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Advanced age (≥60 years) is not associated with an increased risk of post-operative complications in breast reduction surgery: a comparative study on 756 patients

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Running tittle: Age is not a risk factor in reduction mammaplasty

Key Words: breast reduction, age, macromastia, complication risk, reduction mammoplasty

Abstract

Few studies have been published regarding advanced age as risk factor and conclusions have been controversial. As the population ages, the number of elderly patients suffering from macromastia increases and furthermore the number of patients that could benefit from reduction mammoplasty grows. Therefore, it is important to find out whether advanced age might be a complication risk. The aim of this study was to evaluate the impact of age on breast reduction surgery outcomes.

An institutional review board-approved retrospective cohort study was performed and a total 756 patients were included in this study. Procedures were performed between 2005 and 2014 at the Turku University Hospital in Finland. Data was collected from patient files and anaesthetic forms. Patients were divided into two groups on the basis of age: women ≥60 years old (122 patients) and women <60 years old (634 patients).

There was no significant difference in major complications among the two groups (Clavien-Dindo grade II to IV). Similarly, the number of patients with complications in elderly group was 53 while it was 228 in non-elderly group (43.4% vs. 36.0%. p=0.125). However, the only significant difference among minor complications (Clavien-Dindo grade I) was the fat necrosis occurrence in elderly patients (8.20% vs. 3.63%, p=0.032), which did not require any procedures and was treated conservatively. We did not detect any significant difference in late complications or reoperation rates.

Based on our results advanced age (≥60 years) is not associated with overall worse outcomes in patients undergoing reduction mammoplasty.

Introduction

Reduction mammoplasty is 8th common operative procedure in plastic surgery (4.4% of all plastic surgical procedures) (1). It has been proven to be very efficient at relieving neck, shoulder and back pain, headache, posture problems, intertrigo, grooving at shoulder site and discomfort in exercising (2-7). Smaller breasts reduce also psychosocial problems, increase work ability and improve quality of life (2-9). Preoperative factors like increased BMI, tobacco use and greater weight of the surgical breast resection have been related to higher complication rate after breast reduction surgery (10-12). However, reduction mammoplasty is usually considered to be relatively safe operation.

As the population ages number of elderly patients suffering from macromastia increases and, furthermore, the number of patients that could benefit from breast reduction surgery grows (13,14). Clarifying whether there is a relationship between advanced age and increased complication risk after breast reduction might expand patients' selection criteria and help to improve postoperative outcomes. There have been only a few studies regarding advanced age as risk factor in reduction mammoplasty and the conclusions have been controversial. We hypothesized that elderly patients experience similar complications rates and outcomes compared to the younger ones.

Material and Methods

We performed an institutional review board-approved retrospective cohort study, evaluating 756 consecutive patients who underwent breast reduction surgery. Patients were operated

between 2005 and 2014 at the Turku University Hospital in Finland. All patient data were collected from patient files and aesthetic forms. Inclusion criteria included an age greater than or equal to 18 years, and a primarily bilateral breast reduction was performed for medical reasons. Exclusion criteria included patients who underwent mastopexy, asymmetry, secondary procedures and revisions.

Electronic medical records were reviewed for patient characteristics, including age at the time of surgery, body mass index (BMI), and American Society of Anaesthesiology (ASA) score, medical comorbidities, active smoking status, number of children, operative time, blood loss during operation, weight of breast resections and follow up time. Obesity was a body mass index (BMI) greater than or equal to 30 kg/m^2. Any patient who smoked tobacco within 1 month of surgery was considered an active smoker. Surgical characteristics included the type of pedicle and type of suture material and techniques used.

Patients were divided into two groups on the basis of age. There is a different meaning to "old" in different societies and there is no exact definition to it. By age 60, losses in seeing, hearing, moving and age-related chronic diseases generalize (14). United Nations has approved age 60+ to refer older population (15). For that purpose, our elderly group consisted of patients 60 years and older. Elderly group (women ≥ 60 years old) included 122 patients (16.1%), while non-elderly group (women younger than 60 years) consisted 634 patients (83.9%). We defined the elderly group as the experimental group and the younger group (<60 years) as the control group and the outcomes between these two groups were compared.

The primary outcome variable was the occurrence of any surgical complications at 30-days follow-up, including those identified in the outpatient setting. Secondary outcomes included specific surgical site occurrence like wound dehiscence and infection, hematoma, seroma, haemorrhage (bleeding which needed blood transfusion), fat necrosis, nipple necrosis and, late issues such as scarring, dog ear formation and breast asymmetry.

We rated the early postoperative complications (≤30 days) using Clavien-Dindo grading system (16,17); superficial wound infection, fat necrosis and wound dehiscence were defined as Grade I, haemorrhage (need for transfusion), seroma, hematoma and deep wound infection as Grade II, surgical treatment requiring hematoma, deep wound infection, wound dehiscence and nipple necrosis as Grade III, and finally pulmonary embolism as Grade IV complication (Table 1). In our study there was no Grade V complications. Major complications were defined as those meeting the criterion of grade II or higher according to the Clavien-Dindo classification.

Superficial infection did not need antibiotic treatment and healed with conservative care or cleaning the surgical wound at outpatient clinic (Clavien-Dindo grade I). Deep wound infection had local or systemic symptoms and needed antibiotic treatment (Clavien-Dindo grade II) or antibiotics combined with surgical revision of the wound (Clavien-Dindo grade III). Fat necrosis, a benign inflammatory adipose tissue reaction at surgical site, was considered as a palpable mass in operated breast which was confirmed with ultrasound. Fat necrosis did not need any treatment (Clavien-Dindo grade I) but in some cases a surgical intervention was required (Clavien-Dindo grade III). Wound dehiscence was treated conservatively on most of the patients (Clavien-Dindo grade I) and only few cases needed surgical revision (Clavien-Dindo grade III). Seroma, a pocket of serous fluid at operated site, was aspirated percutaneously if palpable and symptomatic (Clavien-Dindo grade II). Haematoma, a surgical site blood collection, was also confirmed with ultrasound. Smaller symptomatic ones were treated with percutaneous aspiration (Clavien-Dindo grade II) and larger ones with surgical evacuation (Clavien-Dindo grade III).

Statistical analysis

The results of parametric and nonparametric data were expressed as mean ± standard deviation (SD) and IBM SPSS statistical software (IBM SPSS 20.0.0.1, Chicago, Illinois 60606, U.S.A) was used for all statistical analyses. Confidence intervals were set at 95%. A two-sided *P* value of ≤ 0.05 was considered as statistically significant. Comparisons between both groups were determined using chi-square or Fisher's exact test for discrete variables as appropriate and Student's t-test for continuous variables.

Results

The average age of the elderly patients was 64.11+/-4.31 years while in non-elderly group it was 41.90+/-10.43 years (Table 1). Mean BMI among older patients was 28.55+/-3.22 kg/m^2 and 27.77+/-3.32 kg/m^2 in the younger group. Elderly patients had significantly more comorbidies, like diabetes, than the younger group. Operative time was longer (133.75±38.94min vs. 126.62±31.72min, p=0.035) and resection weight amounts were greater within elderly group (748.54±293.98g vs. 641.74±319.40g, p<0.001) (Table 2).

There was no significant difference in major complications among the two groups (Clavien-Dindo grade II to IV). Similarly, the number of patients with complications in elderly group was 53 while it was 228 in non-elderly group (43,4% vs. 36,0%. p=0,125) (Table 3). However, the only significant difference among minor complications was the fat necrosis occurrence in elderly patients (8.20% vs. 3.63%, p=0.032), which did not require any procedures and was treated conservatively with expectation. There was no significant difference between the groups regarding other complications like wound dehiscence, wound infection rate, blood transfusion demand or nipple necrosis. We did not detect any significant difference in late complications or reoperation rates (Table 4).

Discussion

Our study indicates that advanced age may not be related to overall increased complication risk after breast reduction surgery. Even though the elderly patients had more comorbidies, we found no significant difference in complication rates between the two groups. The greater resection weight might be the reason why there was more fat necrosis among the elderly group (18). However, fat necrosis is minor complication and it usually doesn't need any further follow up or treatment. Why were the resection weights greater in elderly group, might be due to the fact that elderly patients usually like to reduce their breast size as much as safely possible while younger patients are often more careful with the reduction size.

Other studies have shown similar results to our findings (13, 18, 19, 20). In one large study on this topic, Nelson et al. (13) found no correlation between any surgical complications and age ($p=0.26$). It was based on data from the ACS NSQIP-database and included 3547 breast reduction patients between years 2005-2010 in their analysis, therefore, considering only 30-day follow-up and without taking into account late postoperative complications including scarring and revision surgeries (13). Lewin et al. (18) found significantly higher rate of fat and nipple necrosis among the elderly patients in their study but with further statistical analyses confirmed age not being an independent risk factor.

Some studies have shown controversial results compared to our study (21, 22, 23). Shermak et al. (21) reported in their retrospective study including 1192 patients that women over 50 years of age had significantly more postoperative infections ($p=0.003$) and suggested that wound healing might also be weakened ($p=0.09$). They thought that postmenopausal hormonal changes might have something to do with the findings. In another smaller study enrolling 67 patients, Srinivasaiah et al. (22) found that older age ($p=0.004$), higher BMI, smoking and increased surgical resection weight are definite risk factors predicting

postoperative complications after breast reduction surgery. Cunningham et al. (23) found that age correlating inversely with wound healing problems and acknowledged that the results were against on what previously reported on the wound healing literature.

There have been some studies regarding the “super-elderly” patients (80 years and older) suggesting age being an independent risk factor for increased postoperative complication rate after major surgery (24-27). J. G. Hunter (28) noticed in his commentary that Nelson et al. (13)had average age 65.1 +/- 4.7 years of their elderly cohorts and so the patients were mainly “young-old” (60-69 years old). The same effect was found in our study where the average age of elderly group was 64.11 +/-4.31 years. It is most likely that the same phenomenon is present in other studies as well because it is clear that women over 70 years of age are not as likely to get their breasts operated as the women between 60 and 70 years old. Based on our results, we could assume that women between 60 and 70 years old can be operated safely and there is no an increased risk for postoperative complications. Further studies are needed to possibly clarify differences among age groups in elderly patients (>60 years).

There have been many theories proposing why elderly patients are more prone to postoperative complications. It has been suggested that as people age, they become frail, relatively immunosuppressed, susceptible to infections and their resources for healing decreases (29, 30). On the other hand, it is clear that comorbidity rises with the age and it has been implied that comorbidity is a better predictor of impaired immunity than age by itself (31). In addition, the increase of obesity prevalence in elderly people might play a role (32). Therefore, there will also be more senior patients with greater BMI and consequently macromastia, with part of them obese (BMI >30), which is a predictive factor for postoperative complications (33).

The strength of this study includes a large size of the patient data set, the use of Clavien-Dindo complication grading system, the long follow-up, which took into account also late postoperative complications.

However, there were some restrictions like lacking patient satisfaction data and study not being randomized nor multivariable regression analysed.

Despite the limitations, our results indicate that age (>60 years) is not associated with overall worse outcomes in patients undergoing reduction mammoplasty. Therefore, it seems like age alone cannot be considered as an independent risk factor when evaluating preoperative risks of breast reduction surgery. Thus, it is very important to evaluate every patient individually and consider all risk factors that patient has together. However, there is no information regarding reduction mammoplasty among different elderly age groups, like the "middle old" and "super-elderly" patients and, thus, further studies on this topic are warranted. The role of postmenopausal hormonal changes on postoperative complications after reduction mammaplasty should be investigated as well.

Conclusions

Advanced age (>60 years) is not associated with overall worse outcomes after reduction mammoplasty procedures. Therefore, it seems that age alone cannot be considered an independent risk factor when evaluating preoperative risks of reduction mammoplasty. Patient should be individually evaluated and counselled for individual risk factors.

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Table 1: Demographics of the patients at time of the study

	Elderly group (n=122)	Non-elderly group (n=634)	p-value
Age (mean ± SD)	64.11±4.31	41.90±10.43	<0.001
Mean BMI (kg/m²)	28.55±3.22	27.77±3.32	<0.017
Mean Weight (kg)	75.79±10.16	75.55±10.26	0.815
Number of children	1.62±1.39	1.45±1.19	0.188
Diabetics	10 (8.2%)	6 (0.9%)	<0.001
Depression	14 (11.5%)	71 (11.2%)	0.876
Other comorbidities	105 (86.1%)	345 (54.4%)	<0.001
Smokers	12 (9.8%)	105 (16.6%)	0.074
Herbal supplement	1 (0.8%)	2 (0.3%)	0.410
Follow-up (months)	3.31±4.81	4.33±6.69	0.107

Table 2: Comparison of peri-operative parameters between the two groups of patients

	Elderly group (n=122)	Non-elderly group (n=634)	p-value
Operative time (min, mean ± SD)	133.75±38.94	126.62±31.77	0.035
Resection weight from right breast (g, mean ± SD)	748.54±293.98	641.74±319.40	<0.001
Resection weight from left breast (g, mean ± SD)	744.79±284.38	652.56±323.41	0.004
Blood loss (ml, mean ± SD)	331.79±192.82	315.84±194.04	0.438

Table 3: Postoperative complication <30 days*

	Elderly group (n=122)	Non-elderly group (n=634)	p-value*
Patients with complications	53 (43.4%)	228 (36.0%)	0.125
Overall number of complications	84	486	
All complications classified			
Clavien-Dindo grade I	56	307	0.692
Superficial wound infection	23 (18.6%)	143 (22.6%)	0.405
Wound dehiscence	23 (18.6%)	141 (22.2%)	0.472
Fat necrosis	10 (8.2%)	23 (3.6%)	0.032
Clavien-Dindo grade II	18	125	0.255
Haemorrhage (need for transfusion)	1 (0.8%)	7 (1.1%)	1.000
Hematoma/Seroma	5 (4.1%)	28 (4.4%)	1.000
Deep wound infection	12 (9.8%)	90 (14.2%)	0.246
Clavien-Dindo grade III	10	53	0.951
Hematoma	3 (2.5%)	23 (3.6%)	0.785
Deep wound infection	3 (2.5%)	5 (0.8%)	0.123
Wound dehiscence	2 (1.6%)	13 (2.1%)	1.000
Nipple necrosis	2 (1.6%)	12 (1.9%)	1.000
Clavien-Dindo grade IV	0	1	1.000
Pulmonary embolism	0	1 (0.2%)	1.000
Clavien-Dindo grade V	0	0	1.000
None	0	0	1.000

*Fisher's exact test

Table 4: Late postoperative complications >30 days

	Elderly group (n=122)	Non-elderly group (n=634)	p-value*
Wound revision	1 (0.8%)	3 (0.5%)	0.505
Dog ear excision	12 (9.8%)	77 (12.1%)	0.542
Total re-operations	13 (10.7%)	80 (12.6%)	0.464

*Fisher's exact test