



High BMI as risk factor in mastectomy in transmasculine individuals: a retrospective matched case-control study

Wouter B. van der Sluis^{a,b,c}, Naomi van Hout^{a,b,d} and Mark-Bram Bouman^{a,b,c}

^aDepartment of Plastic, Reconstructive and Hand Surgery, Amsterdam University Medical Center, Amsterdam, The Netherlands; ^bCenter of Expertise on Gender Dysphoria, Amsterdam UMC, Location VUMC, Amsterdam, The Netherlands; ^cDepartment of Surgery, Gender Clinic, Bosch en Duin, The Netherlands; ^dAmsterdam Public Health Institute (APH), Amsterdam UMC, Vrije Universiteit, Amsterdam, The Netherlands

ABSTRACT

Introduction: Obesity as a risk factor in gender-affirming surgery is a hot topic. Though obesity is considered a risk factor for certain surgical complications, BMI cutoffs may be a barrier to surgical care for transgender individuals.

Material and methods: All transgender individuals that underwent gender-affirming mastectomy in our center were retrospectively identified from a departmental database. Every transgender individual with a BMI > 34 kg/m² was matched 1:1 to an individual with a BMI between 18 and 25 kg/m², based on: surgical technique, surgeon, smoking, resection weight (+/-150 grams), and comorbidity such as diabetes and cardiovascular diseases. A retrospective chart study was conducted, recording demographics, surgical characteristics, short- and long-term complications and reoperations. Complications were ordinally categorized according to the Clavien-Dindo (CD) classification. Outcomes of groups were compared.

Results: A total of 53 individuals with BMI > 34 who underwent mastectomy were matched to 53 non-obese individuals according to the abovementioned matching criteria. A total of 44 (83%) non-obese individuals had a complication-free trajectory, versus 23 (43%, $p < 0.01$) in the obese group. Seroma occurred more frequently in obese individuals ($n = 16$ (30%) vs 2 (4%), $p < 0.01$). Looking at de CD rating system, obese individuals experienced more complications overall ($p < 0.01$). However, complications were mostly CD grade I or II. Secondary surgical chest contour corrections were performed in 9 (17%) obese versus 2 (4%) non-obese individuals. CD grade III complications occurred in 10 (18%) obese individuals and in 4 (8%) non-obese individuals. There were no grade CD grade IV or V complications.

Conclusion: Mastectomy in individuals with obesity seems safe with regard to major complications. However, minor complications and revision surgery are significantly more frequently present in these individuals. Preoperative counseling should focus on the higher risk on complications and reoperations.

KEYWORDS

BMI; gender-affirming surgery; gender dysphoria; mastectomy; obesity; transgender

Introduction

The number of individuals with gender dysphoria seeking medical and surgical healthcare has increased, especially in the last decade (Al-Tamimi et al., 2020). The prevalence of obesity is increasing around the world. A BMI between 18.5 and 25 kg/m² is considered normal weight, a BMI between 25 and 30 kg/m² is called overweight or pre-obese, a BMI higher than 30 kg/m² is classified as obese, subdivided in classes: BMI 30–35 kg/m²

class I, 35–40 kg/m² class II and above 40 kg/m² class III obesity. Obesity is a major health problem in transgender individuals. They are disproportionately affected by overweight and obesity.

In several gender surgery centers over the world, BMI cutoffs are employed to assess surgical eligibility, for example for gender-affirming mastectomy, however the underlying evidence for this is poor and they may be a barrier to surgical care for transgender individuals (Martinson et al., 2020). Obesity

CONTACT Wouter B. van der Sluis ✉ w.vandersluis@amsterdamumc.nl Department of Plastic, Reconstructive and Hand Surgery, Center of Expertise on Gender Dysphoria, Amsterdam University Medical Center, location VUMC, De Boelelaan 1117, 1081 HV, Amsterdam, The Netherlands.

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as a risk factor in gender-affirming surgery is a hot topic. There is a need for empirical data on the subject (Brownstone et al., 2021; Castle et al., 2023).

Gender-affirming mastectomy has a well-established positive effect on quality of life, psychological functioning and body image in those transgender individuals that opt for it (Van de Grift et al., 2018). The precise impact of obesity on postoperative outcomes is unknown. For comparable surgical procedures, such as reduction mammoplasty, a significant increase in postsurgical complications is observed in individuals with obesity (Hinson et al., 2022).

In this study, we aimed to assess the surgical outcomes of gender-affirming mastectomy in obese versus non-obese transgender individuals.

Materials and methods

Institutional setting

The Amsterdam University Medical Center (AUMC) is a high-volume center for (surgical) transgender healthcare. All facets of surgical transgender healthcare are offered to both trans-masculine and transfeminine individuals.

Currently, individuals with a BMI > 35 kg/m² are not deemed eligible surgical candidates for gender-affirming mastectomy in our center. This was instated due to a presumed higher risk of surgical and anesthetic complications in individuals in that BMI range. These individuals are counseled to lose weight at the outpatient clinic, and they are referred to weight loss healthcare professionals. In (very) few selected cases over the years, due to for example high psychological burden and persistent inability to lose weight even after applying weight loss interventions, gender-affirming mastectomy was however performed.

Surgical procedure and postoperative care

Gender-affirming mastectomy is performed under general anesthesia. Specifications of different surgical techniques are provided in other manuscripts (Cregten-Escobar et al., 2012; Monstrey et al., 2008). After surgery, a redon drain is placed on each side. Individuals are

hospitalized for one night to check for postoperative bleeding and are discharged without drains on day one, in case of complication-free postoperative course. Early drain removal may lead to a higher risk on postoperative seroma, however some authors successfully use a drain-free approach, also in the obese transgender population (Gallagher et al., 2019). Pressure garment is worn the first 6 postoperative weeks. Scheduled outpatient visit timing differed over the years but are generally planned at +1 and +6 wk after surgery.

Inclusion criteria and matching

All transgender individuals that underwent gender-affirming mastectomy in our center were retrospectively identified from a departmental database. All transgender individuals with a BMI >34 at time of surgery were included and 1:1 matched to a non-obese individual (BMI >18 and <25) based on:

- surgical technique
- surgeon
- smoking (categorized: (1) never smoked, (2) used to smoke but quit, (3) current smoker).
- resection weight (as a surrogate measure of wound and breast size, individuals were matched when the resection weight differed a maximum of +/-150 grams)
- Predefined comorbidities:
 - diabetes (categorized: (1) no, (2) non-insuline dependent diabetes (3) insulin-dependent diabetes).
 - (history of) cardiovascular disease.
- Time of surgery (surgical dates should be within 1 year from each other, to correct for possible surgical learning curves and/or increased experience).
- Concomitant gynecological surgery, which is something that is offered to individuals in our center (Elfering et al., 2020).

Only if all abovementioned categories could provide an exact match, individuals were matched. If >1 match was available, individuals were randomly matched between available matches in a 1:1 manner.

Retrospective chart study

A retrospective chart study was conducted, recording individual demographics, surgical characteristics, short-term complications (hematoma, seroma, infection, wound dehiscence), long-term complications and reoperations. Complications were ordinarily categorized according to the Clavien-Dindo rating system. Anesthesiology reports were checked for particularities. Outcomes of groups were compared.

Ethical statement

All individuals provided written informed consent for inclusion of their anonymous data in the surgical database. This retrospective study and its' protocol was approved by the institutional medical ethical committee. This study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Results

A total of 53 individuals with who underwent mastectomy with a BMI > 34kg/m² were identified and 1:1 matched to individuals undergoing mastectomy with normal weight (BMI range 18–25)

Table 1. Demographic characteristics of obese and non-obese transgender individuals included in this study.

	Obese group (n=53)	Non-obese group (n=53)	p-value
Median age at surgery (range)	28 (16–51)	28 (17–51)	NS*
History of smoking and/or current smoker, n (%)	23 (43%)	23 (43%)	NS**
Comorbidities, n (%)			NS**
Diabetes	3 (6%)	3 (6%)	
Cardiovascular disease	1 (2%)	1 (2%)	
Median BMI (range)	34.8 (34.0–42.7)	23.8 (19.0–25.0)	<0.01*
Operation, n (%)			NS**
Mastectomy only	43 (81%)	43 (81%)	
Mastectomy and hysterectomy +/- oophorectomy	10 (19%)	10 (19%)	
Surgical technique, n (%)			NS**
Double incision	49 (92%)	49 (92%)	
Donut	3 (6%)	3 (6%)	
Batwing	1 (2%)	1 (2%)	
Mean resection weight per side, g ± SD	880 ± 400	860 ± 425	NS***
Median clinical follow-up, y (IQR)	5.2 (2.6–7.2)	5.3 (2.4–7.0)	NS*

P-values were calculated using the Wilcoxon signed rank test (*), chi-square test (**) and paired t-tests (***)

according to the abovementioned matching criteria. Median BMI in the obese group was 34.8kg/m² with a 34.0–42.7 range (mean 35.4±1.9). In the non-obese group median BMI was 23.8kg/m², range 19.0–25.0 (mean 23.5±1.4). An overview of demographic characteristics is presented in Table 1. An overview of surgical outcomes and reoperations is presented in Table 2.

A total of 44 (83%) non-obese individuals had a complication-free trajectory, versus 23 (43%, $p<0.01$) in the obese group. Seroma occurred more frequently in obese individuals ($n=16$ (30%) vs. 2 (4%), $p<0.01$). Looking at de CD

Table 2. Surgical outcomes of mastectomy in obese and non-obese transgender individuals.

	Obese group (n=53)	Non-obese group (n=53)	p-value
Short-term complications, n (%)			
Hematoma, for which reoperation (CD3b)	6 (11%)	4 (8%)	NS
Seroma	16 (30%)	2 (4%)	<0.01
Secondary infected IV	4 (8%)	–	
	3 (6%)	–	
antibiotics + I&D under general anesthesia (CD3b)			
I&D under local anesthesia (CD1)	1 (2%)	–	
Surgical site infection	–	–	NS
Wound dehiscence (CD1)	3 (6%)	1 (2%)	NS
(Partial) non-take nipple FTG (CD1)	5 (9%)	2 (4%)	NS
Hospital readmission due to short-term complications, n (%)	2 (4%)	–	NS
Short-term complications, n (%)			<0.01
None	23 (43%)	44 (83%)	
Clavien-Dindo I	20 (38%)	5 (9%)	
Clavien-Dindo II	4 (8%)	–	
Clavien-Dindo IIIa	–	–	
Clavien-Dindo IIIb	6 (11%)	4 (8%)	
Clavien-Dindo IV	–	–	
Clavien-Dindo V	–	–	
Anesthetic issues, n (%)			
Use of a glidescope during intubation	10 (19%)	–	<0.01
Long-term complications and reoperations, n (%)			
Scar hypertrophy	8 (15%)	5 (9%)	NS
Dogear, for which surgical correction	9 (17%)	4 (8%)	NS
Under local anesthesia	4 (8%)	3 (6%)	
Under general anesthesia	5 (9%)	1 (2%)	
Secondary surgical correction chest contour	9 (17%)	2 (4%)	0.03

P-values were calculated using the chi square test.

IV intravenous, I&D Incision and Drainage, CD Clavien-Dindo

rating system, obese individuals experienced more complications overall ($p < 0.01$). However, complications were mostly CD I or II. Secondary surgical chest contour corrections were performed in 9 (17%) obese versus 2 (4%) non-obese individuals.

Discussion

Gender-affirming mastectomy in individuals with obesity seems safe with regard to major complications. However, minor complications, such as seroma, and revision surgery are significantly more frequently present in these individuals, which should be discussed at preoperative consultation. Results indicate that BMI cutoffs might not be appropriate for gender-affirming mastectomy.

Current literature on the relation of obesity with surgical outcomes in gender-affirming mastectomy is mixed. In a retrospective case series from Perez-Alvarez et al, focusing on surgical outcomes of gender-affirming mastectomy in obese individuals with a mean BMI of 39.2, the reported complications were partial nipple graft loss 18.5%, total nipple graft loss, seroma, hematoma, infection in 3–5% (Perez-Alvarez et al., 2021). All things considered, this is a quite acceptable complication rate, however they only reported on 27 individuals and there was no comparison made. In a retrospective comparative study from Pittelkow et al, a higher rate of infectious complications and surgical duration was reported in obese individuals (Pittelkow et al., 2020). However, another retrospective cohort study, did not show a significant difference in intra- and postoperative complications between groups (Rothenberg et al., 2021).

It is safe to say that obesity predisposes to surgical site infections and deteriorated wound healing in general (Bigarella et al., 2022). Given abovementioned reported outcomes in literature, combined with our data, we conclude that postoperative complications in obese transgender individuals after gender-affirming mastectomy, albeit more frequent, are of a minor nature and are well-treatable. Looking at BMI limitations for surgery, the balance between a higher risk of minor complications and benefits (positive effect on body image and quality of life) of gender-affirming mastectomy has to be considered. Therefore, institutional BMI restrictions are currently being revised

in our center, so that individuals with a BMI > 35 are also deemed surgically eligible for this procedure. At preoperative counseling, the higher complication risk will be discussed. Postoperatively, these individuals will be closely monitored.

In The Netherlands, revision surgery after gender-affirming mastectomy is financially covered by medical insurance companies. In other countries, where this is not the case, obese transgender individuals should also consider the higher secondary correction rate, because it might affect them financially.

If weight-loss interventions such as bariatric surgery or antiobesity medication lower the risk on short-term postoperative complications is unknown (Taormina et al., 2023; van der Sluis et al., 2022). It is unlikely that preoperative weight-loss will have a beneficial effect on postoperative revision rates due to skin laxity issues. However, it is safe to say that lifestyle changes and losing weight will cause a health benefit for obese transgender individuals in a more general sense. We advise an early identification of obesity in the transgender trajectory and targeted multidisciplinary weight-reduction interventions to improve (cardiovascular) health in these individuals.

Using BMI as an obesity index is also somewhat debated. An advantages of BMI, is that it is simple to use. However, it may be an inaccurate assessment of adiposity, because it does not discriminate muscle weight from adipose tissue weight. Age-related differences are not accounted for in the BMI measure, as are sex and race differences. Other measures, for example the waist-to-hip ratio, waist circumference or bioelectrical impedance analysis are probably better for perioperative risk assessment.

Strengths of this study are the completeness of data and the size of the surgical database that allowed for a quite sizeable participant group that could be matched 1:1 on all mentioned matching criteria. Also, obesity and transgender surgery is a much debated subject and data from this study may impact institutional policies. A weakness of this study is its retrospective nature. Surgical duration was not registered consistently over the years and therefore was not a part of this study. Also a cost-analysis between groups could be of value as well as a study on patient-reported outcome measures such as postoperative quality of life and satisfaction with body.

Disclosure statement

The authors declare that they have no conflict of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent is not required.

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