

I Spy Without My Little Eye: Preventing Wound Complications Quantitatively with SPY-PHI QP



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Introduction

- The SPY Fluorescence Imaging system with quantitative perfusion (QP) software allows surgeons to assess relative perfusion quantitatively.
- However, its ability to predict wound development remains unclear, as there is no consensus on a perfusion value at or below which one should be concerned about wound healing compromise.¹

Methods

- Inclusion criteria:** Patients who underwent staged breast reconstruction with tissue expander placement at the time of mastectomy followed by exchange for an implant or flap were included.
- SPY-PHI QP® Quantification:** Images using SPY-PHI QP® were captured prospectively.
- Management:** Using the SPY-PHI QP® values in concert with an intraoperative clinical assessment, the senior author determined management:
 - Adequate perfusion: The tissue expander was inflated with 60-120cc of air.
 - Inadequate: The tissue expander was not inflated and/or nitroglycerin ointment was used.
- Statistical Analysis:**
 - SAS v9.4 (SAS, Cary, NC) was used to perform logistic regression analyses.
 - A validated cut-off value for relative tissue perfusion has yet to be identified; therefore, the following cut-off values were used:
 - 33% as suggested by Moyer et. al.²
 - 30.015% as calculated with the Youden index³

Results

Table 1. Demographics and comorbidities.

Characteristic	N (%)
No. of patients	24
No. of breasts	34
Age in years, mean (SD)	55 (12)
BMI (kg/m ²), mean (SD)	26.70 (4.60)
Race	
Caucasian	10 (42)
Black or African American	10 (42)
Asian	0 (0)
Other	4 (17)
Ethnicity	
Hispanic or Latino	5 (21)
Not Hispanic or Latino	19 (79)
History of smoking	12 (50)
Comorbidities	
Diabetes mellitus	6 (25)
Hypertension	6 (25)

Table 2. Diagnostic accuracy of SPY-PHI QP® for wound development, comparing 2 different relative perfusion cut-off values.

Perfusion	Wound (N, %)		SN	SP	Accuracy	OR
	Yes	No				
<33%	4 (30.8)	9 (69.2)	100.0%	70.0%	73.5%	20.4
≥33%	0 (0.0)	21 (100.0)				(95% CI: 0.9-450.7)
<30.015%	4 (36.4)	7 (63.6)	100.0%	76.7%	79.4%	28.2
≥30.015%	0 (0.0)	23 (100.0)				(95% CI: 1.3-632.8)

Results

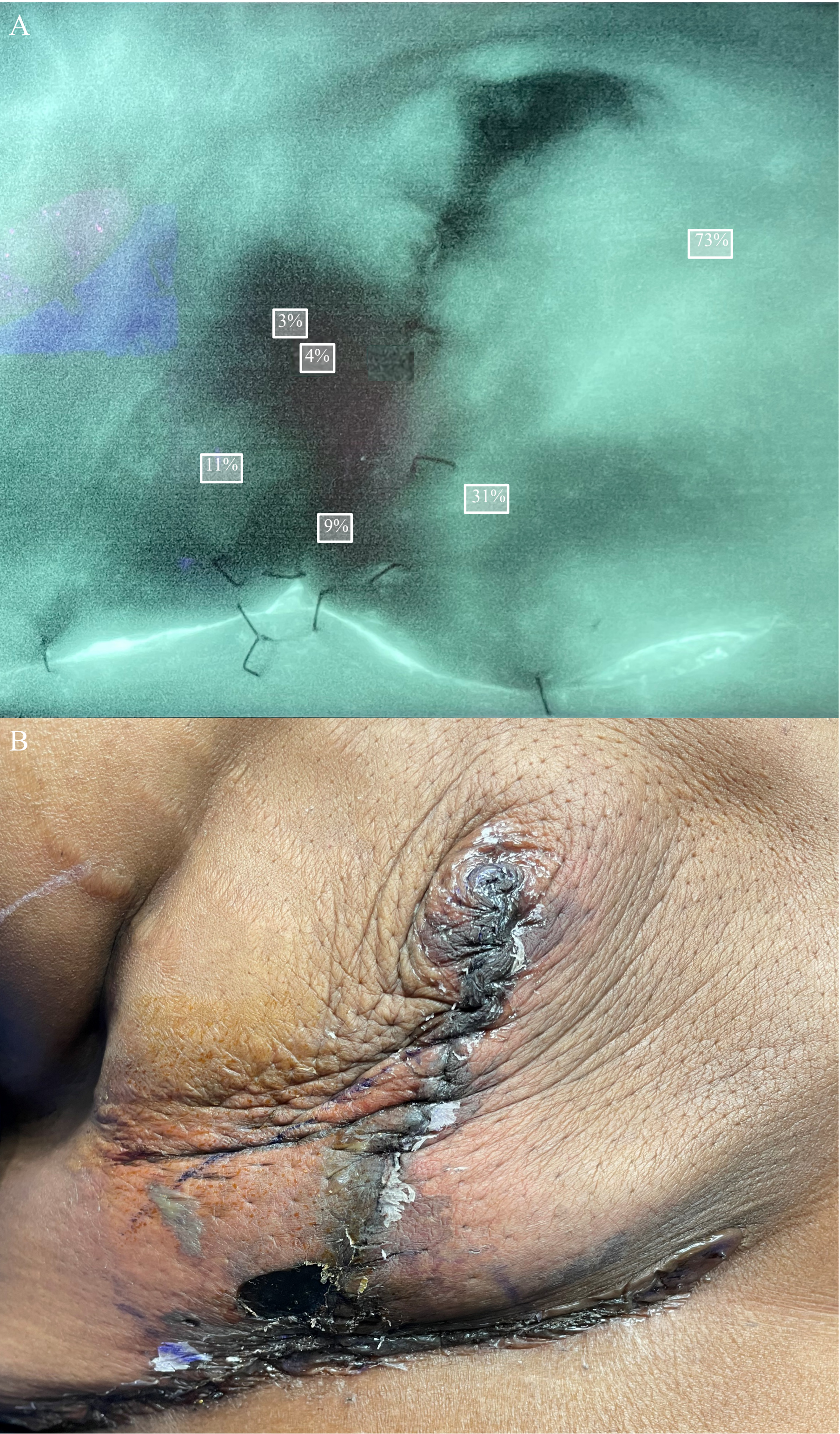


Figure 1.

A. SPY-PHI QP® values on a patient's right breast following mastectomy and tissue expander placement.

B. Breast wound on post-op day 9.

Results

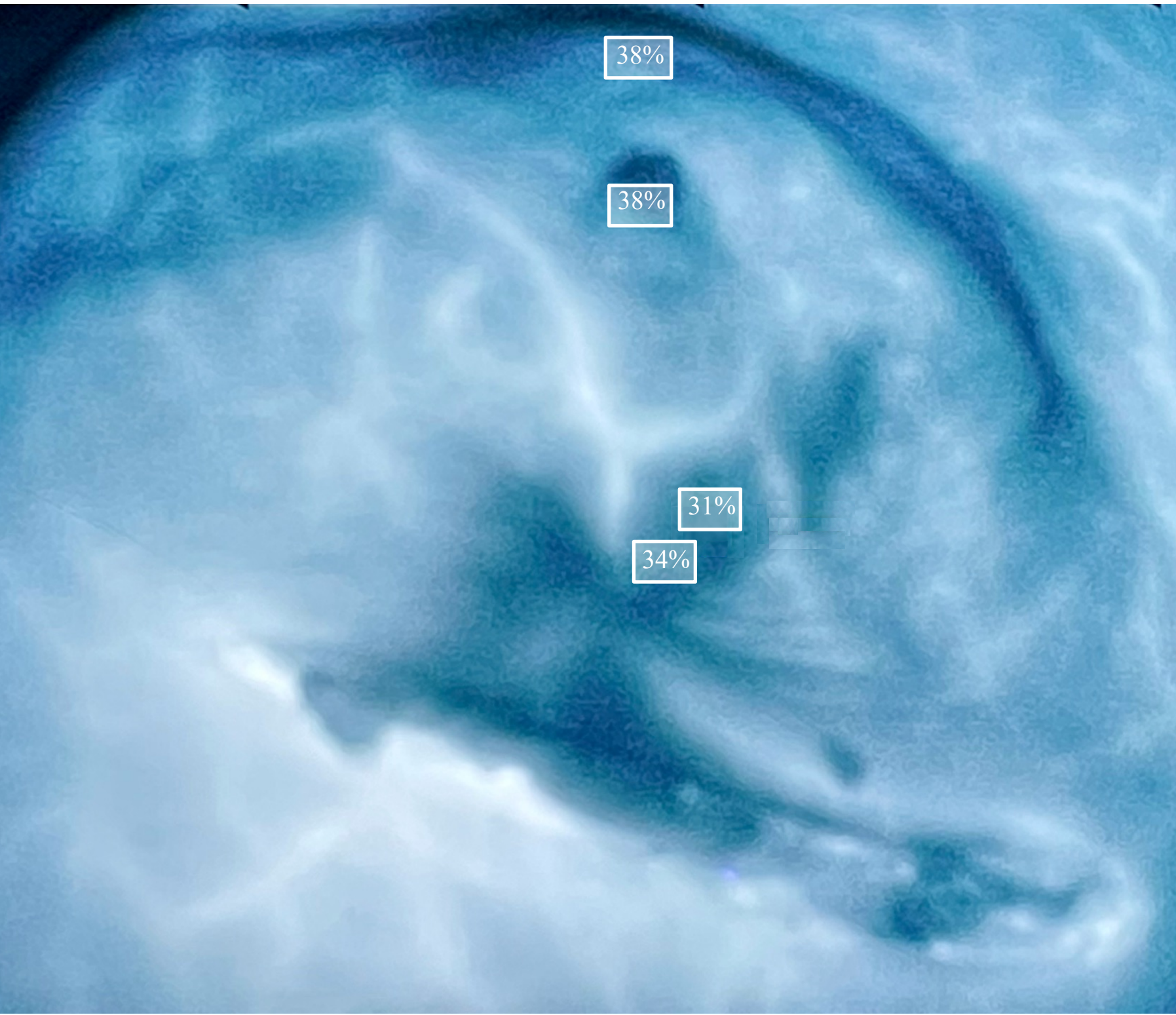


Figure 2. SPY-PHI QP® values across a patient's left breast following mastectomy and tissue expander placement. This patient did **not** develop a wound.

Conclusion

SPY-PHI QP® may be used to better predict wound development in breast reconstruction patients with low perfusion values. We suggest that a cut-off of 30.015% should be used; however, future studies should be conducted prospectively with more patients. If a patient's relative perfusion value is less than 30.015%, we suggest the application of nitroglycerin ointment to prevent mastectomy skin necrosis.

References

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