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EVALUATION OF THE OUTCOMES OF BREAST PTOSIS SURGERY USING THE MODIFIED ROUND BLOCK TECHNIQUE COMBINED WITH SEPTUM-BASED MAMMAPLASTY

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ABSTRACT

Background: *Breast ptosis, or sagging, can result from a variety of pathological or physiological factors. Mastopexy, or breast lift surgery, often involves different incision techniques such as the Round block, Round block combined with vertical incision, and the inverted T incision. The Round block technique is particularly suited for mild to moderate breast ptosis. When this technique is combined with septum-based mammaplasty, it can provide superior aesthetic outcomes by enhancing blood supply and maintaining maximum sensation in the nipple-areola complex.* ***Objectives:*** *To assess the effectiveness and outcomes of a modified Round block technique combined with septum-based mammaplasty in correcting breast ptosis, while focusing on minimizing scarring in the nipple-areola complex.* ***Materials and methods:*** *A case series was conducted, involving 39 patients with a total of 77 treated breasts. The patients underwent mastopexy using the modified Round block technique along with septum-based mammaplasty.* ***Results:*** *The majority of the patients demonstrated successful correction of breast sagging, with most breasts classified as stage A ptosis according to Kirwan's classification system. Only one breast was classified as stage B. Areola scars were categorized into three types: normal scars, stretched scars, and hypertrophic scars, with no cases of keloid formation. Postoperative complications occurred in 9 breasts, representing a complication rate of 11.68%.* ***Conclusion:*** *The modified Round block technique, when combined with septum-based mammaplasty, achieves reliable results in improving breast ptosis across stages A to D according to Kirwan's classification. The technique effectively minimizes scarring while preserving sensation in the nipple-areola complex, making it a valuable approach for addressing mild to moderate breast sagging.*

Keywords: *Breast ptosis, modified Round block technique, Würinger.*

I. INTRODUCTION

From distant past to present day, breasts have always been depicted to illustrate the physical beauty of women in not only sculpture but also photography. However, over time, breast sagging becomes unavoidable, reflecting the aging process, weakness, and loss of attractiveness [1].

Breast ptosis is not a pathological condition but a morphological consequence of some diseases like macromastia or some physiological processes (after weight loss, pregnancy, prolonged breastfeeding or the skin aging process) [2].

Breast lift techniques are mainly included in three groups: Round block, inverted -T incision and vertical incision. The Round block technique, which was suggested by Benelli in 1990, has completely changed the previous breast lift techniques. This method is not simply removing excessive skin and suturing the nipple-areola complex, but also adjusting

the position of the mammary gland in order to solve both causes of breast ptosis: excessive skin and the sagging of the breast [3].

Breast ptosis, combined with the reduction of the breast volume, is a challenge for any experienced surgeon. Balancing the opposing force of the prosthesis container and breast lift, particularly the breast augmentation and skin reduction, requires a thorough understanding of breast anatomy as well as the technical procedures in order to achieve the desirable and reliable results [4]. The combination of breast implant and breast lift surgery has always raised many problems regarding aesthetic result, scar's size and quality, recurrence of the sagging as well as recover of the sensation of the nipple-areola complex [5]. The Round block technique is suitable for mild and moderate sagging breasts; however, with breats that have the shortage of the volume, this technique is unable to improve the fullness of the breast, the natural protrusion as well as the sensation of the nipple-areola complex, the lower-half of the breast looks unaturally due to the direct suture connecting the mammary glands from both sides.

Breast implant, especially in a ptotic breast, needs intensive attention because the tension from the container will oppose the tension force in the process of reducing and elevating the nipple-areola complex in breast lift surgery. Therefore, it is essential to choose the appropriate size of the prosthesis to maximize the effect of breast lift surgery while ensuring the aesthetic appearance of the implant breast [5].

Awad, M.A. *et al.* discovered a thin transverse septum that divides the mammary gland into upper and lower parts. This layer contains nourishing blood vessels and nerves for the nipple-areola complex [6]. In the breast lift surgery, preserving this transverse septum also has a certain significance in enhancing blood supply and sensation for the nipple-areola complex [7], [8].

In the world, there are also a number of authors who have improved the Round Block technique combined with breast implant surgery such as Sterodimas (2015), WeiDing (2016), Ryan E. Austin (2019). However, each of the authors' improvements is different and does not focus on preserving the Würinger septum. In Vietnam, we have not seen any research describing this technique, so we conducted a study on this topic.

II. MATERIALS AND METHODS

2.1. Materials

- Inclusion criteria:

+ Patients who were treated at Thu Cuc Cosmetic Hospital from December 2022 to January 2024.

+ Patients with breast ptosis classified as degree A, B, C, or D (according to the Kirwan classification) were indicated for breast lift surgery using the modified Round block technique combined with breast implants with septum preservation [1].

+ Patients who accepted surgery.

- Exclusion criteria:

+ Patients with combined mammary gland hypertrophy, breast volume of 350cc or more.

+ Patients who had not undergone breast lift surgery or breast implant surgery previously.

+ Patients who are not qualified for endotracheal anesthesia.

+ Patients who are breastfeeding.

+ Patients with malignant tumors in the mammary gland.

2.2. Methods

- Method of the research: Case series.

- Sample size: 39 patients and 77 breasts.

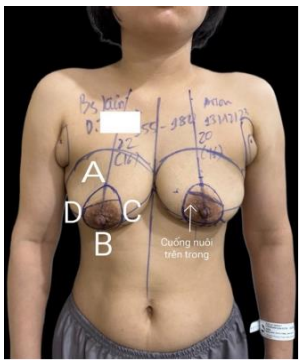
- Evaluation criteria: Grades of sagging, nipple-areola complex (diameter, nipple elevation, scars status), other complications.

- Procedure of the research:

+ Physical examination: Evaluate the breast ptosis according to Kirwan classification, evaluate the size of the implant area (diameter of the implant cavity under the pectoralis major muscle, the skin elasticity, number of available local mammary glands, take photos of patient before surgery).

+ Design the incision [3]: The patient stands upright, evaluates the nipple-areola complex: color, diameter of the areola (normal 2.5 - 5 cm). Determine the size of the breast: distance from the lower border point 5cm from the inner end of the clavicle to the upper areola (normal 15.5 - 17 cm), distance between the two nipples (normal 18 - 20 cm), distance from the nipple to the midline (normal is 9,5 cm), distance from the areola to the inframammary fold (normal is 5 - 7 cm). Draw the new nipple-areola position: Determine the uppermost point of the areola called point A, which is 16 - 17 cm from the lower edge of the collarbone on the midline. Determine the lowermost point of the areola as point B located on the midline 7 - 8 cm away from the inframammary fold. In case point B is inside the areola, take point B as the intersection point between the midline and the lower edge of the areola then mark it, the new inframammary fold is 7 - 8 cm away from point B. Point C is the inner point of the breast about 7 cm from the midline. Point D is symmetrical to point C across the nipple. Draw a circular arc connecting D - A - C and a circular arc connecting D - B - C. The two arcs connect together to form an incision outside the nipple areola. The upper inner pedicle will supply blood for the nipple-areola complex, which is an improvement in the Round Block technique using the upper pedicle only. Draw the implant cavity: the lower edge is the inframammary fold, the upper edge is the boundary of the attachment point of the mammary gland to the pectoralis major muscle, determined when pushing the mammary gland upward by hand. The inner edge is the outer edge of the sternum, the outer edge is the anterior axillary line.

Take photo after design.



Picture 1. Design of the pre-operative incision

- Surgical procedure:

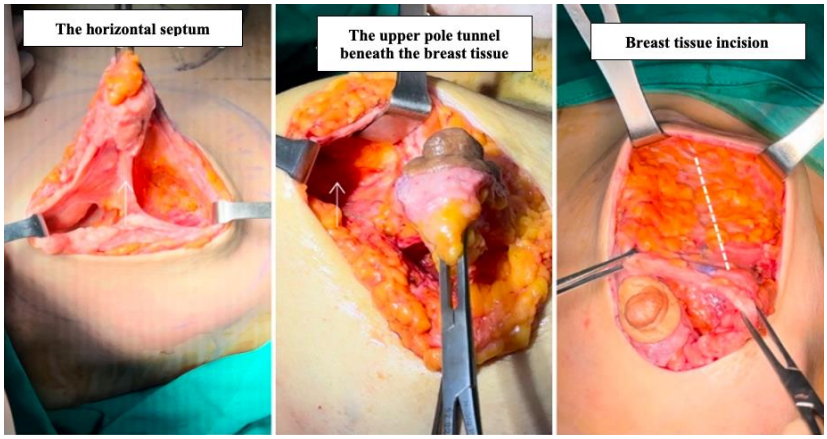
+ Preparation: The patient receives endotracheal anesthesia and is positioned supine with arms extended.

+ Flap Creation: The areola is marked (3.6 - 3.8 cm diameter), and skin is incised to create a flap for the nipple-areola complex. Excess skin and fat are removed, and a tunnel is dissected above the pectoralis major for flap attachment.

+ Implant Placement: The mammary gland is separated from the skin (1.5 - 2 cm), and a cavity is created under the pectoralis major for the implant. The nipple-areola flap is sutured to elevate the complex.

+ Suturing: If the lower mammary gland is excessive, an oblique incision is made to facilitate proper suturing, improving contour compared to traditional techniques.

+ Closure: The wound is closed, and the breast is compressed with tape and a surgical bra.



Picture 2. Advancing steps in the Round Block technique

- Post-operative care: Bandage Removal: Remove the elastic bandage after 24 hours, change the areola bandage, and keep the Urgo crepe for 48-72 hours to prevent hematoma.

- Post-discharge Care: Discharge occurs 24 hours post-surgery. Change bandages daily and wear a compression bra continuously for the first month. Sutures are removed after 14 days and again after 7 days.

- Incision Support: Use Urgo Trips for the incision for 3 months.

- Follow-up Evaluations: Assess results at 1, 6, and 12 months, focusing on symmetry and appearance rated 1-3.

Scar Evaluation: Assess scar location and type: Normal: ≤3 mm, soft, not visible.Stretched: >3 mm, visible but flat. Hypertrophic: Raised but within boundaries. Keloid: Raised, extends beyond margins, often painful.

Pressure sensation was measured by manual pressure on the breast by a single investigator to ensure minimal error in the exam. Use manual force at 4 levels from mild to severe, assessed by whether the patient feels or does not feel pressure changes.

- Data processing:

+ Collecting data according to medical records.

+ Data was collected from medical records, inputted, and analyzed using SPSS 20.0 software. Statistical algorithms commonly used in medical research were applied.

- Ethics approval: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Can Tho University of Medicine and Pharmacy.

III. RESULTS

3.1. Grades of sagging

Table 1. Grades of sagging preoperation and postoperation

Grades of sagging	Preoperation		One-month postoperation		Six-month postoperation		Twelve-month postoperation	
	R (%)	L (%)	R (%)	L (%)	R (%)	L (%)	R (%)	L (%)
Non sagging	0 (0%)	0 (0%)	30 (78.9%)	30 (76.9%)	16 (66.7%)	15 (62.5%)	7 (53.8%)	6 (46.2%)
Grade A	4 (10.5%)	1 (2.6%)	8 (21.1%)	9 (23.1%)	8 (33.3%)	8 (33.3%)	6 (46.2%)	6 (46.2%)
Grade B	8 (21.1%)	8 (20.5%)	0 (0%)	0 (0%)	0 (0%)	1 (4.2%)	0 (0%)	1 (7.6%)
Grade C	17 (44.7%)	19 (48.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Grade D	9 (23.7%)	11 (39.2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Among 38 selected right breasts, grades of sagging were mainly focused on Grade B, C and D with figures 21.1%, 44.7% and 23.7% respectively. Postoperative results showed that there was no breasts with B, C, D sagging grades; only two remained groups including grade A and non-sagging breasts. Among 39 selected left breasts, grades of sagging were mainly focused on Grade B, C and D with respective figures 20.5%, 48.7%, 39.2%. Postoperative results showed that there was no breasts with C, D sagging grades; only one breast with grade B sagging and other two groups were classified in grade A and non-sagging breasts.

3.2. The nipple-areola complex

3.2.1. Diameter of the nipple-areola complex

Table 2. Preoperative and postoperative diameter of the nipple-areola complex

Parameter	Right Breast	Left Breast
Preoperative diameter (cm)	5.539 ± 1.182	5.705 ± 1.228
Designed diameter (cm)	3.728 ± 0.096	3.728 ± 0.097
Postoperative diameter	Primarily <4 cm and <5 cm	Primarily <4 cm and <5 cm

The average preoperative diameter of the nipple-areola complex was 5.539 ± 1.182 (right breast), 5.705 ± 1.228 (left breast); average designed diameter of the nipple-areola complex was 3.728 ± 0.096 (right breast), 5.705 ± 1.228 (left breast).

3.2.2. Ascent distance of the nipple-areola complex

Table 3. Ascent distance of the nipple-areola complex

Ascent distance	Right breast (N=38)	Left breast (N=39)	p
Average	2.590 ± 1.276	2.885 ± 1.126	<0.001
Min	1,0	0,5	
Max	5.0	6.0	

The average distance of the right breast was 2.590 ± 1.276, of the left breast was 2.885 ± 1.126.

3.2.3. Evaluation of the postoperative scar

Table 4. Evaluation of the postoperative scar

Postoperative scar	One-month postoperation		Six-month postoperation		Twelve-month postoperation	
	R (%)	L (%)	R (%)	L (%)	R (%)	L (%)
Normal scar	35 (92.1%)	36 (92.3%)	20 (83.3%)	20(83.3%)	11(84.6%)	10(76.9%)
Stretched scar	3(7.9%)	3(7.7%)	4(11.7%)	3(12.5%)	2(15.4%)	3(23.1%)
Hypertrophic scar	0(0%)	0(0%)	0(0%)	1(4.2%)	0(0%)	0(0%)

The right breast: scars were mainly focused in two groups: normal and stretched scar. The left breast: scars were scattered in three groups: normal, stretched and hypertrophic scar. No keloids were reported.

3.3. Other complications

Table 5. Summary of breast complications and their characteristics

Type of Complication	Number of Breasts	Time Frame/Location
Slow wound healing	1	At the position of 12–3 o'clock
Hematoma	5	Under the skin around the breast
Grade 2 capsular contracture	2	At 6 months
Grade 3 capsular contracture	1	At 3 months
Total	9 (11,68%)	-

There were 09 breasts with complications including: 01 breast had the condition of slow wound healing at the position of 12 - 3 o'clock, 05 breasts had hematoma under the skin around the breast, 02 breasts had grade 2 capsular contracture, 1 breast had grade 3 capsular contracture.

IV. DISCUSSION

4.1. Preoperative and postoperative grades of sagging

We selected patients with breast ptosis from stages A to D according to Kirwan (2002) classification, which are stages that the ascent distance of the nipple-areola complex is not too high, usually less than 4 cm. The sagging breasts in these stages often do not have too much excess skin, so the excessive skin can be removed through the areola incision. At stage D, breasts usually have more excessive skin, so that this skin can be removed through the vertical incision, and of course, patient consent is required. According to Kirwan, if patients have breast ptosis at stages A to D, when they have breast lift surgery combined with breast implants, this Round Block technique will also be used.

Postoperative results showed that most breasts were no longer sagging, with some remaining at stage A and one breast at stage B. Post-surgical stage A sagging breasts are primarily those that were at stage D sagging before surgery, and when comparing the before-and-after images, the improvement is very clear. Thus, it can be seen that in the first 3 stages of Kirwan classification, the Round Block technique can return the breast to a non-sagging state, but at stage D, this technique can only improve the grade of sagging, not completely

resolve the sagging condition. Stages E and F are not suitable for this technique due to excessive skin and mammary tissue. A vertical incision or inverted-T incision is necessary to address these issues.

The Round Block technique by Benelli (1990) is a classic technique that marks a change in understanding and treatment of breast ptosis. This technique focuses on reconstructing the mammary tissue in breast ptosis in addition to just removing excess skin as previous authors. Furthermore, the Round Block technique uses a circle incision around the areola to minimize scar formation compared to the vertical incision and inverted-T incision. We have improved this technique in the following steps:

- Using the superomedial pedicle for the nipple-areola instead of the superior pedicle as the author suggested. This makes moving the nipple-areola complex much easier, as the pedicle is not kinked, resulting in better blood supply. Suturing the peripheral area of the flap to the above pectoralis major fascia increases the fullness of the upper pole of the breast instead of using the superior pedicle as in the original technique.

- By using the superomedial pedicle, we can preserve the Wuringer horizontal septum of the breast. This septum was discovered by E. Wuringer in 1998, who detailed its anatomical structure, including perforating branches from the IV, V, or VI intercostal arteries that supply blood to the nipple-areola complex. Notably, this structure contains the anterior branch of the IV lateral cutaneous nerve, which innervates the nipple-areola complex. There have been many studies worldwide preserving this septum in breast reduction surgery, such as those by Rysel (2010), Osman (2017), and Uslu (2019) [3], [7]. However, no authors have combined this method with the Round Block technique while using breast implants, possibly because the intercostal artery perforators get damaged during implant placement, thus compromising blood supply [9], [10]. In our breast lift surgery for ptosis, preserving the septum is expected to protect the sensation of the nipple-areola complex. The results show that, three months post-surgery, the sensation of pain, temperature and pressure of the nipple-areola complex and breast have all recovered.

- We use an oblique incision for breast tissue resection from top to bottom and from outside to inside, instead of the V-shaped incision along the central axis of the breast as suggested by Benelli. This significantly improves the upward movement of the QNV complex. With this incision, we do not remove the breast tissue but instead overlap two breast tissue flaps. The outer flap is sutured to the pectoralis major fascia for fixation, and the inner flap is sutured over the outer flap to increase the thickness of the lower pole of the breast and minimize the palpability of the breast tissue suture line as in the original Round Block technique.

4.2. Reconstruction of the nipple-areola complex

The breast lift technique with an incision around the areola can create the shortest scar compared to other incisions (Table 5); however, scar formation after surgery is a matter of concern. The tendency of hypertrophic scars, keloids, stretched scars around the areola due to the tension in lifting sagging breasts by the Round Block technique is the highest compared to the other two techniques: inverted -T incision and vertical incision. To limit scar formation, especially stretched scars, reducing tension around the areola is the best solution. In the Round Block technique, the surgeon widely dissects the mammary tissue from the skin around the areola to reduce tension between the mammary tissue and the skin, thereby decreasing the tension of the suture line. We use slow-absorbable PDS 2/0 suture

to significantly reduce the tension of the skin surface, many other authors use non-absorbable monofilament suture to maintain the laxity of the suture line. However, using monofilament sutures can have the situation of the sutures being tied outside the skin, leading to pain when touched by the patient and when the suture removal procedure is performed; therefore, we only used the PDS 2/0 for patients in this study.

4.3. Other complications and solutions

There were 09 breasts with complications, accounting for 11.68%, including: 01 breast had the condition of slow wound healing at the position of 12 - 3 o'clock (secondary wound closure after 3 weeks, 05 breasts had hematoma under the skin around the breast (no actions needed). 02 breasts had grade 2 capsular contracture at 6 months (using montelukast in 3 months). 01 breast had grade 3 capsular contracture at 3-month postoperation, had used motelukast in 3 months, at 6-month postoperation, the degree of capsular contracture reduced from 3 to 2.

V. CONCLUSION

Indications for this technique on patients with grade C and D breast ptosis can minimize scar formation while still achieving reliable results. The modified Round Block technique has many advantages, including improving the condition of breast ptosis in stages A to D according to Kirwan's classification; minimizing postoperative scar in only a circle around the areola; preserving the sensation of pain and temperature of the nipple-areola complex as well as the breast pressure sensation. Preserving the horizontal septum in the surgery of breast ptosis combined with implants, although no longer has much value in terms of blood supply to the nipple-areola complex, it is still valuable in preserving sensation for the nipple-areola complex. Using round breast implants with low or medium projection, avoid using high projection implants because it increases the opposing force on the nipple-areola complex; using small size of implants to avoid pressure on the mammary glands leading to recurrent breast ptosis or stretching of the breast incision scar due to increased tension of the suture line.

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