



New proposal for the use of the Becker 35 expander in second large volume breast reconstruction

Nova proposta para utilização de Becker 35 no segundo tempo de reconstrução mamária de grandes volumes

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■ ABSTRACT

Introduction: Immediate breast reconstruction performed with the Becker expander is a versatile and accepted technique. We present an original proposal for the use of the Becker expander for a second breast implant. **Methods:** A retrospective study was performed between January 2014 and October 2016. Medical records were used to evaluate the indications and complications, the use of radio- and chemotherapy, and comorbidities in all patients, including 5 in whom combined implantation was performed. **Results:** The Becker expander was used for 193 reconstructions in 168 patients, including 25 cases with bilateral reconstructions. The average patient age was 47 years, and 33% had comorbidities. Postoperative radiotherapy and chemotherapy were performed in 119 patients (62%). Complications included seroma in 7 patients, hematoma in the mastectomy flap in 2 patients, partial necrosis of the mastectomy flap in 3 patients, and necrosis/infection with expander exposure in 2 patients. Complications occurred in 9.5% of the cases. A total of 133 (69%) patients underwent a second surgical stage to complement breast reconstruction, with the Becker expander being replaced by a definitive implant. Patients in whom the Becker 35 expander was used in a second breast implant developed no complications. **Conclusions:** the use of the Becker 35 expander for a second breast implant was effective in achieving greater volume in breast reconstruction with a low rate of complications.

Keywords: Mammoplasty; Reconstructive surgical procedures; Breast implantation; Tissue expansion devices; Breast.

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■ RESUMO

Introdução: A reconstrução imediata de mama realizada com o expensor de Becker é uma técnica de reconstrução versátil e consolidada na prática médica. Apresentamos uma proposta original com o uso do expensor de Becker associado a um segundo implante mamário. **Métodos:** Estudo retrospectivo realizado no período de janeiro de 2014 a outubro de 2016 no Hospital A.C. Camargo. A análise dos prontuários das pacientes reconstruídas com Becker 35 avaliou o índice e tipo de complicações e a associação de rádio e quimioterapia e comorbidades das pacientes com 5 casos de associação de implantes. **Resultados:** 193 reconstruções com Becker em 168 pacientes. Vinte e cinco casos com reconstrução bilateral. Idade média de 47 anos e 33% apresentaram comorbidades. Cento e dezenove (62%) pacientes seguiram radioterapia e quimioterapia pós-operatórias. **Complicações:** seroma em 7 pacientes, hematoma no retalho da mastectomia em 2 pacientes, necrose parcial do retalho da mastectomia em 3 pacientes, necrose/infecção com exposição do expensor em 2 pacientes. O total de complicações foi de 9,5%. Um total de 133 (69%) pacientes foram submetidas a esta segunda etapa cirúrgica para complementação da reconstrução da mama, sendo o expensor de Becker substituído por um implante definitivo. As pacientes com uso de Becker 35 associado a outro implante não apresentaram complicações. **Conclusões:** A associação do implante-expensor de Becker 35 a um segundo implante mamário foi eficaz em atingir um volume maior nas reconstruções mamárias com baixo índice de complicações.

Descritores: Mamoplastia; Procedimentos cirúrgicos reconstitutivos; Implante mamário; Dispositivos para expansão de tecidos; Mama.

INTRODUCTION

Breast reconstruction is part of a multidisciplinary approach to treat breast cancer. It can be performed using flaps (autologous tissue) and breast implants alone or in combination.

Immediate breast reconstruction (IBR) follows mastectomy. Collaboration between the mastologist and plastic surgeon is necessary. Advantages include a single hospital stay, a single operation under anesthesia, reduced hospital costs, ease of exposure of the surgical field by mastectomy for reconstruction, aesthetically restored balance, and psychological reassurance for the patient^{1,2}.

In 1984, Becker advocated the use of a permanent expander, combining the benefits of silicone gel, saline implant, and expander implant into a single product, which could allow breast reconstruction in a single step.

The definitive Becker expander has a double lumen and a textured external surface and contains silicone gel as 35% of the expander volume in the anterior layer, with a posterior chamber for an additional

65% that can be filled with saline solution using an external valve³. IBR using the breast expander is simpler and faster, with shorter convalescence time compared to other reconstruction techniques^{4,5}.

Despite being a simple method for breast reconstruction, the use of the Becker expander has unique features and like any technique is associated with some complications.

Late complications may be intense and deforming in a minority of patients and may be a cause of pain, especially after radiotherapy⁶. Other complications include seroma formation, infections, and tissue necrosis resulting from the surgical trauma of mastectomy^{7,8}. Inconveniences include the acquisition and cost of expanders, quality control, risk of elastomer rupture, and need for outpatient follow-up for expansion sessions⁹.

Many implants are available, but in patients with very large breasts, no implants have sufficient volume for adequate reconstruction.

The original proposal of this study is the use of the Becker expander combined with a second breast implant. The Becker expander is the basis for the

second implant, thus determining the final volume of the reconstructed breast.

OBJECTIVE

The objective of this work is to present a new proposal for breast reconstruction using the Becker 35 expander in large-volume breast reconstruction.

METHODS

This retrospective study examined the medical records of the senior author's patients. The following inclusion criteria were established: patients who had undergone breast reconstruction using the Becker Expander 35, in which posterior breast symmetrization had been performed, but the volume of the new implant was insufficient for aesthetic adequacy even with the reduction in the size of the opposite breast. The study period was between January 2014 and October 2016.

The consultations, diagnostic investigation, surgical treatment, adjuvant oncological treatment, and clinical oncological follow-up were performed at the Hospital AC Camargo - Cancer Center of Fundação Antônio Prudente - São Paulo, SP.

The patients were followed-up by a multidisciplinary team from the Hospital do Câncer that included professionals from the following specialties:

- **Plastic Surgeons** - Performed evaluation of the patient's psychological motivation and general and specific clinical and physical conditions relevant to reconstruction, such as contralateral breast conditions, scars, shape, and volume of the breasts. The donor areas were determined with the participation of the patient.
- **Mastologists** - Were involved in staging, on the basis of clinical parameters, imaging, and anatomic-pathologic assessment according to the TNM classification (Union for International Cancer Control). The mastologist performed mastectomy and was involved in ongoing oncological management.
- **Radiotherapists** - Assisted in follow-up, methodology, and management of complications.
- **Clinical Oncologists** - Were involved in the evaluation of clinical conditions, choice of drugs/doses, and management of complications of chemotherapy.
- **Anesthetists** - Performed preoperative evaluation and determined the anesthetic technique.
- **Pathologists** - Performed all tissue examinations including immunohistochemistry.
- **Psychiatrists** - Provided support for mastectomy patients.

- **Physiotherapists** - Enabled upper limb functional recovery after mastectomy.
- **A Dressing group** - Provided nursing with specific techniques for use in breast reconstruction.

The expander is placed in submuscular position, following dissection of the pectoralis major, with additional coverage using the serratus anterior and anterior sheath of the rectus abdominis when needed.

Dissection was performed with reference to the original submammary sulcus and the anatomic limits of the breast. This ensures adequate coverage for the expander. The volume of the expander is determined by reference to the contralateral breast and the weight of the mastectomy product.

When implants overlapped, the Becker expander was completely emptied prior to removal of the valve and adjustments were performed when necessary.

Vacuum drainage was routinely used.

When the proposed technique was used in the second surgical step, the procedure was as follows. The expander was completely emptied (Figure 1), maintaining only the silicone, i.e., 35% of the original volume of the expander (Figure 2).



Figure 1. Emptying the Becker expander Implant. The catheter attached to the valve is removed using an internal sealing system.

When the expander was drained, the valve and connector were also removed. The Becker expander was used as a basis to support a conventional breast implant with a round (Figure 3) or anatomical profile (Figure 4).

The study was approved by the institutional ethics committee.

RESULTS

Of 168 patients who underwent IBR, 25 had a bilateral procedure, for a total of 193 breast



Figure 2. Empty Becker Expander Implant. Note the presence of gel at the top of the implant and the empty bottom acting as the base.



Figure 3. Round conventional implant on a Becker expander.

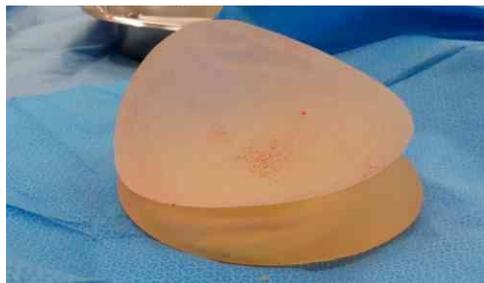


Figure 4. Anatomic implant on a Becker expander base.

reconstructions. The mean age was 47 years; 49 patients were smokers, 57 had systemic arterial hypertension, 22 had diabetes, 9 had heart disease, and 5 had other diseases.

Complications in this group included seroma in 7 patients, hematoma in the mastectomy flap in 2, partial necrosis of the mastectomy flap in 3, and necrosis/infection with expander exposure in 2. One or more complications occurred in 9.5% of all cases.

One or more clinical aggravating factors were present in 33% of patients undergoing mastectomy and immediate reconstruction.

TNM stages ranged from Tis / T1n0m0 to T4n2m0. The mean surgical time for breast reconstruction was 1 hour.

Regarding adjuvant treatment, 119 (62%) patients had postoperative radiotherapy and chemotherapy and 83 received chemotherapy alone.

Only plastic surgery was performed in the second surgical phase of breast reconstruction. In this second phase, reconstruction of the papillary plate and mammoplasty for contralateral breast symmetrization were performed, when necessary, in unilateral cases, with or without the use of breast implants.

A total of 133 (69%) patients underwent this second surgical stage to complement breast reconstruction, with the Becker expander being replaced by a definitive implant. Complications in this group included seroma in 1 patient, hematoma in the mastectomy flap in 2, contralateral mammoplasty hematoma in 2, marginal necrosis in the mastectomy flap in 3, and necrosis/infection with breast implant exposure in 2 (more than one complication may have occurred in the same patient). One or more complications associated with the second surgical phase occurred in 4.5% of cases.

The technique proposed in this study was adopted in 5 patients (3.75%): the empty Becker expander was used with a second breast implant. There were no complications in this group. The aim of this technique was to increase the volume, base, and projection of the reconstructed breast, in which use of a mammary implant alone would not be satisfactory.

DISCUSSION

Appropriate selection of patients, planning, and good technical execution are essential for a good result in breast reconstruction without complications^{10,11}. However, patient characteristics such as large breast volume, a wide breast base, and obesity are challenges often encountered by the plastic surgeon (Figuras 5, 6 e 7).

The Becker expander is a very useful tool for breast reconstruction, but its use should be limited⁶. Becker's initial proposal for reconstruction in a single operation has not proved feasible in the long run, since many surgical adjustments are necessary to achieve an optimal outcome¹². The volume of the implant is a factor that often limits its permanence.

Exchange of the expander with a definitive implant is generally well tolerated by the patient and is an opportunity to make new adjustments for adequate symmetrization¹³. In the present study, the need for capsulotomy was considered, as well as adequacy of lateral projection of the implant in the thoracic cavity with limited attachment points, adjustment in the height of the mammary groove, and vertical repositioning of the implant, since the expander tends to be in a higher thoracic position.



Figure 5. Patient 1 - Right breast reconstructed with the described technique - Empty Becker Expander implant with the superimposed round high-profile implant. Note the similar widths of the breast bases.



Figure 6. Patient 2 - Left breast reconstructed with the described technique - Empty Becker expander with the superimposed round high-profile implant.



Figure 7. Patient 3 - Right breast reconstructed with the described technique - Empty Becker expander with the superimposed anatomical implant.

The largest available Becker expander accommodates 685 cc, with temporary overexpansion of up to 795 cc. The high-volume, high-profile round implant (Mentor) accommodates 800 cc. In 5 patients in this study, the volume provided by an available implant would not have been sufficient to reach the desired volume or sufficient to obtain adequate symmetry. Even if the volume provided by a single implant was sufficient, the breast base, breast height, and projection ratios would not have been not adequate in these 5 patients with very bulky breasts.

We believe that the technical features of the Becker 35 expander provide larger horizontal/vertical measurements than breast implants, despite smaller anterior projection, enabling overlap with a second breast implant to obtain more adequate symmetry.

In the present study, the replacement rate of the expanders was 69%. Chew et al.⁸ reported a 68% exchange and/or removal rate for expanders in 5 years of follow-up. In Brazil, Cammarota et al.⁶ reported a 28.57% replacement rate for expanders combined with implants. In 15.53% of the cases, the procedure was sufficient, without need for additional methods.

Complications did not occur with this procedure; moreover, no comparison is available in the literature for the proposed technique.

Adipose tissue grafting is a current proposal in mammary reconstruction enhancement and has proven to be very effective, as demonstrated by Bezerra et al.¹⁴ However, in cases requiring large volumetric increases, several approaches may be needed to achieve this goal. In Brazil, Blumenschein et al.¹⁵ reported the possible use of lipoenxertia in breast reconstruction to achieve an aesthetic volume increase.

CONCLUSION

The use of a Becker 35 implant with a second breast implant was effective in achieving larger volume in mammary reconstruction in carefully selected patients. The technique is reproducible and has a low rate of complications. More studies and longer postoperative follow-up are necessary to reach more specific conclusions.

COLLABORATIONS

- AKD** Analysis and/or interpretation of data; final approval of the manuscript; completion of surgeries and/or experiments; writing the manuscript or critical review of its contents.
- JAJ** Final approval of the manuscript; writing the manuscript or critical review of its contents.

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