

Does Initial Fill-type Matter? Comparing Complication Rates And Patient-reported Outcomes In Prepectoral Tissue Expanders Initially Filled With Air Versus Saline

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Background

- One option to optimize prepectoral tissue expander (TE) fill volume while minimizing stress on mastectomy skin flaps is to use air as an initial fill medium, with subsequent exchange to saline during postoperative expansion.
- Theoretical basis: Reduces mastectomy skin flap necrosis (MSFN) by mitigating the effects of gravity and pressure on inferior skin flaps.
- We compared complications and early patient-reported outcomes (PROs) based on fill type in patients undergoing prepectoral breast reconstruction. We hypothesized that there would be no marked difference in either complication rates or PROs across cohorts of patients with air or saline as initial fill mediums.

Methodology

- Patient Criteria: Patients with skin-sparing, modified radical, or nipple-sparing mastectomy followed by immediate reconstruction between 2018 - 2020.
- Primary endpoint: tissue expander removal without replacement (tissue expander loss). Secondary endpoints: specific post-operative complications. We also assessed trends in usage over time.
- PRO of choice: BREAST-Q Physical Well-Being of the Chest subscale to assess PROs preoperatively and at 2 weeks postoperatively, before air exchange to saline.
- We also assessed trends in usage over time.
- Analysis: Air and saline cohorts were compared on demographics, complications, and PROs. Propensity-matching was performed as a secondary analysis to match patients in the air-expansion cohort to patients in the saline-expansion cohort.

Results

Table 1. Complications following expansion with either air or saline as initial TE fill types in non-propensity-matched cohorts.

	Air (n = 623)	Saline (n = 305)	OR (95% CI)	p-value
Overall Complications	22.5% (140)	17.7% (54)	0.74 (0.51, 1.06)	0.103
Overall Loss	4.7% (29)	3.0% (9)	0.62 (0.26, 1.37)	0.290
Capsular Contracture	1.0% (6)	0.7% (2)	0.68 (0.07, 3.83)	1.000
TE Exposure	2.7% (17)	1.3% (4)	0.47 (0.12, 1.47)	0.240
Hematoma	2.4% (15)	2.0% (6)	0.81 (0.26, 2.25)	0.816
Cellulitis	7.2% (45)	9.5% (29)	1.35 (0.80, 2.25)	0.246
MSFN	2.4% (15)	1.3% (4)	0.54 (0.13, 1.71)	0.331
Seroma	9.8% (61)	5.9% (18)	0.58 (0.32, 1.01)	0.046

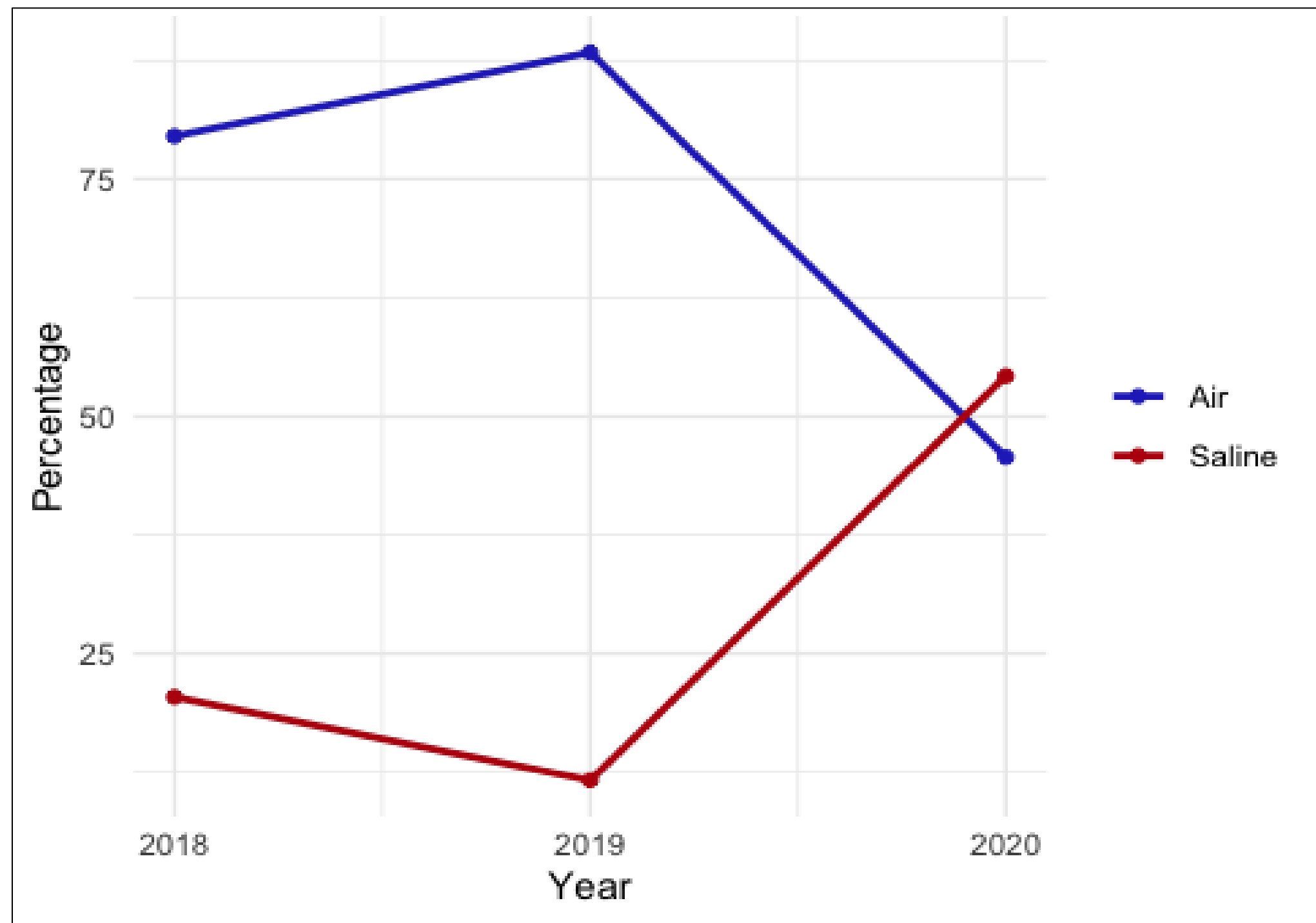
Table 2. Pre- and post-operative BREAST-Q scores following expansion with either air or saline in non-propensity-matched cohorts.

	Mean	S.D.	p-value
Preoperative (n = 320)			
Air (n = 212)	84.46	16.61	0.790
Saline (n = 108)	83.52	17.49	
2-Week Postoperative (n=466)			
Air (n=311)	57.47	17.72	0.143
Saline (n=155)	55.04	18.34	

Table 3. Complications following expansion with either air or saline as initial TE fill types following propensity matching.

	Air (n = 292)	Saline (n = 292)	OR (95% CI)	p-value
Overall Complications	21.23% (62)	17.81% (52)	0.80 (0.52, 1.24)	0.347
Overall Loss	3.77% (11)	3.08% (9)	0.81 (0.29, 2.20)	0.821
Capsular Contracture	0.69% (2)	0.69% (2)	1.00 (0.07, 13.88)	1.000
TE Exposure	3.43% (10)	1.37% (4)	0.39 (0.09, 1.38)	0.174
Hematoma	3.08% (9)	1.71% (5)	0.55 (0.14, 1.85)	0.418
Cellulitis	5.82% (17)	9.59% (28)	1.71 (0.88, 3.42)	0.120
MSFN	1.71% (5)	1.37% (4)	0.80 (0.16, 3.75)	1.000
Seroma	7.88% (23)	6.16% (18)	0.77 (0.38,1.53)	0.518

Figure 1. Air and saline usage as initial fill mediums over the duration of the study period.



Conclusions

- We found no significant difference in postoperative complication rates following initial TE fill with air or saline, especially after propensity matching.
- These findings can guide future choice of initial expansion medium.
- Our results deviate from the rationale behind utilizing air for TE fill, as we observed no difference in pain (via BREAST-Q Physical Well-Being of the Chest) or MSFN.
- The rapid decline in air-based expansion could be secondary to a lack of obvious benefit to using air and a return to traditional practice patterns.
- Future studies should examine the association between incision type and complication rates depending on choice of initial fill type.

References

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