
IV	4
BMI (mean)	43.89
Location of Procedure	
Main Operating Room	94
Ambulatory Surgical Center	6
Pre-existing Diagnosis of OSA	
Yes	51
No	49
STOP-BANG Assessment	
No	83
Partial	2
Complete	15
Preoperative Sedation	
Midazolam only	60
Average Midazolam dose (mg)	1.9
Midazolam with Other Sedative	8
Average Midazolam dose (mg)	1.75
None	22
Regional Anesthesia	21
Intubated	96
Video Laryngoscopy	65
Direct Laryngoscopy	31

Baseline characteristic	OSA Diagnosis		No OSA Diagnosis	
n	51		49	
Location of Procedure				
Main Operating Room	48	94%	46	94%
Ambulatory Surgical Center	3	6%	3	6%
STOP-BANG Assessment				
No	44	86%	39	80%
Partial	1	2%	1	2%
Complete	6	12%	9	18%
Preoperative Sedation				
Midazolam only	30		30	
Midazolam dose (mg)	1.33		1.48	
Midazolam with Other Sedative	4		4	
Midazolam dose (mg)	1.75		1.75	
None	12	24%	10	20%
Regional Anesthesia	12	24%	10	20%
Intubated				
Video Laryngoscopy	31	65%	34	71%
Direct Laryngoscopy	17	35%	14	29%
Reversal Agent, If Given				
Neostigmine	18	50%	19	48.72%
Sugammadex	18	50%	20	51.28%
Paralysis, No Reversal	14		9	
No Paralysis, No Reversal	1		1	

STOP-BANG Assessment

OSA Diagnosis and STOP-BANG Assessment

Laryngoscopy for Patients who Required Intubation

Regional vs. No Regional Anesthesia

- Midazolam only: average dose 1.9mg
- Midazolam with other sedative: average dose of midazolam 1.75mg
- Received no preoperative sedation at all (22%)

Discussion

Major Findings:
- Limited number of STOP-BANG completions for patients not diagnosed with OSA
- Lack of reduction in benzodiazepine use
- One medical service area was an outlier and did not use any benzodiazepines in all patients
- Majority of initial intubation attempts were with video laryngoscopy
- Half of reversals were with sugammadex while half with neostigmine
- Limited amounts of regional anesthesia/analgesia were performed
- Half of the patients were discharged with opioid only analgesic medications
- Minimal difference in care regardless of preexisting diagnosis of OSA

Limitations:
- Retrospective data
- Limited sample size
- Inconsistencies in documentation location
- Human error in the process of data collection

Recommendation

Implementation of a standardized tool to evaluate suspected OSA patients.

Future possibilities of study include strategies to monitor compliance of the tool and dissemination of data regarding guideline adherence after successful tool implementation

References

American Academy of Sleep Medicine (AASM). (2016). *Hidden health crisis costing America billions: Underdiagnosing and undertreating obstructive sleep apnea draining healthcare system.* https://aasm.org/resources/pdf/sleep-apnea-economic-crisis.pdf

American Society of Anesthesiologists (ASA). (2014). Practice guidelines for the perioperative management of patients with obstructive sleep apnea: An updated report by the American Society of Anesthesiologists Task Force on Perioperative Management of Patients with Obstructive Sleep Apnea. *Anesthesiology, 120*(2), 268–286. https://doi.org/10.1097/ALN.0000000000000053

Buckwalter, K. C., Cullen, L., Hanrahan, K., Kleiber, C., McCarthy, A. M., Rakel, B., Steelman, V., Tripp-Reimer, T., Tucker, S., & Authored on behalf of the Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing, 14*(3), 175-182. doi: 10.1111/wvn.12223

Chung, F., Yang, Y., Brown, R., & Liao, P. (2014). Alternative scoring models of STOP-Bang questionnaire improve specificity to detect undiagnosed obstructive sleep apnea. *Journal of Clinical Sleep Medicine: JCSM: Official Publication of the American Academy of Sleep Medicine, 10*(9), 951–958. https://doi.org/10.5664/jcsm.4022

Mathangi, K., Mathews, J., & Mathangi, C. D. (2018). Assessment of perioperative difficult airway among undiagnosed obstructive sleep apnea patients undergoing elective surgery: A prospective cohort study. *Indian Journal of Anaesthesia, 62*(7), 538–544. https://doi.org/10.4103/ija.IJA_158_18

Nagappa, M., Liao, P., Wong, J., Auckley, D., Ramachandran, S. K., Memtsoudis, S., Mokhlesi, B., & Chung, F. (2015). Validation of the STOP-Bang questionnaire as a screening tool for obstructive sleep apnea among different populations: A systematic review and meta-analysis. *PLoS ONE, 10*(12). https://doi.org/10.1371/journal.pone.0143697

Nagappa, M., Subramani, Y., & Chung, F. (2018). Best perioperative practice in management of ambulatory patients with obstructive sleep apnea. *Current Opinion in Anaesthesiology, 31*(6), 700–706. https://doi.org/10.1097/ACO.0000000000000661

Updated by the Committee on Standards and Practice Parameters, Apfelbaum, J. L., Hagberg, C. A., Caplan, R. A., Blitt, C. D., Connis, R. T., Nickinovich, D.G. & Ovassapian, A. (2013). Practice guidelines for management of the difficult airway: An updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology, 118*(2), 251-270. https://doi.org/10.1097/ALN.0b013e31827773b2