



# Incidence of Post-Anesthesia Symptoms, Surgical Events, and Length of Stay of Surgical Oncology Outpatients



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## Background

The Main Post Anesthesia Care Unit (PACU) at Memorial Sloan Kettering utilizes a two-step recovery process:

- PACU I provides acute post-operative care
- PACU II prepares the surgical outpatient for discharge

The perianesthesia nursing staff identified post-operative symptoms (nausea, vomiting, dizziness, somnolence, pain and impaired wound integrity) which delayed outpatient discharge and contributed to an increased PACU II length of stay (LOS).

## Study Purpose

Identify if revised PACU I discharge criteria would decrease the incidence of post-anesthesia symptoms, events and LOS for surgical oncology outpatients during PACU II recovery.

**Hypothesis:** We expect a decrease in post-anesthesia symptoms, events and PACU II LOS due to changes in PACU I transfer criteria

- Aim 1:** Evaluate the incidence of post-anesthesia/post-surgical symptoms and events occurring in PACU II
- Aim 2:** Investigate the PACU LOS among surgical outpatients

## Methodology

**Study Design:** A retrospective analysis of data collected from the Electronic Medical Record (EMR) was used to examine post-surgical records (See Table 1. Variables, Operational Definitions and Data Sources).

**Period 1: Before Guideline Implementation** 4-5-2017 to 6-5-2017

**Period 2: 1-mo. After Guideline Implementation** 7-5-2017 to 9-5-2017

**Period 3: 1-yr. After Guideline Implementation** 6-5-2018 to 8-5-2018

**Inclusion Criteria:**

- Surgical outpatients >age 18
- Patients admitted for surgery, transferred from PACU I to PACU II and discharged from PACU II during study time periods

**Exclusion Criteria:**

- Patients not designated as a surgical outpatient
- Patients with planned discharge from PACU I to an inpatient unit
- Patients with unplanned admissions to inpatient units
- Patients given Aprepitant or regional pain block prior to surgery

**Table 1: Variables, Operational Definitions and Data Sources**

Variable	Operational Definition	Documentation Source and Record
Nausea/Vomiting	Administration of any antiemetic and/or fluid bolus given for nausea/vomiting	<b>Medication Administration Record:</b> Antiemetics, IV fluid, IV fluid bolus <b>Nursing Perioperative Flowsheet:</b> Post-op Nausea/Vomiting <b>Nursing Event Note:</b> indication for fluid bolus/medications.
Dizziness/Syncope/Postural-Unsteadiness	Patient-reported dizziness and/or syncope, or postural unsteadiness documented by the nurse	<b>Nursing Event Notes:</b> Dizziness, syncope, postural unsteadiness; dizzy; unsteady; unstable; fall; fell; hypotension; hypotensive episode; hypertension; hypertensive episode; lightheaded; difficulty ambulating or with ambulation.
Unsteady gait	Unsteady gait when ambulating	<b>Nursing Perioperative Flowsheet:</b> Gait <b>Nursing Event Note:</b> Unsteady gait
Somnolence	Documented: 'drifts to sleep but arousable to stimuli', frequently drowsy, or 'minimal/no response to stimuli'	<b>Nursing Perioperative Flowsheet:</b> Somnolence <b>Nursing Event Note:</b> Somnolence, sleepy
Skin Integrity-Incision Site	Documentation of "not intact"	<b>Nursing Perioperative Flowsheet:</b> Surgical incision/ wound/skin integrity
Pain	Administration of narcotic or non-narcotic medication to alleviate pain	
<b>Post-Anesthesia Care Unit (PACU) Length of Stay (LOS)</b>		
PACU I LOS	Time (minutes) from arrival to PACU I through 'Discharge from PACU I'	Epic - Case Tracking
PACU II LOS	Time (minutes) from 'Discharge from PACU I to 'Discharge from PACU II'	Epic - Case Tracking
Total PACU LOS	Time (minutes) from arrival to PACU I through 'Discharge from PACU II'	Epic - Case Tracking

## Results

- Blood Pressure decreased between each time period — 1.4% (T-1), 0.3% (T-2), 0.2% (T-3)
- Incidence of dizziness inconsistently decreased — 12% (T-1), 3.8% (T-2), 5.6% (T-3)
- Dizziness, pain and nausea decreased from T-1 to T-2, but increased in T-3

**Table 2: PACU II Symptoms by Time Period**

N=1091	T-1 4/3/2017 - 6/5/2017 N = 362	T-2 7/5/2017 - 9/5/2017 N = 316	T-3 6/5/2018 - 8/5/2018 N = 413
<b>Symptoms</b>	<b>Yes (%)</b>	<b>Yes (%)</b>	<b>Yes (%)</b>
Dizziness	42 (12)	12 (3.8)	23 (5.6)
Nausea	1 (0.3)	0 (0)	1 (0.2)
Hyper/Hypotension	5 (1.4)	1 (0.3)	1 (0.2)
Wound Integrity	1 (0.3)	2 (0.6)	3 (0.7)
Pain	2 (0.6)	0 (0)	2 (0.5)

**Table 3: Fentanyl, Oxycodone/Acetaminophen, Hydrocodone/Acetaminophen and IV fluids decreased between all time periods in PACU II**

Medications N=1091	T-1: 4/3/2017 - 6/5/2017 N= 362; N (%)	T-2: 7/5/2017 - 9/5/2017 N=316; N (%)	T-3: 6/5/2018 - 8/5/2018 N= 413; N (%)
<b>PAIN</b>			
Acetaminophen	0 (0)	0 (0)	1 (0.2)
Acetaminophen INJ	0 (0)	0 (0)	1 (0.2)
Fentanyl INJ	1 (0.3)	1 (0.3)	0 (0)
Hydrocodone / Acetaminophen: 5mg-325mg	1 (0.3)	0 (0)	0 (0)
Hydromorphone	1 (0.3)	0 (0)	3 (0.7)
Hydromorphone INJ	0 (0)	1 (0.3)	0 (0)
Ketorolac INJ	0 (0)	1 (0.3)	1 (0.2)
Oxycodone	6 (1.7)	4 (1.3)	10 (2.4)
Oxycodone/Acetaminophen (Percocet) 5mg-325mg	1 (0.3)	0 (0)	0 (0)
OxyContin	1 (0.3)	0 (0)	0 (0)
<b>Anti-Emetic</b>			
Ondansetron	1 (0.3)	0 (0)	3 (0.7)
<b>Fluids/Electrolytes/Bolus</b>			
Normal Saline	1 (0.3)	0 (0)	0 (0)
Normasol-R	1 (0.3)	1 (0.3)	0 (0)
Normasol-R BOLUS	0 (0)	0 (0)	1 (0.2)

**Table 4: Significant decreases in PACU II LOS were found between T-1 (30 min), T-2 (28 min) and T-3 (27min) (P<0.001).**

	T-1: N= 362 4/3/2017 -6/5/2017 Median (MIN, MAX)	T-2: N=316 7/5/17- 9/5/17 Median (MIN, MAX)	T-3: N=413 6/5/18- 8/5/18 Median (MIN, MAX)	P-Value
PACU I	114 (28, 1218)	120 (0, 2784)	116 (33, 1544)	0.4
PACU II	30 (0, 1471)	28 (0, 292)	27 (0, 171)	<0.001*
Total	154 (54, 1601)	156 (42, 2806)	150 (53, 1545)	0.2

\*significance: p = 0.05

## Data Analysis

- Institutional Review Board approval was obtained (19-308)
- Records (n=1091) — T-1 (N=362), T-2 (N=316) and T-3 (N=413) were examined for missing and duplicate data
- Univariate analysis was conducted to identify relationships between study variables and covariant influences on LOS
- Kruskal-Wallis tests used to assess variations in LOS (PACU I, PACU II and PACU I and PACU II combined) across time periods
- P-values <0.05 were considered statistically significant. All analysis was performed in R [v3.6.2]

## Limitations

- ❖ Documentation addressing similar patient issues was found in multiple locations in the EMR which presented challenges to data collection and interpretation
- ❖ Study findings were collected from one Comprehensive Cancer Center and may not be generalized to all Post Anesthesia Care Units
- ❖ Nonetheless, study findings can be used to improve patient outcomes and care of all surgical outpatients

## Discussion

- Patients should have minimal post-surgical symptoms and sequelae before PACU I discharge
- Improved PACU I transfer criteria led to enhanced patient outcomes and a decrease in discharge delays
- Minimally invasive interventions led to a decrease in blood pressure fluctuations, reported dizziness and use of continuous IV fluids and opioids, promoting shorter PACU II Length of Stays

## Implications for Perianesthesia Nurses

- Monitoring key variables improves patient outcomes and sustained practice changes
- Improved collaboration, communication, and clear expectations of PACU discharge criteria among PACU nurses, improves surgical outpatients experience of recovery and discharge

## Summary

- The nurse-led initiatives to improve PACU discharge criteria decreased the incidence of post-operative symptoms and overall PACU II LOS.
- Findings from this research may be used to inform the development of specific metrics that facilitate discharge guidance and criteria

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