Analysis of Complications Associated With Abdominal Incisional Wound Vacuum Assisted Closure Following Deep Inferior Epigastric Perforator Flap Harvest for Breast Reconstruction

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Introduction

Gold Standard in Breast Reconstruction: The deep inferior epigastric perforator (DIEP) flap is widely recognized as the preferred method for autologous breast reconstruction

Risks Associated with DIEP Flaps: Despite advancements in surgical technique and improvements in complication rates, postoperative donor site complications remain one of the most significant challenges of care

Novel Approach for Postoperative Wound Dehiscence: Vacuum assisted closure (VAC) systems used over closed incisions provide negative pressure wound therapy to all types of wounds and are thought to expedite the growth of granulation tissue and reduce surgical site infection rates[1,2]

Clinical Relevance: Understanding the association between wound VAC utilization and postoperative complications is crucial for optimizing patient outcomes and minimizing complications in DIEP flap breast reconstruction

Purpose

To assess the efficacy of postoperative wound VAC use in minimizing complications in DIEP flap breast reconstruction

To explore the impact of closed incision negative pressure wound therapy on wound dehiscence in the setting of autologous breast reconstruction

Methods

A retrospective cohort study examined DIEP flap breast reconstruction patients at a large academic institution from 2021-2023

Patients were categorized into two groups: those **who underwent** closed abdominal incision wound vacuum and those **who did not undergo** closed abdominal incision wound vacuum

Data collection included demographics, clinical characteristics, and 90 days post-op abdominal complications including abdominal hematoma, seroma, surgical site infection, and wound dehiscence

Statistical analysis was conducted to assess significant differences in abdominal complications between VAC and No-VAC group

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Discussion

Our study did not reveal a statistically significant reduction in postoperative complications with the use of closed incision Negative Pressure Therapy (ciNPT), although a trend was observed towards a reduction in the incidence of postoperative abdominal complications through the use of VAC systems.

These results were aligned with the conclusions of three other retrospective studies; however, two RCTs reported a statistically significant reduction in dehiscence in patients who received ciNPT compared to those who did not (8% vs 33%, P = .038), but no other significant relationships were found.[3,4,5,6,7]

Given conflicting data in the literature, multi-center prospective studies are essential to clarify ciNPT's role in reducing postoperative complications.

Results

Among 302 patients, 114 (38%) had a closed incisional wound vacuum placed on the abdominal donor site, while 188 patients did not (62%). Patients in the VAC group were older (mean age 53±10 vs. 50±10 years, p=0.03), and had longer operative times (534±108 vs. 495±110 minutes, p=0.003).

No significant differences were observed in BMI, ASA class, or most comorbidities. Complications such as hematoma, seroma, infection, and wound and dehiscence showed no significant differences between groups.

There was no significant difference in overall abdominal complication rates between the VAC and No VAC cohorts (OR 0.812 [95% CI 0.474, 1.389]); multivariable regression indicated a non-significant trend toward fewer complications with VAC use (adjusted OR 0.549, 95% CI 0.277-1.088, p=0.08)

Table 1: *A comparison of postoperative abdominal complications following DIEP flap reconstruction by usage of Vac*

	Odds Ratio	95% CI	P-Value
Hematoma	2 (2)	2 (1)	0.70
Infection	6 (5)	10 (5)	0.70
Dehiscence	12 (11)	22 (12)	0.70
Seroma	4 (3)	12 (6)	0.50
Hernia	0 (0)	1 (0.5)	0.20
Bulge	4 (4)	10 (5)	0.10
ER Visit	10 (9)	11 (6)	0.20
Readmission	3 (3)	11 (6)	0.20

Table 2: *Demographics and Clinical Characteristics by Usage of VAC*

Characteristic	VAC (n=114)	No VAC (N = 188)	P-Value
Mean age (years)	53 ± 10	50 ± 10	0.03
Mean BMI (SD)	31 ± 6	30 ± 6	0.20
BMI <=30 (SD)	58 (51)	110 (59)	0.20
BMI >30 (SD)	56 (49)	78 (42)	
Length of Stay (Median, IQR)	4 (3-5)	4 (3-4)	0.05
Operative Time (Mean ± SD)	534 ± 108	495 ± 110	<0.01
ASA Class 1 Normally Healthy	1 (1)	3 (2)	0.50
ASA Class 2 Mild Systemic Disease	71 (62)	128 (68)	
ASA Class 3 Severe Systemic Disease	42 (37)	57 (30)	
History of Steroid Therapy	33 (29)	50 (27)	0.90
Hyperlipidemia	26 (23)	24 (13)	0.05
Hypertension	34 (30)	34 (18)	0.03
Coronary Artery Disease	2 (2)	2 (1)	0.60
Anti-coagulants	8 (7)	5 (3)	0.08
Depression	45 (39)	68 (36)	0.80
Alcohol	61 (54)	104 (55)	0.80
Tamoxifen Use	12 (11)	31 (16)	0.20
Ex-Smoker	32 (28)	57 (30)	0.80
Non-Smoker	80 (70)	129 (69)	
Drug Use	3 (3)	6 (3)	1.00
Diabetes	11 (10)	17 (9)	0.80
Unilateral Reconstruction	36 (32)	65 (35)	0.50
Bilateral Reconstruction	78 (68)	123 (65)	
Chemotherapy	58 (51)	73 (39)	0.10

BMI = body mass index, SD = standard deviation, IQR = interquartile range, ASA = American Society for Anesthesiologists

Table 3: *Adjusted and unadjusted logistic regression models comparing abdominal complications by usage of Vac*

	Odds Ratio	95% CI	P-Value
Unadjusted	0.812	(0.474, 1.389)	0.44
Adjusted *	0.549	(0.277, 1.088)	0.08
BMI <=30 (SD)	58 (51)	110 (59)	0.20

* Adjusted for age, body mass index, and operative time

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