

Peer Review File

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Reviewer Comment

Comment 1: The authors revised the manuscript in a minor way. Unfortunately there are still missing facts.

Agreeing with Reviewer A the three groups are not really comparable due to huge sample size differences. Regarding the topic of this study as a review concerning complication rates, this is quite dissatisfying.

Reply 1: Authors agree. Both reviewers commented the sample size difference in their prior comments. As suggested earlier by the Reviewer B, we have discussed this weakness of the study and added the following comment to Discussion (Page 16, from line 19): "This study has several limitations. There was a great difference in the sample size of three groups, which increases the chance of simple bias. Especially the number of patients operated with SP combined with vertical skin incision was small, which could have influenced the results."

Comment 2: I still advise a retrospective patient survey of patient satisfaction and NAC sensibility as an easily possible retrospective patient survey to make this study more complete, especially due to the before mentioned dissatisfying fact. Besides, the patient satisfaction and NAC sensibility should be further discussed with numbers/ percentages related to each technique (IP, SP, SMP) compared to other studies.

Reply 2: Authors agree that the missing evaluation of patient satisfaction and NAC sensibility is a limitation of this study. According to the Reviewer B's prior comments, we have already added a comment to Discussion (Page 16, from line 25). This study included patients who undergone operation between January 2014 and November 2020. We feel that it would be unreliable to ask patients about NAC sensibility several years after the operation because we do not have preoperative assessment of the sensibility to compare (the survey would be based on what patient remembers). In our clinic, we have not routinely tested the NAC sensibility preoperatively. The analysis of aesthetic results and NAC sensibility is a scope of our further study in which we plan to conduct both preoperative and postoperative surveys.

Comment 3: I agree with reviewer A that the incision is an important factor related to type and rate of complications but another factor is the type of suturing. How do the authors suture especially the very vulnerable tripod zone in the inverted T? Wound healing deficiencies are frequently reported in this region and the suturing method can be a factor for problems and should be further discussed.

Reply 3: Authors agree. We have now added the following information:

Patients and Methods (Page 7, from line 22): "In the inverted T, a deep dermal trifurcation suture to the tripod zone is performed. Deep dermal sutures are performed with triclosan-coated multifilament or monofilament 3-0 sutures (per surgeon preference). Running barbed resorbable sutures (4-0) are employed intracutaneously."

Results (Page 9, from line 20): "A wound healing problem was located at tripod zone in 35% of SMP and 37% of IP patients and in the middle of the inframammary fold in 35% of SP patients ($p=0.244$). Multifilament and monofilament suture was

used in 77%/23% of SMP cases, 75%/25% of IP cases and in 59%/41% of SP cases correspondingly (p=0.284).”

Discussion (Page 13, from line 12):” A suture material used in the wound closure may also have an influence in complication rates. In our study, interrupted deep dermal multifilament sutures were most commonly used in all groups. In prior studies, monofilament sutures have been associated with a lower surgical site infection than multifilament sutures, probably because bacteria can escape phagocytosis within the filament interstitials. However, studies have indicated positive effects of triclosan-coated sutures on the prevention of surgical site infection. Triclosan is an antibacterial substance that has been shown to reduce bacterial load. No significantly different rate for surgical site infection between multifilament and monofilament sutures coated with triclosan have been reported. Suture’s absorption time seemed not have an impact on incidence of complications either (21).

We used also barbed intracutaneous running suture. In prior studies, barbed sutures have been associated with slightly higher rates of minor wound complications compared to nonbarbed monofilament sutures (25.2% vs. 23.1%) in plastic surgery (22). Barbed suture was associated with higher rate of suture extrusion when sutures were placed for upper dermal approximation (22). Over 60% of our wound complication were located other place than tripod zone. Whether this is due to suture materials or approximation of suture remains to be studied.

Comment 4: There is also a limitation concerning the responsible main surgeon being either resident or board certified plastic surgeon. Is there a difference in the occurrence of complications? The rate should be analyzed and discussed.

Reply 4: We have already reported the data concerning the responsible main surgeon in:

Table 1.

	Total (N=760)		SMP (n=477)		IP (n=201)		SP (n=82)	
Operating surgeon								
Resident	293	(39)	188	(39)	83	(41)	22	(27)
Plastic surgeon	467	(61)	289	(61)	118	(59)	60	(73)

Table 3.

Included in the Model 2, which was adjusted for operative details (laterality, resected tissue, drain, operating surgeon).

	Complications			
	Minor (n=259)		Major (n=31)	
	OR	(95% CI)	OR	(95% CI)
Model 2				
Superomedial pedicle	1.00		1.00	
Inferior pedicle	1.92	(1.35-2.72)	0.73	(0.29-1.83)
Superior pedicle	0.76	(0.43-1.35)	-	
Model 1+2				
Superomedial pedicle	1.00		1.00	
Inferior pedicle	2.03	(1.41-2.91)	0.75	(0.29-1.92)
Superior pedicle	0.85	(0.47-1.53)	-	

Table 4.

	The occurrence of overall complications		
	N	n (%)	OR (95% CI)
Operating surgeon			
Resident	293	133 (45)	1.00
Plastic surgeon	467	157 (34)	0.74 (0.53-1.02)

And in Table 5.

	Patients' age			p-value
	<50 years (n=335)	≥50 years (n=425)		
Operating surgeon				0.075
Resident/trainee	141 (42)	152 (36)		
Plastic surgeon	194 (58)	273 (64)		

We have also commented this in Results: “No statistically significant effect on the complication rate could be found according to BMI, comorbidity, N-SN, drain or **operating surgeon**.” (Page 10, from line 7) and Page 10, from line 17.

Comment 5: Why were drains not used in all cases? how was this decision made? were there differences in the complication rates? this should also be analyzed in the results.

Reply 5: We have already reported the data concerning drains as follows:

Table 1.

	Total (N=760)	SMP (n=477)	IP (n=201)	SP (n=82)	p- value
Drain					0.080
No	396 (52)	256 (54)	92 (46)	48 (59)	
Yes	364 (48)	221 (46)	109 (54)	34 (41)	

Table 3.

Included in the Model 2, which was adjusted for operative details (laterality, resected tissue, drain, operating surgeon).

	Complications			
	Minor (n=259)		Major (n=31)	
	OR	(95% CI)	OR	(95% CI)
Model 2				
Superomedial pedicle	1.00		1.00	
Inferior pedicle	1.92	(1.35-2.72)	0.73	(0.29-1.83)
Superior pedicle	0.76	(0.43-1.35)	-	
Model 1+2				
Superomedial pedicle	1.00		1.00	
Inferior pedicle	2.03	(1.41-2.91)	0.75	(0.29-1.92)
Superior pedicle	0.85	(0.47-1.53)	-	

And in Table 4.

	The occurrence of overall complications		
	N	n (%)	OR (95% CI)
Drain			

No	396	141 (36)	1.00	
Yes	364	149 (41)	1.21	(0.88-1.67)

We have commented this in Results (Page 10, from line 7): “No statistically significant effect on the complication rate could be found according to BMI, comorbidity, N-SN, **drain** or operating surgeon.”

We have not discussed this further because drain seemed not to be a risk factor for increased complications.

We have also clarified this issue in Patients and Methods (Page 7, from line 15): “A closed suction drain may be used if the operating surgeon desired. The evidence-based clinical practice guideline released by the American Society of Plastic Surgeons recommends that drains should not be routinely used in breast reduction (14). We have followed this guideline and reduced the use of drains in our clinic during last few years. We use postoperative drains nowadays only rarely.”

Comment 6: Describing pros and cons, either the term "SP" or "Superior pedicle" was used. This should be clarified. First there was described "SP" and then "Superior Pedicle on the other hand, ..." this is confusing.

Grammatically better is the following "The or this technique..." instead of "Technique can also be..." throughout the manuscript. I advise grammatical changes throughout the whole manuscript.

Reply 6: We have now performed changes as advised and indicated them in the text with blue color.

Comment 7: There are still missing facts concerning description of pros and cons of the three techniques (IP, SP, SMP) especially facts and numbers/percentages of complication rates of each technique in other high-ranked publications compared to the results of the current study. This is the main topic of the study and should be extensively discussed focusing on each technique and pedicle!!!

Reply 7: We have now added facts and numbers/percentages of complications and discussed the issue as follows:

Page 11, from line 16: “When comparing our complication rates of different techniques separately to prior studies, our rates and profile of major complications are comparable, but rates for minor complications are higher. The prior study by Bauermeister et al. (2018) with 938 reduction mammoplasties with the SMP technique combined with Wise pattern incision reported the overall complication rate of 16%, of which 10% were minor (2). Our complication rates for minor and major complications in the SMP technique were 31%/5% correspondingly. Considering the SP technique with vertical skin incision, we had 22% rate for complications, which all were minor. Klinger et al. (2020) have reported an analysis of 832 patients undergoing SP breast reduction. In that study, the rate for seroma was 2%, deep infection 1%, hematoma 0.5%, necrosis 3% and wound dehiscence 5.1% (17). Several studies have also evaluated complication rates in IP with Wise pattern. Antony et al. (2013) reported this technique to have 3% major and 24% minor complication rate (18). In a study by Bustos et al. 2021, the overall complication rate for IP was 14.8% including seroma 3.3%, hematoma 1.6%, deep infection 2.1%, 5.6% wound dehiscence and necrosis 2% (19). In our study, the overall complication rate for IP with Wise pattern was 50%. Of these 47% were minor complications.

This difference in complication rates might be the result of standard study variability, study population heterogeneity or differing thresholds for the diagnosis of a complication. We were able to see our patients with postoperative problems in our consulting room and scored all postoperative complications using Clavien-Dindo classification, which defines a complication as any deviation from the normal postoperative course. Larger-cohort database studies may not even capture conservatively managed small wound healing problems and therefore likely underestimates patients with these issues (7). Yet, every operation and hospital visit involve the use of healthcare resources.

Prior studies have also reported results comparing complications associated with vertical and Wise pattern skin incisions. In the study by Cunnigham et al., vertical incision technique was associated with an increased complication frequency (20). An overall incidence of complications was 43% including delayed wound healing 21.6%, spitting sutures 9.2%, hematoma 3.7%, necrosis 5.4%, seroma 1.2% and infection 1.2%. In this study, IP technique was used in 78% and SP in 32% of patients. Kulkarni et al. (2019) reported also higher complication rate for vertical incision (36.4%) compared to Wise pattern (20.4%) incision. In this study, Wise pattern incision was combined either with IP or SMP and vertical pattern with SP (1). On the other hand, a meta-analysis performed by Li et al. (2021) reported that a vertical scar approach resulted in a statistically lower rate of overall complications and wound dehiscence. In that study, the used pedicle was not identified (12). Our results agree with this study.

The wound complications have been reported to occur commonly at the point of greatest stress or tension on the closure. Especially in the IP with inverted T skin incision the tension lies to skin over the breast parenchyma to maintain the desired shape. The use of suspended gland in SP technique reduces the strain on the skin, which results the benefit to avoiding wound dehiscence and promoting wound healing. In the SMP technique combined with inverted T incision the main support is also glandular but the closure of skin flaps at a single point creates excess tension and possibility for wound break down at that point (12). In our study, 35-37% of wound healing problems were located in the middle of the inframammary fold. There were no statistically significant difference between groups.”

Comment 8: In the results section the tripod zone wound healing problems should be added for each technique.

Reply 8: We have now added this information to Results and discussed the issue in Discussion as follows:

Page 9, from line 20: “A wound healing problem was located at tripod zone in 35% of SMP and 37% of IP patients and in the middle of the inframammary fold in 35% of SP patients ($p=0.244$). Multifilament and monofilament suture was used in 77%/23% of SMP cases, 75%/25% of IP cases and in 59%/41% of SP cases correspondingly ($p=0.284$).”

Page 13, from line 3: “The wound complications have been reported to occur commonly at the point of greatest stress or tension on the closure. Especially in the IP with inverted T skin incision the tension lies to skin over the breast parenchyma to maintain the desired shape. The use of suspended gland in SP technique reduces the strain on the skin, which results the benefit to avoiding wound dehiscence and promoting wound healing. In the SMP technique combined

with inverted T incision the main support is also glandular but the closure of skin flaps at a single point creates excess tension and possibility for wound break down at that point (12). In our study, 35-37% of wound healing problems were located in the middle of the inframammary fold. There were no statistically significant difference between groups.

A suture material used in the wound closure may also have an influence in complication rates. In our study, interrupted deep dermal multifilament sutures were most commonly used in all groups. In prior studies, monofilament sutures have been associated with a lower surgical site infection than multifilament sutures, probably because bacteria can escape phagocytosis within the filament interstitials. However, studies have indicated positive effects of triclosan-coated sutures on the prevention of surgical site infection. Triclosan is an antibacterial substance that has been shown to reduce bacterial load. No significantly different rate for surgical site infection between multifilament and monofilament sutures coated with triclosan have been reported. Suture's absorption time seemed not have an impact on incidence of complications either (21).

We used also barbed intracutaneous running suture. In prior studies, barbed sutures have been associated with slightly higher rates of minor wound complications compared to nonbarbed monofilament sutures (25.2% vs. 23.1%) in plastic surgery (22). Barbed suture was associated with higher rate of suture extrusion when sutures were placed for upper dermal approximation (22). Over 60% of our wound complication were located other place than tripod zone. Whether this is due to suture materials or approximation of suture remains to be studied."

Comment 9: Still there should be patient examples added due to representative patient examples for each technique in a comparative study concerning three different techniques with pre and post-op pictures in (frontal view, 45 degree oblique from left and right) which are standard perspectives in breast surgery. A describing patient example text is definitely NOT sufficient in plastic surgery and very disappointing.

Reply 9: We have now added pictures as suggested by the Reviewer (Figures 1 and 2). Thumbnail photographs below.

Figure 1. A typical patient for reduction with IP (top), SMP (middle) and SP (bottom) techniques.



Figure 2. Postoperative result after reduction with IP (top) and SMP (middle) techniques. Right breast operated with the SP technique (bottom) and fat injections performed to left reconstructed breast.



Comment 10: The authors mention "preventive measures to patient*s unique risk factors" in their conclusion. These should be discussed before and clarified.

Reply 10: We decided to modify the sentence to clarify it as follows: “The variety of patients undergoing reduction mammoplasty is broad and careful consideration of the best technique and informing the patient about possible complications is important.” (Page 17, from line 15).