Surgical strategies in the management of tuberous breast

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Abstract:

The tuberous breast is a congenital abnormality of breast development that incorporates a constricted base of the breast and 1 or more of the following: high inframammary fold, areola hypertrophy, pseudoherniation of tissue through the areola, ptosis, hypoplasia, and breast asymmetry. Advanced forms of tuberous breast are readily apparent clinically; however, the diagnosis of more minor forms of tuberous breast requires careful examination and a high index of suspicion. The principles of treatment of the tuberous breast include: a. Release of the constricted base through expansion, scoring, or internal flaps. b. Lowering of the inframammary fold and restoring a normal nipple to inframammary fold distance. c. Correction of herniated breast tissue. d. Reduction of the size of the areola. e. Augmenting the breast volume, when necessary. f. Correction of underlying breast asymmetry.

Keywords: Tuberous Breast, Silicone, Fat Grafting.

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Introduction:

Patients with a tuberous breast dwell on the boundary between aesthetic and reconstructive surgery. The goal of plastic surgery of the breast is to recreate a natural appearance that is satisfying to the patient. The proper management of tuberous breast is to deal with the principal issues of such deformity, which are breast hypoplasia, constricted base, elevated IMF and areolar (1).

Proper management of the tuberous breast is eventually determined by the degree of severity of presentation, and requires both the surgeon and patient to address each aspect of the deformity; the fundamentals of treatment should deal with the principal issues of such deformity include the following:

- Release of the constricted base in a vertical and horizontal plane.
- Lowering down of the neo IMF to restore a normal nipple to IMF distance.
- Obliterate the old IMF to avoid a double-bubble appearance.
- Correction of areola herniation or enlargement hypertrophy.

- Restoration of breast volume.
- Correction of breast asymmetry

In addition, the decision must be planed whether to address the multiple elements of this deformity in one or two stages. Whenever possible, correction is to be done in a single stage, however, in cases advanced types of deformity or severe herniation of tissues into the areola, a two-stage approach is advocated (1).

Skin incision

The periareolar surgical incision was the most common approach used by authors. Depending on the aim of TB surgical correction, an inferior hemi-periareolar or a complete periareolar incision was made. This surgical access was usually chosen due to the easy visibility of the whole breast gland and wider vision of the operative field. Furthermore, a complete periareolar incision allows for nipple-areolar-complex reshaping, repositioning and breast mastopexy (2).

Constricted ring and Glanduloplasty

By modification of breast parenchyma, the constricted base can be released and redistributed to the glandular tissue to address areas of hypoplasia, particularly in the lower quadrants (3).

Glandular detachment procedure was also greatly employed in the literature. It involved the complete interruption of retractile fibers connecting muscular and glandular tissue. This maneuver is greatly important because it allows for the whole gland tissue to be reshaped and homogeneously redistributed through flaps in all four breast poles. This also allows the correction of both vertical and horizontal stenosis, by respectively lowering the IMF and by obtaining a breast base enlargement (4).

Tissue scoring is a common technique used to release the glandular tissue from the stenotic fascia, to allow expansion, and to minimize the anesthetic postsurgical defects such as glandular retractions. Glandular scoring is commonly performed through a periareolar approach or percutaneously using a cannula or needle to release the constricted ring This is done by performing parallel vertical and horizontal surgical incisions directly on the fascia or by percutaneous 18-gauge V-shaped fasciotomies (5).

Silicone Implants

Breast implants have been vastly employed in different procedures for TBD correction. In particular, they were used to adjust the breast volume and to provide the correct conical shape when absent. (6, 7).

In cases of severe tuberous breasts and associated asymmetry, exclusive glandular tissue modification may not be sufficient, thereby, making the use of implants necessary. Certain studies consistently incorporate implant placement, whereas other studies use implants only if breast volume augmentation is necessary or desired. (3).

The implant placement can be subglandular, dual-plane or retropectoral Implants were mostly placed in subpectoral (dual plane) position. This procedure involves the pectoralis major muscle dissection and the creation of a pocket where to place the chosen breast implant. Partial

submuscular coverage of breast implants is usually employed. This adds supporting tissue coverage to the implant, especially when the skin is thin **(3, 6)**.

When the pectoralis major costal insertion is excessively cranial or when the pectoralis muscle does not provide adequate covering, the implants are inserted in the subglandular plane **(8).** Furthermore, either single-stage or two-stage breast correction procedures were used depending on the level of breast hypoplasia. Hypoplastic breasts did not allow a direct implant insertion, but required the use of tissue expanders before the insertion of a breast implant **(6).** The lower amount of breast parenchyma due to hypoplasia in fact, obliges surgeons to first create a subpectoral space in a gradual time period to allow the tissue adaptation to increasing volumes **(9).**

Attention must be paid in treating tuberous breasts with implants, as neglecting the constricted ring during insertion can result in the persistent double-bubble deformity which could addressed through fat grafting for correction **(10)**.

Expanders

Although every effort is made to correct tuberous breasts in a single stage, severe cases of tuberous breasts with significant glandular tissue and skin deficiency may occasionally require tissue expanders, followed by a secondary procedure to replace them with permanent implants. Von Heim- burg et al. recommended over-expanding the pocket, as they observed superior outcomes with this approach **(11).**

External tissue expansion

By using a BRAVA device is a useful adjunct to fat injection and is thought to assist in retention of the fat graft through expansion of the recipient site, increasing the graft to capacity ratio and improving recipient site vascularity **(1).**

Fat Grafting:

Fat grafts were used in combination with augmentation techniques to help in improving breast remodeling. Lipofilling is, in fact, helpful in reshaping tissue depression and correcting the "tissue memory" caused by the high fibrosis characteristic of TBD. Lipofilling overall improved tissue release and breast pole filling **(12).**

Fat graft was harvested through Coleman technique. The fat grafting was performed in a multiplanar, multidirectional fan-shaped technique to maximize the surface area of the graft **(13).** The fat transfer was also performed with the use of needles, as they allow both graft deposit and needle-induced fibrosis release by needleotomy **(8).**

Fat grafts were also employed as the sole procedure for the correction of asymmetrical or unilateral TBD, to volumetrically match the contralateral breast. The fat was grafted in multiple layers and the volume over-corrected due to future fat reabsorption **(14).**

Biological morphogenetic surgery technique (BMS)

Rigotti introduced the innovative "biological morphogenetic surgery (BMS)"technique. This minimally invasive procedure was designed to use biological mechanisms to induce expansive and reductive morphogenesis in the treatment of tuberous breasts. During the expansive morphogenesis procedure, fat is extracted during liposuction and then injected percutaneously into the breast. For the injection of the fat, a needle with a cutting tip is used so that small openings are created in the fibrotic tissue; thereby no radial incisions are needed. This process helps loosen and weaken the fibrotic tissue. The injected fat contains substances that trigger mesenchymalization in the local subcutaneous fat tissue. Using this method, augmentation of breast volume is achieved through the mechanical addition of fat and induction of adipogenesis, leading to additional volume enhancement **(12).**

Lowering the IMF

The elevated IMF results from the constrained base of the breast. The IMF can be lowered by dissecting towards the new IMF position, and releasing the constricted ring, particularly at the native IMF as the inferior pole experiences the most constriction. The dissection can be performed subcutaneously, as suggested by Grolleau et al., or as recommended by Kolker et al., it can be performed prepectorally by starting the first incision periareolarly (**3**).

After completing their footprint loop, Abboud et al. employed the IMF loop that spans the superficial subcutaneous tissue along the location where the new IMF will be **(15).** The position of the new IMF in unilateral cases is based on the contralateral breast and in bilateral cases, the sixth rib serves as a landmark **(10).**

Areolar herniation and enlargement

The predominant approach used for herniation and areola enlargement correction involves a circumareolar de-epithelialization in the form of a donut-shaped incision**,** Following this de-epithelialization, the resultant zone is frequently closed using the round block technique to lift the areola more upwards**(1)**. Herniation can also be managed via glanduloplasty and, if necessary, via glandular tissue resection **(16).**

In contrast, less severe cases usually do not encounter the issue of herniation through the NAC and primarily demand breast augmentation with a preference for minimal scarring. Andjelkov et al. created controlled burns with percutaneous electrocoagulation when they identified a relaxed erectile muscle in the NAC during clinical examination. The procedure induced scar tissue formation and retraction of the muscle fibers. Consequently, this led to the prevention of gland herniation through the NAC **(17).**

Abboud et al. used a combination of liposuction and a periareolar loop to address herniation and enlargement of the areola. Moreover, by using their footprint loop, they achieved an expansion of the lower pole and a corresponding reduction in herniation **(15).**

Ionescu et al. introduced the 'scarless compass rose suture technique', which involves the use of 3 layers of sutures to mitigate the expansion of the areola. This method is particularly applicable in cases of mild tuberous breasts characterized by isolated areolar enlargement **(18).**

The BMS theory of Rigotti et al. includes reductive morphogenesis as an addition to expansive morphogenesis. By surgically scraping the NAC zone percutaneously at the junction of the dermal and subcutaneous tissues, a granulation tissue-fibrotic response can be generated, resulting in reduced epidermal surface of the areola through fibrotic contraction **(12).**

References:

1. Brown MH, Somogyi RB. Surgical strategies in the correction of the tuberous breast. Clin Plast Surg. 2015; 42(4):531–549.
2. **Zholtikov V, Korableva N, Lebedeva J.** Tuberous breast deformity correction: 12-year experience. Aesth Plast Surg. 2019:43:16-26.
3. Van Durme J, Cooreman A, Paternoster J, Jeroen Vranckx J. The Different Surgical Strategies for Treating Tuberous Breast Deformity: A Scoping Review JPRAS Open 42 (2024) 315–328
4. Oroz-Torres J, Pelay-Ruata MJ, Escolán-Gonzalvo N, et al. Correction of tuberous breasts using the unfolded subareolar gland flap. Aesthetic Plast Surg. 2014; 38:692–703.
5. Bonomi R, Johnson M, Toussoun G. Refining aesthetic approaches to tuberous breast using combined minimally invasive approaches to treat moderate asymmetric tuberous breast. J Surg Case Rep. 2020; 2020:rjaa373.
6. Kolker AR, Collins MS. Tuberous breast deformity: classification and treatment strategy for improving consistency in aesthetic correction. Plast Reconstr Surg. 2015; 135:73–86.
7. Brault N, Stivala A, Guillier D, et al. Correction of tuberous breast deformity: A retrospective study comparing Lipofilling versus breast implant augmentation. J Plast Reconstr Aesthet Surg. 2017; 70(5):585–595.
8. Klinger M, Klinger F, Giannasi S, et al. Stenotic breast malformation and its reconstructive surgical correction: a new concept from minor deformity to tuberous breast. Aesthetic Plastic Surg. 2017; 41:1068–1077.
9. Lozito A, Vinci V, Talerico E, Asselta R, et al. Review of Tuberous Breast Deformity: Developments over the Last 20 Years. PRS Global Open • 2022; 1-7.
10. Serra-Renom JM, Munoz-Olmo J, Serra-Mestre JM. Treatment of grade 3 tuberous breasts with Puckett's technique (modified) and fat grafting to correct the constricting ring. Aesthetic Plast Surg . 2011; 35(5):773–781.
11. Panchapakesan V, Brown MH. Management of tuberous breast deformity with anatomic cohesive silicone gel breast implants. Aesthetic Plast Surg. 2009; 33(1):49–53.
12. Rigotti G, Chirumbolo S. Biological morphogenetic surgery: a minimally invasive procedure to address different biological mechanisms. Aesthet Surg J. 2019; 39:745–755.
13. Delay E, Sinna R, Ho Quoc C. Tuberous breast correction by fat grafting. Aesthet Surg J. 2013; 33: 522-528.
14. Klit A, Siemssen PA, Gramkow CS. Treatment of congenital unilateral hypoplastic breast anomalies using autologous fat grafting: a study of 11 consecutive patients. J Plast Reconstr Aesthet Surg. 2015; 68:1106–1111.
15. Abboud MH, Abboud NM, El Hajj H. A novel approach for tuberous breast correction using power-assisted liposuction, loops, and lipofilling (PALLL). Aesthet Surg J. 2022;42(11):NP613–NNP29
16. Innocenti A, Innocenti M, Mori F, et al. Tuberous breast: past, present, and future:

personal classification, treatment, and surgical outcomes. Ann Plast Surg. 2018; 80:104–108.
17. Andjelkov K, Music N, Mosahebi A, et al. Management of nipple-areola deformity. Aesthetic Plast Surg . 2021; 45(4):1407–1415.
18. Ionescu R, Dima D, Antohi N. Intra-Areolar Pexy: The “Compass Rose” Suture Technique for Small and Moderate Areola Herniation. Aesthet Surg J . 2019; 39(4):393–402.