

Esthetic Correction of *Pectus Excavatum*

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Key Words: Pectus Excavatum, Funnel Chest, Thoracic Deformity

Abstract

Pectus excavatum is the most common deformity of the chest wall. The scope of the technique described is to resolve the esthetic part of this pathology. Two cases are used to illustrate this work which employs adipose glandular flaps advanced toward the mid-portion of the thorax. A silicone prosthesis was inserted in the female patient. If correctly indicated and executed, this minimally invasive technique achieves satisfactory esthetic results with lower post-operative morbidity.

Introduction

Pectus excavatum is the most common chest wall deformity⁶. The pathology presents with an acute posterior curvature of the chest, extending from the manubrium to the xiphoid process, and is deeper on the distal portion. Sometimes, associated defects may be present, i.e., protruding abdomen, kyphoscoliosis, hypomastia and

rarely cardiorespiratory pathologies¹.

Various theories have been proposed to explain this defect, among them the intrauterine position of the fetus, rickets, presence of a substernal ligament which would promote depression of the sternum, retraction of the central tendon of the diaphragm, congenital aplasia of the sternum, congenitally short rectus muscles, mediastinal tumor and hereditary syphilis¹. However, the most acceptable explanation is that there might be an unproportional growth of the rib cartilages and consequently retroposition of the sternum. The latter is termed *Pectus excavatum*, or if the sternum is positioned anteriorly, the result is *Pectus carinatum*³.

Occasionally, the sternal retroposition may affect the cardiac and/or pulmonary dynamics. A systolic murmur can be heard in these patients and a chest X ray reveals heart displacement. The ECG may demonstrate axis deviation, abnormal P waves and conduction disturbances. In spite of these findings, the majority of patients are asymptomatic and without functional impairment¹¹.

The first report of this pathology is attributed to Bauhinus² in 1594. In 1913, Sauerbruch¹² accomplished the first successful corrective surgery. Ochsner and DeBakey⁸, in 1939, presented a classical study, on the surgical treatment of this pathology. Brown and Ravitch¹⁰, subsequently defined the basic principles for correction of *Pectus excavatum*. Since then, various modifications requiring costochondral dissection and mobilization of the sternum have been described. In 1965, Murray⁷ reported the insertion of a silicone implant

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for correction of the defect, a technique utilized with some modifications, until the present time. The aim of the procedure described is to correct the esthetic element of the pathology and two cases will be used to illustrate this.

Material and Methods

This study was conducted in 1995, in the “Centro Científico Brasileiro de Cirurgia Plástica”, Santos-São Paulo. Two patients underwent surgery: a white, 18 years old male with only a cosmetic defect, without cardiorespiratory symptoms and with a moderate amount of adipose-glandular tissue in the chest wall. The other patient was a white, 31 years old female, without cardiorespiratory problems, with sternal depression associated with lateralization of the breasts, and on profile, showed the areola corresponding to the highest point of the sternum. Because of her body image, this patient also presented with severe psychological changes.

Operative Technique

The technique employed adipose-glandular flaps together with a silicone prosthesis in the female patient. In this patient, an incision about 0.7 cm long was made in the projection of the submammary fold followed by wide undermining of the supra-aponeurotic plane which also included the excavated portion of the sternum. Then by undermining the subcutaneous layer, an adipose-glandular flap was fashioned from the internal part of each breast (internal pedicle) (Fig. 1). These flaps were rotated medially and sutured to the excavated portion of the chest and the rest of each breast was turned to close the dead space left by the flap rotation (Fig. 2). After meticulous hemostasis, the silicone prosthesis were placed and the skin sutured (2-0 mononylon intradermic suture). Suction drains, exteriorized by a stab wound were employed and maintained until the volume was reduced to 30 ml/day, corresponding to five days.

A 0.8 cm long midsternal fusiform incision was made in the male patient. This incision was used to attach the adipose-glandular and dermo-adipose flaps (Fig. 3). Wide supra-aponeurotic undermining was also accomplished, limited by: the anterior axillary line, projection of the mammary fold and projection of the second rib.

The adipose-glandular flaps were fashioned bilaterally

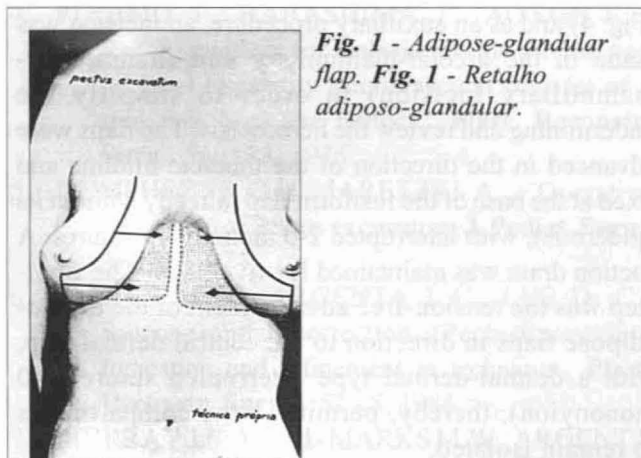


Fig. 1 - Adipose-glandular flap. Fig. 1 - Retalho adiposo-glandular.

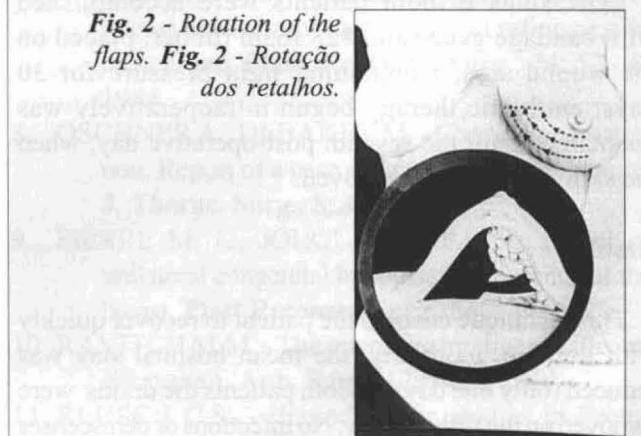


Fig. 2 - Rotation of the flaps. Fig. 2 - Rotação dos retalhos.



Fig. 3 - Midsternal fusiform incision. Fig. 3 - Incisão médio-esternal em fusão.

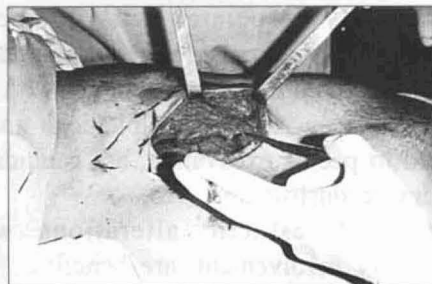


Fig. 4 - Adipose-glandular tissue. Fig. 4 - Retalho adiposo-glandular.

(Fig. 4) and as an auxiliary procedure, an incision was made in the areolar-mammillary unit (transareolar-mammillary incision) in order to simplify the undermining and review the hemostasis. The flaps were advanced in the direction of the thoracic midline and fixed at the base of the fusiform flap (already without its epidermis), with interrupted 2-0 mononylon sutures. A suction drain was maintained for five days. The final step was the tension-free advancement of the dermo-adipose flaps in direction to the central dermal flap, with a dermal-dermal type interrupted suture (2-0 mononylon), thereby, permitting the compartments to remain isolated.

LDressings in both patients were accomplished with bandage gauze and #28 foam rubber, placed on the wound area, maintaining light pressure for 30 days; antibiotic therapy begun intraoperatively was maintained until the seventh post-operative day, when the skin sutures were removed.

Results

This technique enabled the patient to recover quickly with low p.o. morbidity, the mean hospital stay was reduced (only one day). In both patients the drains were removed on the fifth p.o. day. No infections or dehiscences occurred nor did seromas or hematomas form.

The scars were esthetically pleasing, which contributed much to increase the patients satisfaction with their body image (Figs. 5,6,7,8).

Discussion

According to the literature, the etiology of *Pectus excavatum* is secondary to an excessive growth of the ribs dislocating the sternum to accomodate them³. This defect is usually present at birth and progresses with the child's growth. After adolescence, it is characteristically associated with lombodorsal scoliosis, round shoulders and protruding abdomen¹.

Regarding surgical indication: patients with cardiac changes, dyspnea on exercise, palpitations and chest pains related to pectus excavatum, are candidates for costochondral reconstruction.

Subjects with esthetic alterations without cardiorespiratory involvement, are benefitted by this technique, since a thoracic prosthesis is not used, they do not present complications such as displacements, visualization of the prosthesis³ profile or extrusion.



Fig. 5 - Female patient; pre and post-operative frontal aspect. Fig. 5 - Paciente do sexo feminino; pré e pós-operatório - vista frontal.



Fig. 6 - Female patient; pre and post-operative 3/4 left profile. Fig. 6 - Paciente do sexo feminino; pré e pós-operatório - vista 3/4 perfil esquerdo.

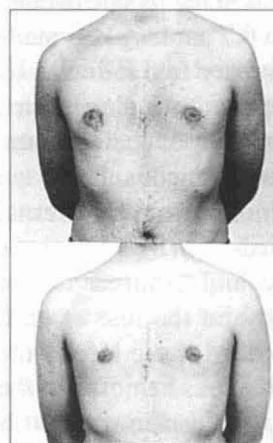


Fig. 7 - Male patient; pre and post-operative frontal aspect. Fig. 7 - Paciente do sexo masculino - pré e pós-operatório - vista frontal.

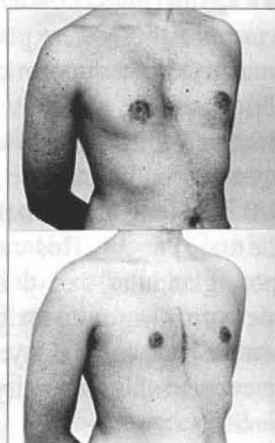


Fig. 8 - Male patient; pre and post-operative 3/4 right profile. Fig. 8 - Paciente do sexo masculino - pré e pós-operatório - vista 3/4 perfil direito.

We would like to point out that breast prosthesis placed at a second 1 stage would be better indicated because the adipose-glandular or dermo-adipose flaps occasionally present various degrees of ischemia and the prosthesis placed at the same surgical stage may lead to compression and ischemia of the flaps.

Conclusion

The technique reported achieved satisfactory results, it is accomplished in a single stage, permits a rapid recovery and without large scars.

Since the most common indication for *Pectus excavatum* is esthetic⁵, it is mandatory that we employ the simplest and safest procedure, a condition fully met by this technique.

References

1. ASTON J.S., PICKRELL L.K. - Chest wall reconstruction. In: CONVERSE, J. M. - **Reconstructive Plastic Surgery**. Volume VII. 2nd. Edition. Philadelphia, W.B. Saunders, 1977, p. 3633-45.
2. BAUHINUS J. Apoud - MARKS M.W., ARGENTA L.C., LEE D.C. Silicone implant correction of Pectus Excavatum: indication and refinement in technique. **Plast Reconstr. Surg.** 74:52-8, 1984.
3. EHRENHAT T.L., ROSSI N.P., LAURENCE M.S. - Development chest wall defects. **Ann. Thorac. Surg.**, 2: 384, 1966.
4. FUGIMO T., HARASHIMA T., AOYGE F. - Reconstruction for aplasia of the breast and pectoral region by microvascular transfer of a free flap from the buttock. **Plast. Reconstr. Surg.**, 56: 178, 1975.
5. HUMPHREYS G.H., JARETZKI A. - Operative correction of Pectus excavatum. **J. Pediat. Surg.**, 9: 899, 1974.
6. MARKS M.W., ARGENTA L.C., LEE D. C. - Silicone implant correction of Pectus Excavatum: Indication and refinement in technique. **Plast. Reconstr. Surg.** 1:52 - 8, 1984.
7. MURRAY J.F. Apoud - MARKS M.W., ARGENTA L.C., LEE D.C. - Silicone implant correction of Pectus excavatum: Indication and refinement in technique. **Plast. Reconstr. Surg.**, 74: 52 - 8, 1984.
8. OSCHNER A., DEBAKEY M. - Chonechondrosternum: Report of a case and review of the literature. **J. Thorac. Surg.**, 8: 469, 1939.
9. PIERRE M. L., JOUGLARD J.P. - Treatment of unilateral congenital hypoplasia or absence of the breast. **Plast Reconstr. Surg.**, 56: 146, 1975.
10. RAVITCH M.M. - The operative treatment of Pectus excavatum. **Ann. Surg.**, 129: 429, 1949.
11. REUSCH C.S. - Hemodynamic studies in Pectus excavatum. **Circulation**, 24: 1143, 1961.
12. SAUERBRUCH D.F. - Apoud - MARKS M.W., ARGENTA L.C., LEE D.C. Silicone implant correction of Pectus excavatum: indication and refinement in technique. **Plast. Reconstr. Surg.**, 74: 52-4, 1984.