Decreasing Incidence of Neck Hematomas after Thyroid and Parathyroid Surgery

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Purpose

Postoperative neck hematomas are a known complication of thyroid and parathyroid surgeries, with an incidence ranging from 0.5% to 1.5% based on large retrospective samples[1,2]. While postoperative neck hematoma requiring surgical re-intervention has been associated with numerous risk factors, such as male sex, obesity, Graves disease, bilateral thyroidectomy, and preexisting hypertension, the contribution of each individual risk factor varies in the current literature. In addition, preventative measures are not consistently applied[3].

Study Aims:

- Investigate the **incidence of neck hematomas** in select surgical populations at NYP-Weill Cornell
- To develop a **clinical protocol and order set** to identify and manage neck hematoma risk factors in **thyroid and parathyroid surgeries**

Investigation Methods

- **Chart Review** 01/2021 – 12/31/22
  - All thyroid and parathyroid surgeries (851 cases) performed at Weill Cornell Medical Center
  - Focused on the time from extubation through the early post-anesthesia care unit (PACU) stay: 3 hours
- **Interviews** with thyroid and parathyroid general surgeons along with otolaryngologists
  - Describe processes for risk-stratification for neck hematoma and management of any possible hematoma or complications in perioperative period

Ref: 1. Dehal A. *Perm J.* 2025; 2. Zhang X. *Sci Rep.* 2017; 3. Fan C. *BMC Surgery.* 2019

Audit Results

Total Thyroid and Parathyroid Surgeries (Jan 2021 to Dec 2022)	**851**
Neck hematomas (NH) requiring surgical re-exploration	6 (0.7%)
Neck hematomas with systolic BP > 150 mmHg	3
Neck hematomas that received at least two anti-emetics (e.g., ondansetron, dexamethasone)	6

Figure 1: Root Cause Analysis (5 Why's)

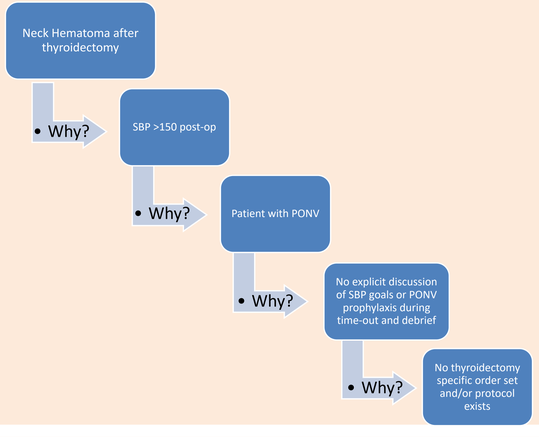
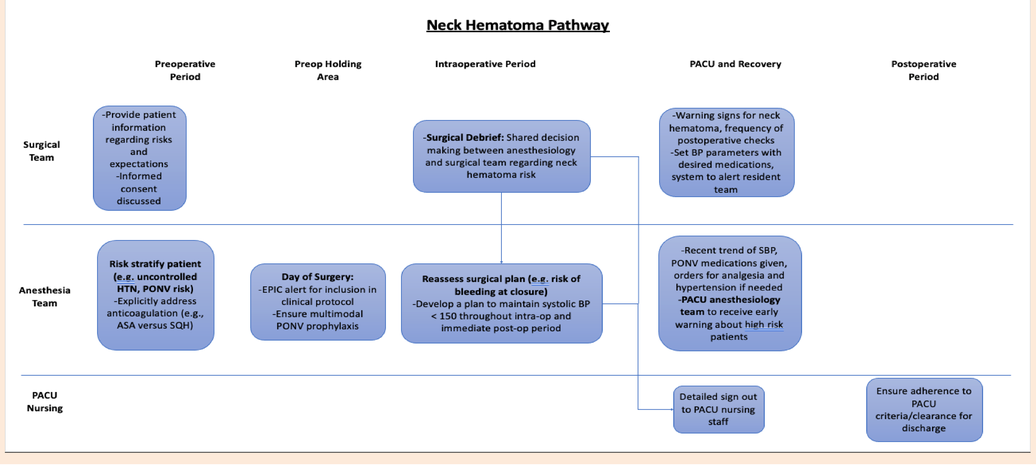


Figure 2: Proposed Clinical Pathway



Proposed Solutions

- **Clinical Pathway**
  - Developed a clinical pathway for patients undergoing thyroid and parathyroid surgeries to increase perioperative collaboration between surgeons, nursing staff, anesthesiologists (both in the OR and PACU), and surgeons
- **Postoperative Order Set**
  - Discussions with surgical service to improve standard postoperative order sets in EPIC for anti-hypertensives and PONV prophylaxis/ rescue

Future Directions

- Work with EMR programmers to
  - **Create a clinical pathway** that can be easily accessed in EPIC for all patients undergoing thyroid and parathyroid surgery, similar to other ERAS protocols
  - **Create new "smart" preoperative order set** that prompts clinicians to choose antihypertensives and PONV prophylaxis for thyroid and parathyroid surgeries
- Conduct a **follow-up chart review** to assess progress after solutions fully implemented
- **Interview** surgical and anesthesiology teams to assess acceptance and success of implemented changes

Anesthesia Ready:
Improving Anesthesia Scheduling for Sedated Pediatric MRIs

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Purpose

In the field of pediatrics, anesthesia-provided sedation is often necessary for advanced imaging modalities, such as magnetic resonance imaging (MRI), which require prolonged immobility. Currently at our institution, the process for scheduling an inpatient MRI with anesthesia care is not standardized, leading to both delays in care and frustrations for patients, anesthesiologists, and pediatricians. These inefficiencies are especially pronounced for add-on cases, leading to increased need for call team coverage. Our quality improvement initiative identifies opportunities to create a process that clarifies and streamlines our current workflow.

Investigation Methods

Multiple discussions were held with key stakeholders including pediatric anesthesiologists, pediatricians, MRI staff, and EPIC technicians to better understand the current workflow and its challenges.

Baseline data regarding MRI scheduling, including anesthesia time in MRI after 5pm and on weekends, was collected from the EMR (Table 1).

Table 1: Current State - Peds MRI

Time Spent in MRI for Peds MRI Cases			
	Total MRI Time From Anes Start to Anes Stop (in MINUTES / DAYS / %)	Average Time From Anes Start to Anes Stop (per case)	Average Time From Case Scheduled to Anes Start (per case)
Peds MRI Cases on Weekends	3864 / 2.7 / 4.16%	1 hours 57 minutes	1 hours 38 minutes
Peds MRI Cases Anes Start > After 5pm Weekday Cases	3417 / 2.4 / 3.68%	2 hours 2 minutes	3 hours 58 minutes
Peds MRI normal hours	85646 / 59.5 / 92.16%	1 hours 57 minutes	1 hours 11 minutes
Total Cases	92927 / 69.6 / 100.0%	1 hours 57 minutes	1 hours 18 minutes

Figure 1: Future State Process Map for Non-Urgent Pediatric MRI Scheduling

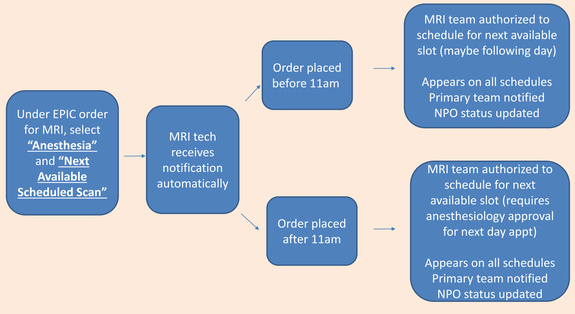
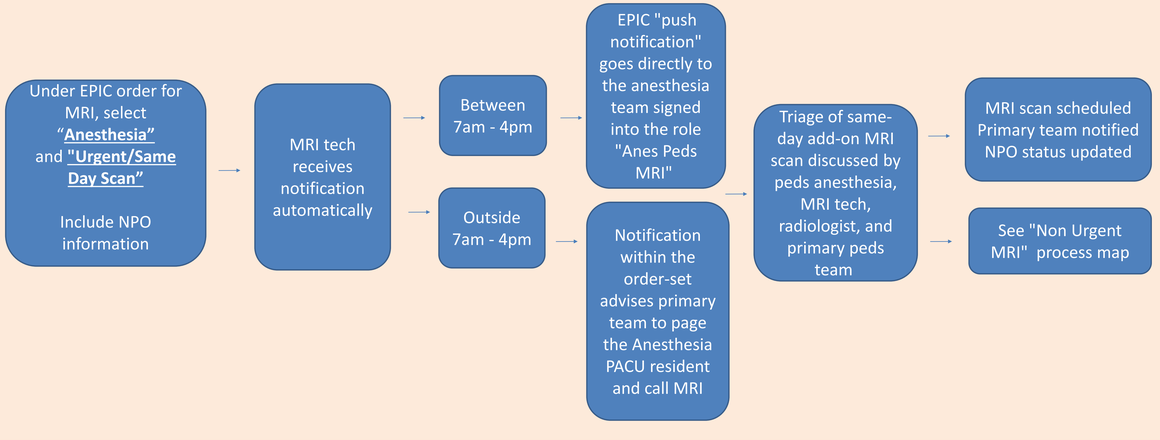


Figure 2: Future State Process Map for Urgent Pediatric MRI Scheduling



Proposed Solutions

1) **Standardize scheduling of pediatric MRIs requiring sedation (Figures 1,2).**

2) **Implement a user-friendly EPIC order set**
   - To alert the pediatric anesthesia team
   - To allow primary teams and anesthesiologists the ability to triage the urgency of each MRI
   - To facilitate future scheduling

3) **Give MRI team more agency**
   - To schedule appropriate studies in available anesthesiology-covered time slots

Conclusions and Future Directions

Our initiative seeks to improve scheduling for pediatric MRIs requiring anesthesia care. Imaging procedures in children can be difficult to schedule as they require coordination between inpatient primary teams, anesthesiology teams, and imaging technicians. Our project utilizes effective interdepartmental communication to create institutional processes and easy to understand EMR interfaces. We plant to study the effect of our interventions on ease of scheduling and call team utilization. We hope our initiative can be used as a model for future interdepartmental scheduling processes.

PONV Prophylaxis As An Adjunct to CSF Leak Prevention In A Neurosurgical Patient Population

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Background

- ❖CSF leak occurs in about 3.4% of transsphenoidal surgery (TSS) patients[1]
- ❖CSF leak may be associated with meningitis, intracranial infection, CSF hypotension syndrome, and other complications
- ❖Neurosurgical team was concerned PONV might contribute
- ❖PONV prophylaxis and opioid reduction strategies may limit incidence of PONV

Baseline Data Report

❖ **Patient Population:** 228 TSS cases - Single Neurosurgeon

❖ **Data Period:** December 2020 – December 2022

Overview of TSS	
Baseline Total Cases	228
No CSF Leak/Repair	224 (98.25%)
CSF Leak/Repair	4 (1.75%)

# of Cases Receiving Acetaminophen			
	Baseline (n = 228)	No CSF Leak (n = 224)	CSF Leaks (n = 4)
Pre-Op	19 (8.33%)	19 (8.48%)	0 (0.00%)
Intra-Op	50 (21.93%)	48 (21.43%)	2 (50.00%)

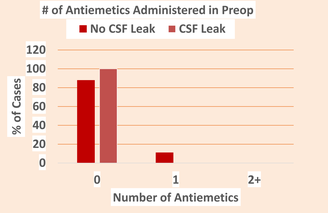
Abbreviations: PONV, post-op nausea vomiting; CSF, cerebrospinal fluid; TSS, transsphenoidal surgery; ICP, intracranial pressure; ERAS, enhanced recovery after surgery; PEC, pre-evaluation clinic; OG, orogastric

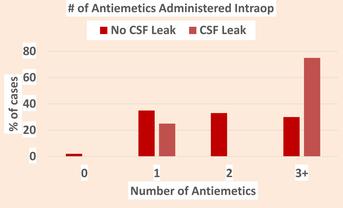
Baseline Data Report Cont.

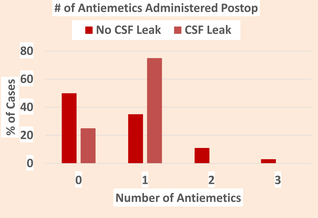
Patients Receiving an Antiemetic in Pre-Op			
Antiemetic	**Baseline (n = 228)**	**No CSF Leak (n = 224)**	**CSF Leaks (n = 4)**
Aprepitant	14 (6.14%)	14 (6.25%)	0 (0.00%)
Scopolamine	2 (0.88%)	2 (0.89%)	0 (0.00%)

Patients Receiving an Antiemetic in Intra-Op			
Antiemetic	**Baseline (n = 228)**	**No CSF Leak (n = 224)**	**CSF Leaks (n = 4)**
Dexamethasone	73 (32.02%)	71 (31.70%)	2 (50.00%)
Propofol Infusion	49 (21.49%)	47 (20.98%)	2 (50.00%)
Diphenhydramine	60 (26.32%)	59 (26.34%)	1 (25.00%)
Ondansetron	203 (89.04%)	199 (88.84%)	4 (100.00%)

Medications Administered Post-Op			
Antiemetic	**Baseline (n = 228)**	**No CSF Leak (n = 224)**	**CSF Leaks (n = 4)**
Aprepitant	6 (2.63%)	6 (2.68%)	0 (0.00%)
Dexamethasone	28 (12.28%)	26 (11.61%)	2 (50.00%)
Diphenhydramine	14 (6.14%)	14 (6.25%)	0 (0.00%)
Ondansetron	93 (40.79%)	92 (41.07%)	1 (25.00%)
Prochlorperazine	15 (6.58%)	15 (6.70%)	0 (0.00%)







Current Status and Future Steps

- ✓ ERAS Protocol published on Anesthesiology Sharepoint.
- ✓ Neurosurgical housestaff and physician assistants educated on ERAS protocol.
- ✓ EPIC postoperative order set implemented.

- ❑ Assess compliance with indicated pre-, intra-, and post-op recommendations
- ❑ Follow up data on CSF leak incidence, potentially evaluating >1 surgeon

ERAS Pathway for Transsphenoidal Surgery

PRE-HOSPITALIZATION
- ✓ Assess patient's PONV risk during PEC clinic visit and discuss protocol with patient
- ✓ Book case as requiring ERAS protocol

PRE-OP, DAY OF SURGERY
- ✓ Aprepitant 40 mg PO in preoperative area

INTRA-OP GUIDELINES
- ✓ OG tube after intubation
- ✓ Hydrocortisone 100 mg or Decadron 4-8mg + Zofran 4mg to every patient unless contraindicated
- ✓ Decadron 10 mg and diphenhydramine 25 –50 mg if using intrathecal fluorescein
- ✓ Acetaminophen 1000 mg IV prior to closure
- ✓ Remifentanil or lidocaine peri-extubation
- ✓ Nicardipine infusion or labetolol prn for SBP < 150
- ✓ Surgical team: Consider throat pack

POST-OP GUIDELINES
- ✓ Surgical Order Set:
  - ✓ IV acetaminophen x 24 hours then 975mg PO q8h
  - ✓ Oxycodone 5 mg q4h prn for mild or moderate pain and 10 mg q4h prn for severe pain when tolerating PO
- ✓ Anesthesiology PACU orders: Amisulpride prn

1. Slot EMH, Sabaoglu R, Voormolen EHJ, Hoving EW, van Doormaal TPC. Cerebrospinal Fluid Leak after Transsphenoidal Surgery: A Systematic Review and Meta-analysis. J Neurol Surg B Skull Base. 2021 Aug 20;83(Suppl 2):e501-e513. doi: 10.1055/s-0041-1733918. PMID: 35832952; PMCID: PMC9272274.

Improving Response to Routine and Difficult Airways at Weill Cornell Medicine/NewYork-Presbyterian Hospital

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Introduction

When a patient suffers cardiac arrest, shorter times to securing an airway are associated with better neurological outcomes.[1] Emergency airway management may be difficult, with 9-12% identified as challenging, and with complication rates up to 28%.[2]

After discontinuing pagers, our institution no longer had an efficient and systematic approach to airway consultation.

Objectives

- Identify perceived barriers to rapid and safe non-operating room airway interventions
- Improve communication between primary team and consulting anesthesiologist
- Identify potential difficult airways prior to evaluating the patient, to recruit necessary personnel and equipment

Investigation Methods

Survey Conducted - perceived barriers to urgent airway care and indications for advanced airway equipment/personnel

Initial results - need for non-emergent airway consult, and opportunity to identify potential difficult airway prior to arrival

Initial intervention - development of airway consult order in EMR for non-emergent airway evaluation

Figure 1: Fishbone Diagram

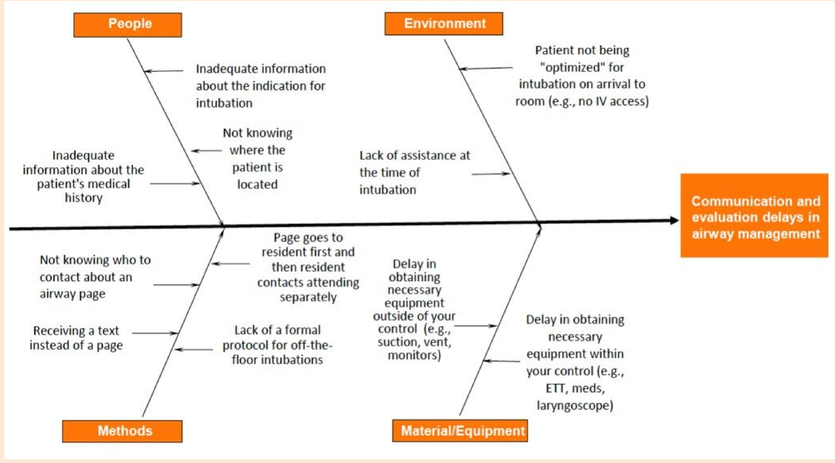
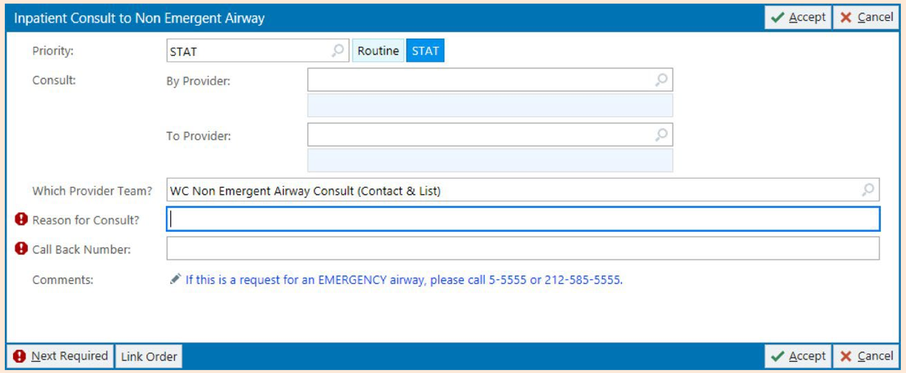


Figure 2: Airway Consult Order in EMR



Discussion

- Prior to airway consult order, airway consultation was initiated via single page or EMR text chat without important patient info.
- **Initial identified needs**:
  - **Anesthesiology** – identification of urgency of airway and necessary information/equipment prior to arriving at the bedside; direct and immediate access to the patient chart
  - **Primary teams/unit staff** - means to contact anesthesiology reliably & efficiently depending on urgency of airway needs
- **Proposed solution**:
  - Maintain the emergency airway ("STAT INTUBATION") system to contact airway team during true emergency
  - Create airway consult order for urgent airway consultation and evaluation, facilitating rapid notification of multiple providers and providing immediate chart access. It also provides method of direct communication with primary team
- **Future directions**:
  - **Apply PDSA** method: assess frequency of STAT vs consult order and patient outcomes, refine intervention as indicated
  - **Create "Difficult Airway Response Team"** to address need for systematic response to more difficult airways

References

1. Steffen R, Hischier S, Roten FM, Huber M, Knapp J. Airway management during ongoing chest compressions-direct vs. video laryngoscopy. A randomised manikin study. PLoS One. 2023 Feb 9;18(2):e0281186. doi: 10.1371/journal.pone.0281186. PMID: 36757942; PMCID: PMC9910718.
2. Mark LJ, Herzer KR, Cover R, Pandian V, Bhatti NI, Berkow LC, Haut ER, Hillel AT, Miller CR, Feller-Kopman DJ, Schiavi AJ, Xie YJ, Lim C, Holzmueller C, Ahmad M, Thomas P, Flint PW, Mirski MA. Difficult airway response team: a novel quality improvement program for managing hospital-wide airway emergencies. Anesth Analg. 2015 Jul;121(1):127-139.

Abbreviations: EMR – electronic medical record.

Initiative for Early Epidural Use

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Purpose

Epidural catheters effectively decrease postoperative pain while avoiding common side effects seen with enteral/parenteral opioids (e.g. nausea, ileus) [1]. Intraoperative use of these catheters has been limited by the lack of a process to obtain appropriate commercially prepared epidural infusions as well as pumps and an absence of a system to secure the "chain of custody" for controlled substance infusions throughout the perioperative process. Without such a process, upon arrival in PACU, patients wait until an epidural pump is brought to the bedside, primed, connected, and, eventually, initiated with the ordered infusion.

Study Aims:

- Investigate the rate of intraoperative PCEA use
- Develop novel workflow for obtaining and using PCEA
- Improve medication handoff process between provider and PACU nurse
- Decrease delay in initiation of epidural PCEA

Investigation Methods

- **Chart Review** 01/2022 – 06/2023
  - PCEA connected to epidurals intraoperatively / by PACU arrival
  - Time from "Anesthesia Ready" to start of epidural infusion
- **Feedback Surveys** with PACU RNs, CRNAs, Residents, and Attending Anesthesiologists
  - Regarding ease of obtaining and using PCEAs with the new workflow

Ref: 1. Pöpping DM, et al. British Journal of Anesthesia. 2008 Dec;101(6):832-840

Results

Data Overview

	Pre-Implementation	Post-Implementation
Baseline Total Cases with an Epidural	395	83
PCEA Running before PACU	27 (6.84%)	50 (60.24%)

Pre-Implementation: 1/1/2022 – 12/22/2022

Post-Implementation: 12/22/2022 – 2/28/2023

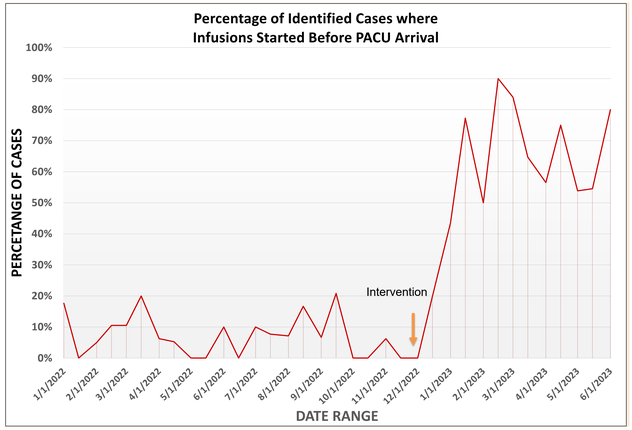


Figure 1: Epic Workflow

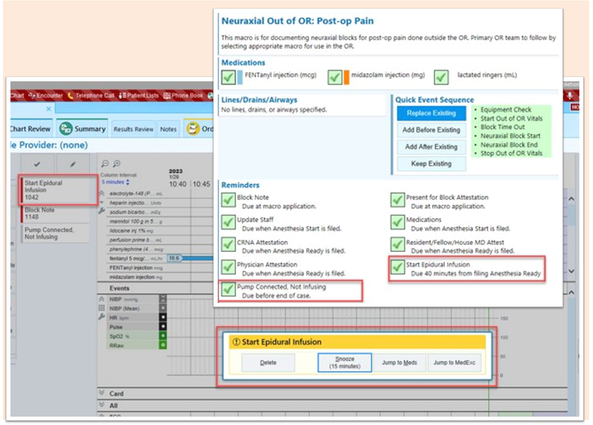
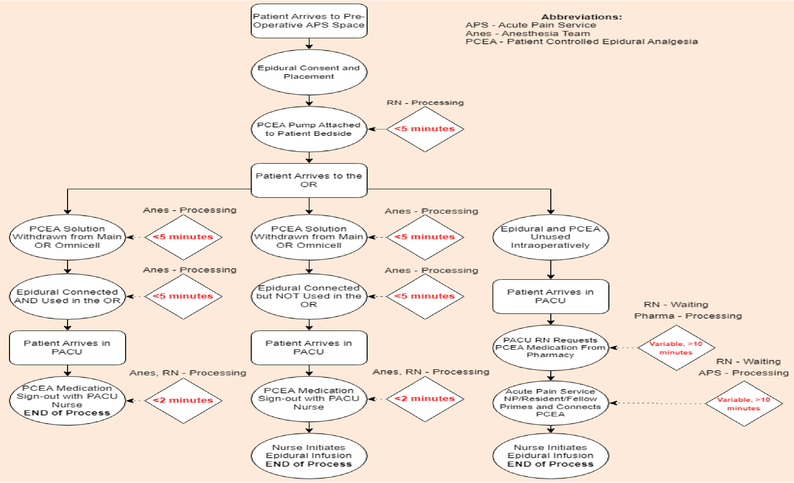


Figure 2: Value Stream Map



Future Directions

- Continued Data Collection
- Continued education of Anesthesiology and PACU staff
- Data collection of feedback on project (Qualtrics Survey)