

# Use of a Flap Composed of Skin and Breast Tissue for Repairing a Recalcitrant Wound Resulting from Dehiscence of Sternotomy in Cardiac Surgery

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## Objective

*To describe a new technique for repairing recalcitrant wounds resulting from infection and dehiscence in sternotomy of cardiac surgery in 6 women, who had an extensive raw area in the sternal region and had undergone a previous reintervention with relapse.*

## Methods

*The surgical technique used was based on a triangular flap composed of skin and breast tissue with a base in the inframammary crease, which was transposed to the raw area to provide coverage with vascularized tissue.*

## Results

*The several treatments of the acute phase are discussed, as are the techniques for reconstructing dehiscences of the sternal region.*

## Conclusion

*That flap composed of skin and breast tissue fulfills the needs regarding the dimensions of tissue loss in the raw area, in addition to providing greater protection against infection to an area that, due to the dehiscence, remained exposed for a longer period.*

## Key words

*cardiac surgery, plastic surgery, coronary artery disease, dehiscence*

Median sternotomy was first described in 1957 as an access route for cardiac surgery. Dehiscence of that incision has been associated with high indices of morbidity and mortality.

In 1976, Lee et al <sup>1</sup> reported the use of the great omentum for covering that mediastinal flaw. A little later, Jurkiewicz et al <sup>2</sup> reported the use of muscular flaps, which favored the earlier repair of raw areas and a significant reduction in the indices of chronic infection because it added vascularized tissue.

Debridement associated with early and aggressive use of antibiotics and, when necessary, the use of flaps has been the basis of the therapy in cases of dehiscence of sternotomy for the past 20 years, reducing drastically the indices of morbidity and mortality <sup>3-6</sup>.

Most dehiscences may be corrected only with resuture of the borders after an improvement in the conditions of the tissues involved. However, sometimes that is not possible due to tissue loss or when great tension is exerted in the final suture.

The type of flap should be chosen according to the change present. The discussion about choosing a muscular or musculocutaneous flap or a cutaneous flap is based on the vascularization of each flap. A very well irrigated flap could favor the eradication of infection and increase the vitality of the tissues involved, favoring a more rapid stabilization of the infection and healing process.

However, in 1981, some studies <sup>7,8</sup> about the use of different types of flaps for the treatment of pressure ulcers reported that cutaneous flaps or those composed of other tissues may have the same efficacy of muscular flaps, and eventually, provide a better and more effective esthetic result. Therefore, muscular flaps can be an option in cases of relapse.

This study presents a new technique for reconstructing the sternal region with flaps composed of breast tissue in women. The result was effective, with lower morbidity and better quality than those of muscular flaps.

## Methods

In 2001, 1445 cardiac surgeries were performed through sternal access, 66 of which evolved with infection in the sternal region and 15 with mediastinal impairment. Twenty-four patients had partial or total dehiscence of the sternotomy and had to be resutured. Eight had relapse of the dehiscence, and in 6 the technique of the breast tissue flap was used. In 2 other patients, the musculocutaneous flap of the greater pectoral muscle was used.

A triangular flap with a proximal base is demarcated in the

base of the breast in the inframammary crease in contiguity with the raw area. The base of the flap must have the same dimensions as the base of the sternal flaw and the height must be equal to or greater than that of the raw area (fig. 1). The flap is released and dissected until the fascia of the greater pectoral muscle. After mobilization of the flap, an incision is performed in the inframammary crease, in the lateral direction, with dimensions varying according to the quantity of mammary tissue available and the elasticity of the skin. That incision extends until the fascia, and the breast is dissected laterally in its deep plane. The breast tissue should be released and medially rotated, filling the donor's created flaw (fig. 2). The planes are approximated.

The procedure can be bilateral, according to the dimensions of the raw area.

## Results

Of the 6 patients operated on, 2 underwent the bilateral procedure. Two patients had areas of superficial necrosis in the distal extremity of the flap of at most 1 cm, which healed spontaneously, without changes in the final result. No dehiscences occurred (fig. 3, 4, and 5).

## Discussion

The complications of sternotomy depend on the surgical technique used, as well as on the general conditions of the patient. They occur more often in patients with arterial hypertension, obesity, chronic obstructive pulmonary disease, diabetes, and renal diseases, increasing their morbidity and mortality. Some clinical situations



Fig. 3 – Patient with secondary dehiscence of sternotomy after resuture. Patient in the orthostatic position.

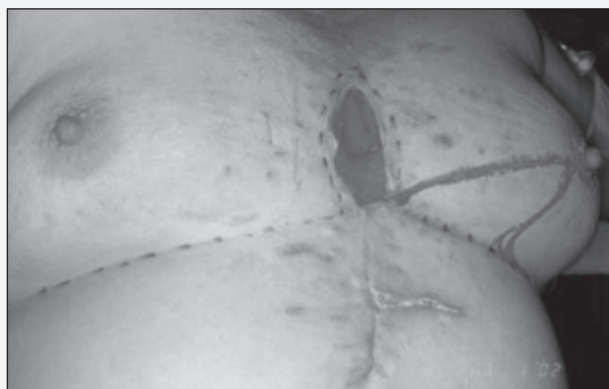


Fig. 4 – Margins of resection and demarcated flap.



Fig. 5 – Final aspect on the 30th postoperative day.

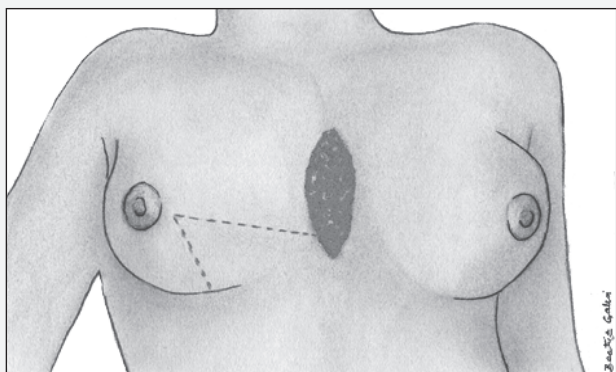


Fig. 1 – Sketch of the markings of the composed flap.

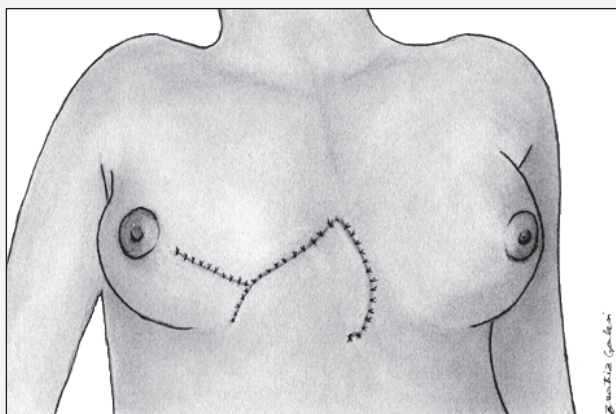


Fig. 2 – Sketch of the result after flap rotation.

are considered of greater risk, such as smoking, reoperations, and a long length of stay in the intensive care unit <sup>9,10</sup>.

This type of patient frequently has significant hemodynamic changes, and, when coverage of the sternal raw area is necessary, lower risk procedures allowing greater viability of the tissues involved are required.



After the description of the first musculocutaneous and muscular flaps for the treatment of dehiscences of sternotomy<sup>2-4,11</sup>, those flaps began to be widely used and the cutaneous flaps were abandoned, because of the concept of the need for highly vascularized flaps. The muscle or great omentum, when used as vectors of vascularization, may provide greater safety<sup>12,13</sup>, mainly in high-risk patients. However, as already seen in the treatment of pressure ulcers, many times a cutaneous flap of adequate dimensions and good vascularization may be more effective and safer than a complex flap<sup>7</sup>.

In resutures of sternotomy, the difficulties of approaching the superior and inferior portions of the incision involve distinct characteristics and management. In the superior portion of the sternotomy, the borders are more easily approximated and may have the vascularization increased by the inclusion of the greater pectoral muscle in the advanced flap. That muscle, when released, helps to fill the central raw area.

On the other hand, the treatment of the inferior portion of the sternal incision poses greater difficulties due to the absence of available contiguous muscles, which may help in increasing vascularization of the advanced and released cutaneous flaps. The necrosis of the borders with substance loss hinders the procedure

even more. In the most severe cases, musculocutaneous flaps of the rectus muscle of the abdomen and of the great dorsal muscle, or even the omentum have been used. However these surgeries are extensive and have a greater chance of complications, mainly in patients with circulatory changes<sup>14</sup>. The breast tissue flap that we use has a significant vascularization, and the surgical procedure for its obtainment is less aggressive and has lower morbidity. The flap interposed in the inferior portion of the dehiscence favors the approximation of the borders without tension in the final suture.

The base of the flap described is located in a region with arterial pedicles, and if its height is compatible with the dimensions of the base, that flap will be very safe. The amount of breast tissue available may fill the cavity resulting from tissue necrosis in the sternal area, providing nutritional supply for the tissues, especially to the sternum, sometimes exposed for a long time.

Although the flap is limited to patients with sufficient breast tissue, it should be the first choice in female patients with dehiscence of the sternotomy, leaving the musculocutaneous flap and the omentum flap for more complex clinical situations. The esthetic sequelae of that type of flap are minimum and well tolerated by patients, due to their more advanced age and presence of mammary ptosis.

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