

Peer Review File

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Reviewer A

This is a poor manuscript.

This has been attempted in multiple previously published papers, several of which are not referenced here, and this does not offer new data here.

Reply: To provide a comprehensive overview of various methods for measuring breast volume, additional studies have been included in the introduction. However, these studies differ in that they do not use plastic cups, involve a limited number of patients, and do not employ water displacement as a standard for direct measurement of breast volume

Change in text: “Latest, methods using advanced software have been introduced such as three-dimensional scanners and web-based algorithms” (Page 3, line 91 – 92) and “time-consuming and difficult to establish in standard practice due to lack of sufficient access to special software or scanners” (Page 3, line 96 – 97)

The paper is not particularly well written, and would need significant improvement in study design and writing as to the unique nature of the research.

Reply: We have implemented the changes suggested by reviewers B and C, which we believe have significantly improved the quality of the manuscript. Furthermore, the manuscript has been proof read and corrections have been made where it was necessary.

Change in text: See below

Reviewer B

The Authors aimed to investigate the reliability of breast volume measurements using plastic cups. They included 17 breasts after skin or nipple sparing mastectomies. The Authors a significant discrepancy between breast volumes measured by plastic cups and those determined by water displacement techniques or calculated by breast density and weight. They concluded that “in general, the plastic cups method overestimated breast volume” and that “plastic cups remain an inexpensive and non-invasive means for breast volume measurement and may still serve as a valuable tool when taking this volume overestimation into account.” This is very interesting report but needs some revisions.

I have the following suggestions:

Abstract – pls include the aim

Reply: The aim has been added to the abstract

Change in text: “The aim of this study was to investigate the reliability of breast volume measurements using plastic cups”. (Page 2, line 37 – 38)

Introduction:

- “Breast volume measurements can be used to diagnose conditions such as macromastia” - there are now no “volumetric criteria” for the diagnosis of macromastia

Reply: The sentence regarding purpose of breast measurement in the Introduction has been changed and diagnosis of macromastia removed.

Change in text: “Breast volume measurements can be helpful in planning a variety of breast operations, including those for macromastia and asymmetry.” (Page 3, line 77–78)

- You could also mention some other techniques to measure breast volume, see: Kasielska-Trojan A, Mikołajczyk M, Antoszewski B. BreastIdea Volume Estimator: A New Tool for Breast Volume Estimation-Presentation and Validation for Women. *Plast Reconstr Surg.* 2020 Dec;146(6):744e-748e., Henseler H, Kuznetsova A, Vogt P, Rosenhahn B. Validation of the Kinect device as a new portable imaging system for three-dimensional breast assessment. *J Plast Reconstr Aesthet Surg.* 2014 Apr;67(4):483-8. What about commercial products, e.g. Markovic A, Pessoa SGP, Leite JAD, de Alcântara FS, Collaço BG, Ariel de Lima D. Assessment of Three Breast Volume Measurement Techniques: Single Marking, MRI and Crisalix 3D Software®. *Aesthetic Plast Surg.* 2023 Jun 19. doi: 10.1007/s00266-023-03432-w.

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- Aim: “...in patients undergoing primary breast reconstruction with implants. “ – this is a part of methodology

Reply: The sentence “in patients undergoing primary breast reconstruction with implants” has been removed from the aim.

Change in text: “in patients undergoing primary breast reconstruction with implants” has been deleted, (Page 4, line 105 – 106)

Methods

- Here, you should mention what kind of mastectomy was performed /skin/nipple-sparing/ and why you included both types /inclusion/exclusion criteria/

Reply: The type of mastectomy has been stated in line 123 - 124 in Method section “...female patients undergoing skin-sparing or nipple sparing mastectomy...” and line 186 - 187 in Result section “10 patients had skin-sparing mastectomy while only 3 patients had nipple-sparing mastectomy.”

Change in text: The information is already present

- How did you choose these eleven volumes of cups? Is it a standard set of cups?

Reply: This is a valid point. Using plastic cups to measure breast volume is a method developed in Sweden. The cups we used are the same as those described by Strömbeck and Malm and are manufactured by the Swedish company Emballageform, coming in a standard set. A sentence describing this is added in the methods, page 4 line: 138-140.

Change in text: “The breast volume cups utilized are the same as those described by Strömbeck and Malm. These come in a standard set, manufactured by the Swedish company Emballageform AB”.

- Who performed these volume estimations with cups? Always one surgeon /or two – what about their agreement? /you had cups 350 and then 500cc? – looking at the mean volume of your specimens, I have a feeling that you validated “surgeons eye” /not cups/ in estimating the right volume...

Reply: The volume estimation by cups was performed by two senior consultant plastic surgeons. This has been added to the method section and described in the method section line 128 - 129: “. Preoperatively, the breast volume was evaluated objectively by a senior consultant plastic surgeon using plastic cups”. and in the discussion section line 257 - 259: “...only two surgeons participated in evaluation of plastic cup volume, however there could still be a difference in their estimation.”

Change in text: “The evaluation was divided between two different consultants” (Page 4, line 129– 130)

- Pls provide reference for the idea of measuring the volume of breast using mastectomy specimen weight and mammography density

Reply: The idea for this was inspired by an article by Rostas et al., which compared four different equations for calculating breast volume. Their results were then compared to mastectomy specimen volumes, calculated using specimen weights and breast density. They also provided breast densities based on the BIRADS classification. This article is already cited as reference number 14.:

Rostas JW, Bhutiani N, Crigger M, Crawford SMW, Hollenbach RB, Heidrich SR, et al. Calculation of breast volumes from mammogram: Comparison of four separate equations relative to mastectomy specimen volumes. Journal of Surgical Oncology. 2018;

To make it clearer a sentence has been added to the methods.

Change in text: “in alignment with the methodology outlined in the study conducted by Rostas et al.” (Page 5, line 158-159)

Results

Discussion

- Measuring with cups you applied intervals -25/50cc and then you interpret a difference of 12 cc as “significant”?

Reply: This is a good point. A sentence describing this has been added to the discussion.

Change in text: “In addition, the interval between cup size leaves a certain volume for the surgeon’s judgement for choosing the cup with the best fit.” (Page 8, line 267 – 269)

- What about the volume of skin? Using cups you included skin and a gland and then you compared the results with only gland volumes /after nipple sparing mastectomy/... and there was “overestimation” of 12cc /?/ using cups? – you discussed this as limitation but I think this is not enough...you could mathematically estimate a volume of skin of the breast and “normalize” your results with this. Then in fact I am not sure if this 12 cc overestimation will in fact be “overestimation”.

Reply: This is a very relevant limitation of cup measurement. However, we are not aware of any standardized method for measuring the volume of the breast's skin and subcutaneous tissue. The simplicity of the cup measurement technique is its main advantage, and this would be compromised if we were to introduce complex mathematical calculations for skin volume

Change in text: No change

- Overall, the ms should be proof-read

Reviewer C

The manuscript is well written and the and the selected question is clearly addressed. Nevertheless, I would like to make the following comments:

The indication for mastectomy remains unclear, please add in the material and methods section.

Reply: The reason for mastectomy was initially not included, as we viewed the breast size and implant choice as independent of the mastectomy's underlying cause. However, we have now added this information to the results section for further clarity

Change in text: “Ten patients underwent surgery for invasive carcinoma, while three had surgery for DCIS. Among the four patients who received bilateral mastectomies, the surgery on the contralateral breast was performed as a prophylactic measure.” (Page 6 line 195-198)

Please add which clinical consequence was drawn from the data collected. On which of the mentioned measurements was the implant size made dependent? Or was this decided differently?

Reply: Implant size was decided from plastic cup measurement. This has been added to the method section.

Change in text: “The volume estimated using plastic cups was combined with additional details, such as the width and height of the patient's breast footprint, to guide the selection of the implant” (Page 4, line 133 – 135)

The case number is very small, is a study on a larger case number planned?

Reply: Ideally, we would have preferred a larger sample size. However, due to another

trial including the same patient group and structural changes in patient selection for different hospitals no more patients were included. A national study would be needed to increase the sample size, which would both validate our findings and introduce greater variation due to involvement from multiple surgeons. A sentence regarding this has been added in the discussion.

Change in text: “A study of a larger scale is needed to allow for stratification and to substantiate the results” (Page 8, line 271 – 272)