

Analysis of Free Flap Breast Reconstruction Failures: Are specific patient characteristics associated with free flap failure?

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INTRODUCTION

The use of free flaps has revolutionized the management of complex reconstructive defects, but nothing comes without risks.^{1, 2} Free flaps have been shown to have an increased risk of complications, reoperation, and failure versus pedicle flap reconstructions.³

The literature reveals a concentrated interest on the risk factors associated with flap complications.^{4,5} However, there is a lack of studies evaluating a patient's characteristics that could predispose them to flap failure specifically.

Our hypothesis is that there is at least one patient characteristic associated with an elevated risk for flap failure that, by identification, could be used to improve the pre-operative risk analysis of patients, as well as their post-operative care.

MATERIALS AND METHODS

- A retrospective chart review of 1800 patients who had received surgery during January 2008 - 2012 was designed
- Data was collected through electronic medical records and paper charts
- A cohort of 124 patients receiving free flap breast reconstruction was identified using the Current Procedural Technology (CPT) code 19364
- Patients were categorized into two groups - those without and those with flap failure
- Statistical software, MedCalc, was used to determine statistical significance between the two groups' characteristics

MATERIALS AND METHODS

- Characteristics analyzed included age, body mass index (BMI); ASA grade; Caprini score; operation time; history of diabetes, hypertension (HTN), cardiovascular diseases, pulmonary diseases, and renal diseases; oral contraceptive use; tobacco use; hospital in which the surgery was performed; and barbed suture use
- The American Society for Anesthesiology (ASA) Physical Status Classification is a subjective analysis of a patient's overall health status
- Caprini scores were tabulated on the criteria outlined within the 2005 Caprini Thrombosis Risk Factor Assessment
- Total flap failure was defined as complete necrosis of the flap requiring subsequent removal. Partial flap failure was defined as the loss of a portion or segment of the flap

RESULTS

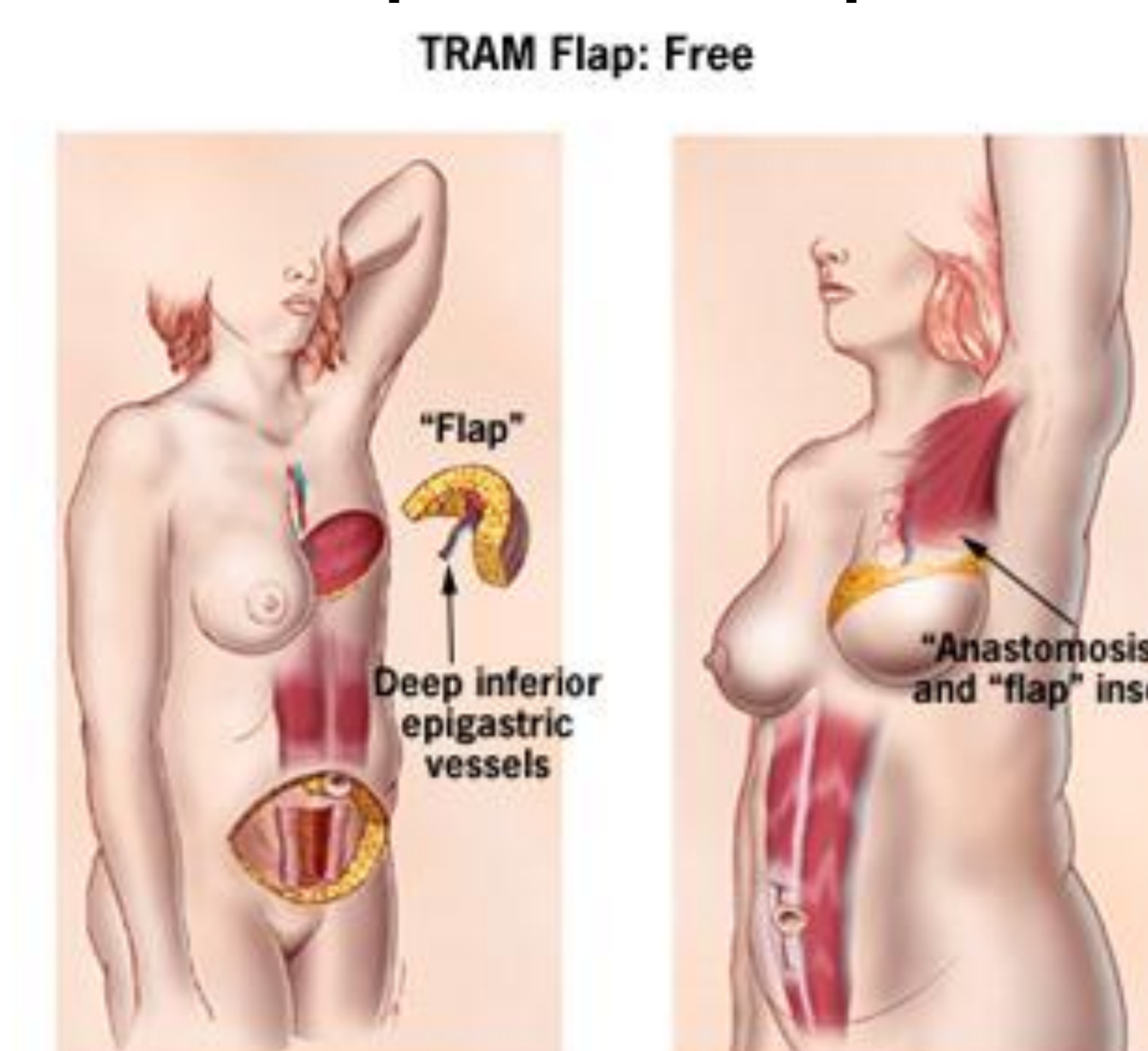
Table 1: Comparison of patient characteristics with and without flap failure

Risk Factor	Patients without Flap Failure	Patients with Flap Failure	P Value
Patients	114	10	—
Female %	100	100	—
Mean Age	50.97	49.20	0.54
Mean BMI	27.75	27.83	0.96
Mean ASA Grade	2.05	2.0	0.25
Mean Caprini Score	6.11	6.2	0.50
Mean Operation Time	10.52	11.05	0.63
BMI <25 n (%)	27 (23.68)	2 (20)	0.90
BMI > 30 n (%)	34 (29.82)	2 (20)	0.77
Tobacco Use n (%)	5 (4.39)	1 (10)	0.98
Diabetes n (%)	6 (5.26)	2 (20)	0.25
COPD/Other Pulmonary Diseases n (%)	23 (20.18)	1 (10)	0.72
HTN n (%)	23 (20.18)	0 (0)	0.25
CAD, History of MI, Other CAD n (%)	19 (16.67)	4 (40)	0.16
Renal n (%)	7 (6.14)	0 (0)	0.93
Oral Contraceptive Use n (%)	9 (7.89)	0 (0)	0.77
Barbed Suture n (%)	34 (29.82)	3 (30)	0.73
University Hospital - St. Paul n (%)	2 (1.75)	0 (0)	0.38
University Hospital - Zale Lipshy n (%)	76 (66.67)	8 (80)	0.61
Parkland Memorial Hospital n (%)	36(31.58)	2 (20)	0.69
Complete Failure n	—	2	—
Partial Failure n	—	8	—

RESULTS

- Of 124 patients, ten (8.06%) experienced flap failure
- Overall success rate of 91.94 percent (n=114)
- The patient characteristics such as age, weight, and contraceptive use and their comorbidities i.e. tobacco use, diabetes, renal diseases, cardiovascular diseases, and pulmonary diseases were not significant ($P < 0.05$) predisposing risk factors for developing free flap failure
- Caprini scores and ASA grades showed no significance in determining risk for failure
- The use of barbed sutures (without failure n = 34, with failure n = 3) during the reconstruction was not indicative of failure
- The majority of surgeries took place at the Zale Lipshy but the location was also not indicative of failure

FIGURE 1: Example Of A Free Flap Reconstruction⁶



CONCLUSION

- This study was unable to identify a patient characteristic that increases proclivity to flap failure
- Recognizing certain variables as risk factors can provide surgeons the benefit of foresight when assessing patients not only preoperatively, but postoperatively
- Flap failures are thankfully uncommon but sample size was a limiting factor
 - Educating all candidates can help increase the volume of patients that choose breast reconstruction
 - An increased patient volume could not only provide an adequate sample size but could also yield more beneficial information
- With such a large retrospective study subjectivity and simple human error can also be a problem
- In the future, other investigations with a larger sample size will be needed to yield more information for predicting failures in patients

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