3-6-2020

Use of Enhanced Recovery After Surgery (ERAS) Protocol for Immediate Sub-Muscular Breast Reconstruction after Outpatient Mastectomy is Safe and Significantly Reduces Costs

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Introduction

- ERAS protocols are associated with decreased postoperative stays, reduced opioid use, lower rates of postoperative nausea and vomiting, and lower overall costs to institutions and healthcare systems[1-4]
- The aim of this study was to evaluate the impact of an ERAS approach on mastectomy with implant-based subpectoral reconstruction (IBR) with respect to procedure cost and 30-day complication rates for both ambulatory surgery patients and patients hospitalized overnight

Methods

Study Type: Retrospective chart review analysis

Subjects: Patients over age 18 undergoing nipple-sparing mastectomy or skin-sparing mastectomy with subpectoral IBR at a single institution.

Study Cohorts:
- ERAS: same-day surgery at an ambulatory surgical center
- Overnight hospital admission control group
- Surgeries performed by 2 breast surgeons and 3 plastic surgeons

Analysis Plan:
- ERAS compared to control group, divided by surgical modality (nipple sparing vs. non-nipple sparing mastectomy)
- Demographics, comorbidities, 30-day complications, and cost analyses were examined.
- Direct costs were defined as patient-specific costs, such as pharmacy costs, and radiology charges. Indirect costs included a facility-derived multiplier added to the encounter to cover fixed expenses such as salaried labor, and building overhead.

Enhanced Recovery After Surgery: Mastectomy Pathway

Pre-operative

Analgesia
- Acetaminophen 1000 mg PO
- Gabapentin 600 mg PO
- Celecoxib 200 mg PO

NPO status
- Gatorade up to 2 hours prior to start time

PONV Prophylaxis

Regional anesthesia
- Pecs II block: 20 cc of 0.25% bupivacaine with epinephrine

Anxiolysis
- Minimize long-acting sedatives (e.g. midazolam)

Intra-operative

Analgesia
- Fentanyl/ hydromorphone for patients without pecs block

PONV Prophylaxis
- Dexamethasone 4 mg IV on induction
- Ondansetron 4 mg IV prior to emergence
- Consider TIVA if Apfel risk score=4

Post-operative

Analgesia
- IV hydromorphone bolus for severe pain
- Hydrocodone/ acetaminophen or oxycodone/ acetaminophen PO q 6-8 hrs PRN for moderate pain

Results

Table 1. Descriptive characteristics of patients and surgery by type of stay, n (%)

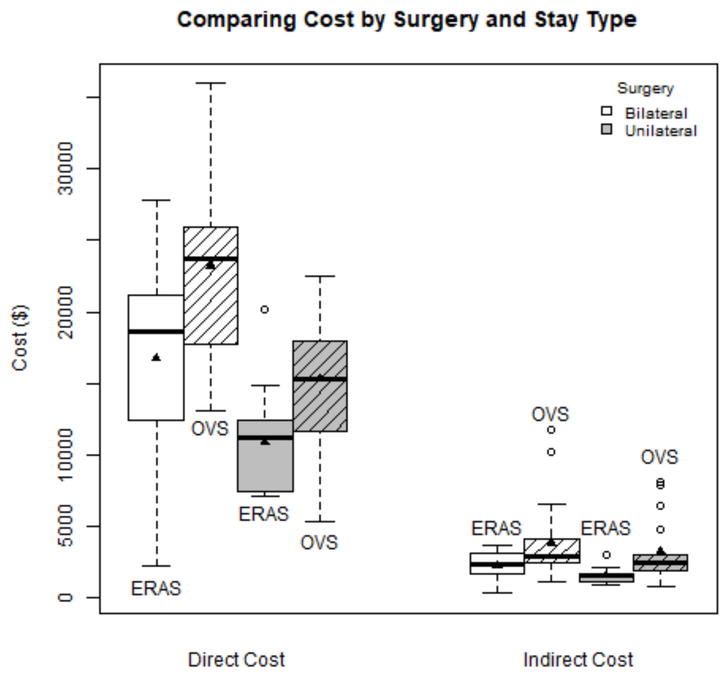
Characteristic	Level	Type of Stay: ERAS N=34	Type of Stay: Overnight Stay N=34	P-value*
Unilateral / Bilateral	Unilateral	17 (50)	17 (50)	1.000
	Bilateral	17 (50)	17 (50)	
Length of Stay	Same day	34 (100)	0 (0)	**<.0001**
	One night, OBS	0 (0)	30 (88.24)	
	2 Days	0 (0)	1 (2.94)	
	3+ Days	0 (0)	3 (8.82)	
Complication	None	33 (97.06)	29 (85.29)	0.197
	Cellulitis	1 (2.94)	2 (5.88)	
	Hematoma	0 (0)	3 (8.82)	
Indication	Malignant	12 (35.29)	15 (44.12)	0.400
	Prophylactic	12 (35.29)	7 (20.59)	
	Both	10 (29.41)	12 (35.29)	
ER Visit (30d Post)		0 (0)	3 (8.82)	0.076
Diabetes		1 (2.94)	2 (5.88)	0.555
Obstructive Sleep Apnea		4 (11.76)	1 (2.94)	0.163
Social Issues		0 (0)	6 (17.65)	**0.025**
Subsequent Mastectomy		3 (8.82)	2 (5.88)	0.642
Age, mean (SD)		45.71 (10.74)	49.03 (10.47)	0.201
BMI (kg/m^2), mean (SD)		25.22 (4.23)	27.79 (5.82)	**0.041**
PACU Time (min), mean (SD)		150.56 (54.35)	159.29 (103.27)	0.664
OR Time (min), mean (SD)		269.06 (77.87)	289.03 (75.05)	0.286

Table 2. Direct and indirect costs ($) by type of stay and surgery type (n=68)

	Stay	N	Mean (SD)	95% CI	Mean	P-Value*
Direct Cost	ERAS	34	13791 (6243)	11613	15970	**0.001**
	OVS	34	19274 (6858)	16881	21666	
Indirect Cost	ERAS	34	1882 (810)	1600	2165	**0.001**
	OVS	34	3511 (2623)	2595	4426	
Direct Cost	Unilateral	34	13096 (4665)	11468	14723	**<.0001**
	Bilateral	34	19969 (7442)	17372	22566	
Indirect Cost	Unilateral	34	2367 (1804)	1737	2996	0.196
	Bilateral	34	3026 (2329)	2214	3839	
Direct Cost	Bilateral + ERAS	17	16716 (7027)	13103	20329	**<.0001**
	Bilateral + OVS	17	23222 (6510)	19875	26569	
	Unilateral + ERAS	17	10866 (3582)	9024	12708	
	Unilateral + OVS	17	15325 (4637)	12941	17709	
Indirect Cost	Bilateral + ERAS	17	2226 (911)	1757	2694	**0.005**
	Bilateral + OVS	17	3827 (2999)	2285	5369	
	Unilateral + ERAS	17	1539 (524)	1270	1808	
	Unilateral + OVS	17	3194 (2233)	2046	4342	

* The p-value is calculated by t-Test or ANOVA with multiple group comparisons

Figure 1. Direct and indirect cost ($) by type of stay and surgery type (n=68)



Conclusions

- There were no significant differences in 30-day complication rates between patients whose mastectomy with reconstruction procedure was at an ambulatory surgical center (utilizing our ERAS protocol) and patients whose operation was at a hospital facility with a planned overnight admission.
- Social factors were the main determinant for identifying those patients who could be safely discharged from an ambulatory setting from those requiring a planned admission.
- On average, a 30% cost saving can be expected with the application of ERAS principles and a same-day surgery approach.

References

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