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ARTICLE

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Mastectomy is a safe procedure in transgender men with a history of breast reduction

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ABSTRACT

Little is known about the safety and surgical outcomes of mastectomy after breast reduction in the trans male population. Several concerns have been voiced that performing mastectomy with prior breast reduction surgery, increases the risk for complications and revision surgery. All transgender men with a history of breast reduction, who underwent a mastectomy at our center between 01-1990 and 01-2021 were identified from our hospital registry. A retrospective chart study was conducted recording surgical characteristics, surgical complications, revision surgery, and clinical follow-up. A total of 1362 subcutaneous mastectomies were performed between 01-1990 and 01-2021. A total of 36 (2.6%) individuals were included (35 bilateral and 1 unilateral breast reduction). The mean age at mastectomy was 37 ± 10 years, and the median time between breast reduction and mastectomy was 6.3 years (range 1.0–31.1). Most individuals underwent a Wise-pattern breast reduction (91%) and a double incision mastectomy with free nipple grafts (86%). Following mastectomy, one acute reoperation was performed because of hemorrhage (3%). Partial pedicled nipple necrosis was seen in 7% and (partial) non-take of nipple grafts in 4%. Scar revisions were performed in 9%, dogear corrections in 20%, and both nipple corrections, and contour corrections in 6%. When comparing the outcomes in literature for surgical complications, scar revision, contour correction or nipple areolar complex revision, no clear disadvantage seems to be present when performing mastectomy after breast reduction. Mastectomy is a safe procedure in transgender men with a history of breast reduction.

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Introduction

Mastectomy, regularly referred to as 'top surgery', is the most frequently requested and performed gender-affirming surgical procedure in transgender men [1,2]. Mastectomies are generally performed to increase quality of life and decrease gender dysphoric burden [3,4]. Historically, many different gender-affirming mastectomy techniques have been described [5–7]. Surgical techniques may vary based on anatomical factors (breast size, ptosis, and skin quality), surgical history, the preference of the transgender individual, and the surgeons' own experience and inclination. Generally, the most frequently chosen techniques for large-to-medium, medium-to-small, and small sized breasts are respectively double incision mastectomy (with free nipple grafts or pedicled nipple-areolar complex (NAC)), donut or batwing mastectomy, and peri-areolar incision mastectomy [8,9]. These different techniques are known to differ in complication and revision rates. In our experience, the most common corrective procedures after gender-affirming mastectomies are secondary scar revisions, chest contouring, and nipple corrections [6,10].

Prior to undergoing gender-affirming mastectomy, transgender men may have opted for breast reduction surgery. Reasons to seek breast reduction surgery prior to a mastectomy can be having large breasts, resulting in physical complaints, or more specifically in this population, breast dysphoria as an expression of gender dysphoria. In some clinics, especially in the past, breast reduction was offered as 'top surgery', as there was little or no experience with gender-affirming mastectomy. Resultantly, having undergone breast reduction surgery prior to a gender-affirming mastectomy may limit the available mastectomy techniques that are commonly used in transgender individuals. Some concerns are present that performing mastectomy with prior breast reduction surgery, increases the risk of complications and revision surgery [11,12]. Furthermore, the previous use of a NAC-bearing pedicle during breast reduction may endanger NAC vascularization and vitality during pedicled NAC mastectomy [13].

This study aims to present our experience with performing mastectomies following breast reduction surgery in transgender male individuals. These insights will help to shape and establish a broader understanding of this sequential approach to chest masculinization.

Material and methods

Retrospective chart study

All transgender men with a history of breast reduction, who underwent mastectomy in our institution between 1990 and 2021 were retrospectively identified from a departmental database on

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subcutaneous mastectomy. A systematic retrospective chart review was conducted, recording the following data:

- Surgical characteristics of the breast reduction procedure,
- Individual characteristics at time of mastectomy (BMI, history of smoking, somatic and breast size, ptosis degree),
- Surgical characteristics of the mastectomy procedure (surgical technique, resection weight),
- Intra- and postoperative complications, with short-term and long-term complications being respectively defined as complication occurrence before and after 3 months follow-up.
- Reoperations (type of procedure, under general or local anesthesia, time between mastectomy and reoperation), and
- Clinical follow-up.

Statistical analyses

Descriptive statistics were used for the outcomes. Continuous Gaussian variables were presented as means and standard deviations (SD), continuous non-Gaussian variables as medians and ranges. Categorical data were presented as frequencies and percentages. IMB SPSS software Version 26.0 (IBM Corp., Armonk, N.Y.) was used to calculate the outcomes.

Ethical statement

The treatment of transgender individuals in our center is in accordance with the Standard of Care set by the World Professional Association of Transgender Health (WPATH) [14]. Furthermore, this study performed in accordance with the Declaration of Helsinki and guidelines for Good Clinical Practice. The study protocol was assessed and approved by the Ethical Review Board of the Amsterdam UMC, VU University Medical Center, and is registered under METC 2014.322.

Results

Demographic and surgical data

A total of 1362 subcutaneous mastectomies were performed between 01-1990 and 01-2021. From this database, a total of 36 individuals were identified who had prior breast reduction surgery (2.6%). Demographic and surgical data are presented in Table 1. All but one individual had a prior bilateral breast reduction in their surgical history. None of the included individuals underwent breast reduction surgery at our institution. The Wise-pattern with pedicled NAC was the most commonly performed breast reduction technique (94%), followed by one each for the Wise-technique with free nipple graft and the Regnault-B approach. The median time between breast reduction and mastectomy was 6.3 years (1.0–31.1). The estimated cup sizes before mastectomy were most commonly cup C (39%) or larger than D (31%) with a ptosis grade 3 breast shape (50%). A minority (17%) underwent mastectomy combined with a total laparoscopic hysterectomy and bilateral salpingo-oophorectomy, and one individual had a mastectomy-abdominoplasty combined procedure.

An example of the pre- and postoperative chest is presented in Figure 1. The double incision mastectomy was the most commonly performed mastectomy technique (86%), of which the free nipple grafts were more frequently performed (75%) than the pedicled NAC (11%). The concentric circular and Regnault B were performed once each. A Wise-approach was performed on three individuals, one with a pedicled NAC and two with a free nipple graft, of which one was a converted pedicled NAC.

Complications

A total of eleven surgical complications were registered, all within 3 months following the mastectomy. An overview of the complications is shown in Table 2. One of which was hemorrhage requiring re-operation. No surgical site infections were observed, but in one individual, infected seroma was treated with aspiration and oral antibiotics. Seroma development was also registered in six other individuals, which were also treated through aspiration. One partial nipple necrosis (1/14; 7%) was seen in an individual who had received a pedicled-NAC mastectomy. In the free-grafted nipple group, two (partial) non-takes of free nipple grafts (2/58; 4%) were observed.

Revision surgery

Revision surgery was most easily divided into; (1) surgical scar revision, (2) surgical dogear correction, (3) secondary nipple correction, and (4) secondary contour correction. An overview of the revision surgeries is shown in Table 2. Surgical scar revisions were performed three times. Dogear corrections were performed on a total of seven individuals. Furthermore, nipple corrections were performed twice; one was fine-tuning the areolar size by tattooing and the second was a nipple shape correction under local anesthesia. None of the nipple corrections were the result of (partial) nipple necrosis. Lastly, a contour correction was performed in two individuals through the means of liposuction and lipofilling of the chest.

Discussion

In this study, the results of performing subcutaneous mastectomies in transgender men who had undergone prior breast reduction surgery is described. The outcomes indicate that especially performing a double incision mastectomy following breast reduction surgery does not result in an increased risk for surgical complications, (partial) nipple necrosis, or revision surgery. To date, this is the biggest cohort of transgender men who received this sequential approach to top surgery.

Surgical complications

Surgical complications were predominantly minor, with outcomes similar to the numbers found in the literature and previous reports from our center [6,9,10,15,16]. One reoperation (hemorrhage (3%)) was necessary, which is comparable to previously reported acute reoperation rates of 4.8% for double-incision mastectomy and 10.3% for skin-sparing mastectomy techniques [17]. Furthermore, the outcomes of this cohort showed similar complication rates and no increased risk for pedicled NAC necrosis in pedicled NAC-mastectomies. Dogear corrections (19%) were the most common secondary procedure followed by scar revision surgery (8%). In the literature, rates for secondary corrections range from 19%-55%, and 62% when prior breast surgery had been performed [9–11,16,18]. Importantly, different mastectomy techniques are known to show different revision rates, whilst the literature generally does not provide details on the types of performed revision surgery [6,10,16–18]. The known need for scar revision ranges from 2.2%-25.9%, contour corrections from 0.25%-41.4%, and nipple corrections from 0.9%-34.8% [6,9,16,19,20]. When comparing the known outcomes with our results (scar revision, contour correction, or NAC revision), no clear disadvantage seems to be present when performing mastectomies after breast reductions.

Table 1. Demographics of included individuals.

Mean age at mastectomy ± SD	37 ± 10
Mean BMI at mastectomy, kg/m^2 ± SD	28.0 ± 3.7
Documented history of smoking, n (%)	15 (42%)
Somatic comorbidities	
Chronic obstructive pulmonary disease	1 (3%)
Pulmonary embolism	1 (3%)
Sarcoidosis	1 (3%)
Hypothyroidism	1 (3%)
Hepatitis A	1 (3%)
Inflammatory bowel disease	1 (3%)
Ischemic stroke	1 (3%)
Hypertension	2 (6%)
Breast reduction technique	
Bilateral	35
Wise pattern with pedicled nipple-areolar complex	33
Wise pattern with nipple graft	1
Regnault B	1
Unilateral	1
Wise pattern with pedicled nipple-areolar complex	1
Median time between reduction and mastectomy, (range)	6.3 (1.0-31.1)
Cup size at mastectomy, n (%)	
A	1 (3%)
B	6 (17%)
C	14 (39%)
D	4 (11%)
>D	11 (31%)
Breast ptosis, n (%)	
Grade 1	1 (3%)
Grade 2	14 (39%)
Grade 3	18 (50%)
Unknown	3 (3%)
Concurrent surgical procedures, n (%)	
Mastectomy only	29 (81%)
Mastectomy combined with TLH-BSO	6 (17%)
Mastectomy combined with abdominoplasty	1 (3%)
Mastectomy subtechnique, n (%)	
Double incision	31 (86%)
Free nipple graft	27 (75%)
Pedicled nipple areolar complex	4 (11%)
Donut	1 (3%)
Regnault B	1 (3%)
Wise	3 (8%)
Free nipple graft	1 (3%)
Pedicled nipple-areolar complex	1 (3%)
Wise reduction pattern with free nipple graft and additional liposuction[a]	1 (3%)
Mean resection weight per breast, g ± SD	597 ± 292

[a]Conversion from a pedicled nipple-areolar complex to nipple grafting due to intraoperative vascular compromise.

Figure 1. Results after the breast reduction and sequential gender-affirming mastectomy at one year follow-up.

Several concerns have been raised about increased complication and revision rates when prior breast surgery had been performed in subcutaneous mastectomy patients [11,12,21]. The study by Whitehead et al. reported that prior breast surgery was a significant overall predictor for both minor and major complications (hematoma and NAC necrosis). Unfortunately, a statistical

Table 2. Complications and revision surgery after gender-affirming mastectomy.

Complications	
Hemorrhage, for which return to theatre[a,c]	1 (3%)
Surgical site infection[a]	–
Seroma, for which aspiration[a]	6 (17%)
Infected seroma, for which aspiration and antibiotical treatment[a]	1 (3%)
(Partial) necrosis of pedicled nipple-areolar complex[b]	1/14 (7%)
Partial non-take of nipple graft[b]	2/58 (4%)
Revision surgery[a]	
Surgical scar revision	3 (8%)
Under local anesthesia	1 (3%)
Under general anesthesia during other gender-related operation	1 (3%)
Under general anesthesia	1 (3%)
Surgical dogear correction	7 (20%)
Under local anesthesia	5 (14%)
Under general anesthesia during other gender-related operation	1 (3%)
Under general anesthesia	1 (3%)
Secondary nipple correction	2 (6%)
Tattoo	1 (3%)
Correction of nipple shape under local anesthesia	1 (3%)
Secondary contour correction	2 (6%)
Liposuction/lipofilling under general anesthesia	2 (6%)

[a]Depicted per individual, [b]depicted per breast, [c]Mastectomy type: Double incision with free nipple grafts.

comparison was not possible as key defining characteristics were missing. The study by Donato et al. presented a more in-depth analysis of risk factors for complications and revision rates and showed a significant association between prior breast surgery and the need for revision surgery [11]. The revision rate was reported to be 69%, versus 31% in those without prior breast surgery. This revision rate in our cohort is noticeably lower. This might be due to differences in practice, such as mastectomy choice, patient counseling, and expectation management. They also were one of the first studies to voice their concern that prior surgery on the breast leaves scars that make optimal skin resection and scar placement more challenging. This was not shown in our cohort. A possible explanation might be due to their small sample, resulting in an overstated proportion of people needing revision surgery.

Surgical considerations

Salim et al. stated that individuals with prior breast reduction surgery are also at greater risk for revision surgery [21]. They relate this difficulty to pre-existing scars, which can result in wound healing compromising skin tension. In this case series of five participants, one underwent nipple and scar revision. In another individual, they were unable to excise all breast reduction scars. Factors such as individual preference, breast and skin properties help to distill the most effective mastectomy approach. In our cohort, the group who was eligible for minimal scar remained very limited, as the double incision mastectomy represent represents 87% of the sample. Therefore, the level of evidence of our results for these other types of mastectomies remains limited. In almost all cases, proper physical examination and a well-considered mastectomy technique will allow a weighted prediction of possible residual scars and the location of new mastectomy scars.

There are some preoperative considerations worth discussing. Performing a double incision mastectomy may lead to an areolar remnant in the cranial flap. If suitable, other mastectomy techniques such as the batwing technique can be performed. A double incision mastectomy with a higher scar is also an option. A third option is performing a 'standard' double incision mastectomy and incorporating a small vertical triangle/pillar to excise the remaining NAC. All these alternative options should be discussed with the transgender individual. Regardless of these technical alterations, our experiences taught us that skin elasticity after reduction surgery is often still adequate, especially in combination with adequate cranial dissection of the skin flaps.

Evaluation of practice

The aspect of gender dysphoria, or more specifically the presence of breast dysphoria is worthwhile discussing. Unfortunately, no records were present regarding the initial motivation for breast reduction surgery. However, we understand that breast reduction surgery in transgender individuals can result from several different motives. While breast dysphoria might not be actively linked to gender identity, it may be the first step into gender self-exploration and expression. This especially holds true for individuals with large breasts with only limited binding options for "*passability*". Nevertheless, the sequential approach to a full subcutaneous mastectomy increases the likelihood of breast reduction scars that are difficult or impossible to remove with the current mastectomy techniques. This greatly emphasizes the need for proper expectation management on scarring and counseling on possible additional interventions required to achieve an envisioned result.

Limitations and strengths

This study had several limitations such as the retrospective design and the lack of patient-reported outcome measures on scarring, cosmetic result, and general satisfaction. Due to sample sizes, the results reflect a higher level of evidence for double incision mastectomies than the other mastectomy techniques. A strength lies in the fact that the data was extracted from a high-volume gender clinic, that provides the majority of gender-affirming surgeries in the Netherlands. Therefore, we expect little to no inclusion loss of individuals with breast reduction prior to a subcutaneous mastectomy. This is especially important since this presentation remains rare and we are also able to provide a long clinical follow-up time. To conclude, gender-affirming mastectomy, following a prior breast reduction, is a safe and viable treatment option without an apparent increased risk for the individual. Proper counseling and expectation management on possible resulting scars due to prior breast surgery might help reduce the request and need for revision surgery.

Listing of each author's role/participation in the authorship of the manuscript

All authors contributed to the final design of the manuscript, interpreted data, and helped draft the final manuscript, and revised it critically in equal measure as a group effort. All authors approve the final version to be published and agree to be accountable for all aspects of the work related to its accuracy and integrity.

Statement of institutional review board approval and/or statement of conforming to the declaration of Helsinki

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Study registration

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Disclosure statement

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