Outcomes of emergency surgery and trauma operative cases done at night

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Background

- The nature of Acute Care Surgery involves emergency surgical cases done at night.
- Performance decrements have been well documented with lack of sleep in the simulation environment.
- Outcomes of cases done after a night operation and/or night call have had mixed findings.
- Sleep opportunity less than 6 hours has been associated with increased risk of adverse outcomes.
- Transplant surgeons have demonstrated equivalent outcomes for night cases.
- At this meeting in a single center study we have identified worse outcomes for night cases.

Background

- Cases done at night may suffer from several factors affecting outcomes:
  - The nature of the night environment
  - Competing priorities of the Acute Care Surgeon at Night
  - Sleep opportunity (scheduling variations)
  - Seniority of surgeon

Hypothesis

- Lack of sleep opportunity will result in equivalent outcomes for cases done by acute care surgeons when controlled for the many confounding factors.

- Secondary Aims
  - Impact of non-operative surgical consults/trauma volume
  - Impact of surgeon experience

Methods

- Ideally a prospective study with daily collection of cases done
  - Daily Email to colleagues: What cases did you do yesterday and how many hours of sleep did you have before starting any night cases?
  - Majority of data to be collected from the medical record
  - Alternative: NSQIP institutions, add surgeon data, trauma data, other consults and trauma volume/admissions, AAST disease grade.
- Optionally a pure retrospective chart review.
- Inclusion criteria: Any major abdominal operative case done by an acute care surgeon.
- Exclusion criteria: cholecystectomy, appendectomy, Incision and drainage subcutaneous abscess.

Variables

Variable	Source	Options	Definition
Demographics	Medical Record		NSQIP
DOB			
Gender			
Race			
Ethnicity			
Operative	Medical Record		NSQIP
Date			
Operation start time			
Operation end time			
Operation			
CPT code			
Operative blood loss			
Wound Class		Clean, Clean/Contaminated, Contaminated, Dirty/Infected	
Wound closure			
ASA class			
AAST disease grade			
Fascia closed			
Colostomy created			
Transfused blood			

Variables

Variable	Source	Options	Definition
Comorbidities Admitted from Height Weight Diabetes (Insulin) Smoker Dyspnea Functional Health Status Ventilator dependent COPD Ascites within 30 days CHF within 30 days Hypertension with meds Acute renal failure ESRD Disseminated Cancer Open wound Immunosuppressant use Weight loss >10% Bleeding disorder Pre-op Transfusion Sepsis Septic shock	Medical Record	(None, SIRS, Septic shock)	NSQIP
Physiology Heart Rate Systolic blood pressure Respiratory rate Temperature Na/K/BUN/Cr/Albumin/Total bilirubin/AST/Alk Phos/WBC/Hct/Plt/INR/PTT	Medical Record		

Variables

Variable	Source	Options	Definition
Complications **Superficial SSI** **Deep SSI** **Organ space SSI** **Wound disruption** **Pneumonia** **Pulmonary Embolism** **Ventilator days** **Acute Kidney Injury** **Acute renal failure** **Requiring dialysis** **Urinary tract infection** **Stroke** **Cardiac arrest** **Myocardial Infarction** **Sepsis** **Deep venous thrombosis**	Medical Record	(None, SIRS, Septic shock)	NSQIP
Outcomes **Discharge disposition** **Death (date if applicable)** **Unplanned return to OR** **Hospital discharge data** **Ventilator free days**	Medical Record		NSQIP

Variables

Variable	Source	Options	Definition
Others	Medical Record		
Type of call schedule			Standard, Night float
Surgeon's experience			Years from fellowship completion
Number of trauma admissions/alerts over same time			
Number of surgical consults seen over same time			
Number of operations performed same time frame			

Analysis Plan

- Univariable and multivariable analysis with logistic regression, linear regression, t-tests and Wilcoxon tests where appropriate.
- A preliminary power analysis:
  - Assumptions: $\alpha=0.05$ and $\beta=0.2$, 50% of cases at night.
  - 440 per group to detect an increase in mortality for 5% to 10%.

Progress / Needs

- Progress
  - IRB submitted

- Needs for participating centers
  - A dedicated individual (probably 2) to collect retrospective data and if agreed upon prospective data.
  - Vote on willingness to participate options:
    - Prospective with full medical record abstraction
    - Retrospective with full medical record abstraction (trauma included)
    - NSQIP collection, with additional data from billing records, trauma database.

Goals / Timeline

- January - February of 2015 -> Yale IRB(HIC) approval; identify interested individuals/centers
- February –March 2015 -> Decide if prospective collection feasible
- March - May 2015 -> Obtain IRB approval for participating institutions.
- May – July 2015 -> Develop data collection methedology
- May 2015 – January 2017 -> Data collection
- January 2017 – March 2017 -> Data analysis
- Goal: EAST submission 2017