International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 04 Issue 05 May 2024

Page No: 842-844

DOI: https://doi.org/10.47191/ijmscrs/v4-i05-12, Impact Factor: 7.949

Thoracic Wall Reconstruction with Thoracoabdominal Flap

Yasmin Sánchez Delgado[1], Christian Enrique Soulé Martínez[2], Héctor Manuel Suárez Ortega[2], Juan Jesús Ortega Landeros[3], María del Rocío Barrera Figueroa[4], Víctor Mario Martínez Bravo[5], Giselle Castillo Garcia[6], Rogelio Rodríguez Cárdenas[7], César Enrique Pedraza Falcón[8], Alvaro Sebastian Gutierrez Macklis[9], Ariadna Martínez Becerril[10], Karla Patricia Montoya Moreno[11], Fernanda Berenice Ramírez García[12]

[1]Hospital General de México S.S CDMX
[2]CMN Lic. Adolfo López Mateos, Toluca Estado de México.
[3]Hospital Regional Licenciado Adolfo López Mateos, ISSSTE CDMX
[4]Hospital General Dra. Matilde Petra Montoya Lafragua, Tláhuac, ISSSTE CDMX
[5]Hospital Regional ISSSTE Veracruz
[6]Hospital General La Villa CDMX
[7]Hospital General Regional 46 Lázaro Cárdenas, IMSS Guadalajara Jalisco
[8]Centro de Alta Especialidad Dr. Rafael Lucio, Xalapa.
[9]Universidad Autónoma de Baja California, Campus Ensenada. Unidad Valle Dorado
[10]Hospital General Dra. Matilde Petra Montoya Lafragua, Tláhuac, ISSSTE CDMX
[11]Hospital General Norte de Puebla Bicentenario de la independencia
[12]Hospital Juárez de México

ABSTRACT

Reconstructing the chest wall following substantial surgical removal is a challenging task for thoracic, oncologic, and reconstructive surgeons. Common indications include breast cancer, radionecrosis, and malignancies affecting fascia, muscle, and sometimes the ribs. Skin grafts are not a favorable choice due to their thinness and unsuitability of the recipient site. Over the past 30 years, a wide range of flaps have been created to achieve sufficient covering and protection of intrathoracic structures.The Tai and Hasegawa technique, developed in 1974, involves using a transverse fasciocutaneous flap taken from the same side of the body in the thoracoabdominal region. Davis and McCraw made modifications to this technique in 1977, and Brown and Vasconez in 1975 revealed the presence of musculocutaneous perforator branches originating from subcostal, intercostal, and lumbar arteries. Baroudi introduced a contralateral thoracoabdominal fasciocutaneous flap in 1978.In the 1980s, muscular and musculocutaneous flaps became widely accepted as the best method for reconstructing the chest wall. However, there have been limited comparison studies published, making it difficult to determine whether musculocutaneous flaps are preferable than fasciocutaneous flaps. Deo et al. (2019) proposed that the fasciocutaneous "thoracoabdominal" flap should be considered as the primary choice.The extended cutaneous thoracoabdominal flap is a straightforward and efficient surgery that can be completed in a single step. It is generally safe and rarely results in tissue death, and its generous mobility and "back-cut" incision facilitate advancement and rotation. However, it has drawbacks such as the inability to carry out an instant breast reconstruction and the presence of lengthy scars on the abdominal wall.

ARTICLE DETAILS

Published On:
16 May 2024

Available on:
https://ijmscr.org/

INTRODUCTION

Reconstructing the chest wall following substantial surgical removal has consistently posed a difficult task for thoracic, oncologic, and reconstructive surgeons. Typical indications include breast cancer that has spread locally, radionecrosis

(tissue death caused by radiation therapy), and malignancies that affect the fascia, muscle, and sometimes the ribs [1].

The main objective of reconstruction is to achieve sufficient covering and ultimately protection of intrathoracic structures, while avoiding any interference with respiratory processes, and achieving a satisfactory aesthetic result. Due to their thinness and the unsuitability of the recipient site, skin grafts are not a favorable choice. This has led to the creation of a wide range of flaps over the past 30 years [2].

The Tai and Hasegawa technique, developed in 1974, involves using a transverse fasciocutaneous flap taken from the same side of the body in the thoracoabdominal region. This flap is based on perforator vessels from the superior epigastric artery and vein. Davis and McCraw made modifications to this technique in 1977. The vascular architecture of the anterior and lateral abdominal wall was further elucidated by the investigations conducted by Brown and Vasconez in 1975. These studies also revealed the presence of musculocutaneous perforator branches originating from subcostal, intercostal, and lumbar arteries, which have the potential to feed laterally based flaps [3].

In 1978, Baroudi introduced a contralateral thoracoabdominal fasciocutaneous flap, which was later modified by Rivas, to stretch from the middle sternal line to the anterior axillary line on the other side of the defect. During the 1980s, muscular and musculocutaneous flaps became widely accepted as the best method for reconstructing the chest wall [4].

Flaps such as the pectoralis major, latissimus dorsi, serratus anterior, rectus abdominis, and omentum have all been utilized, either as pedicled or free flaps. These flaps have proven to be effective in providing sufficient coverage, even when taken from a distant location [5].

Therefore, Hodgkinson, Bogossian, and Moschella introduced novel musculocutaneous flaps collected from the external oblique abdominis muscle, as an alternative to big thoracoabdominal flaps. These advancements were made in 1980, 1996, and 1999, respectively. Although there are several surgical variants available, there have been only a limited number of comparison studies published. As a result, it is now difficult to determine whether musculocutaneous flaps are preferable than fasciocutaneous flaps. Deo et al. (2019) proposed that the fasciocutaneous "thoracoabdominal" flap should be considered as the primary choice [6].

DISCUSSION

Figure 1. Wide resection, defect measuring 20 x 18 cm

Figure 2. thoracoabdominal flap rotation

Figure 3. thoracoabdominal flap rotation, lateral view

The selection of the optimal reconstructive procedure for chest wall reconstruction is influenced by several crucial factors, including the advanced stage of the tumor, difficulties arising from radiation in the surrounding tissue, and the patient's poor general health [1, 2].

Reconstructive surgery has historically relied on the deployment of muscular or other pedicled flaps to address significant chest wall abnormalities. Historically, muscular and musculocutaneous flaps have been widely favored, however, cutaneous flaps have also demonstrated their use. The extended cutaneous thoracoabdominal flap is a straightforward and efficient surgery that may be completed in a single step. It has shown to be a compelling choice for specific situations [2, 5].

When comparing it to comparable flaps discussed in the literature, such as Moschella and Bogossian, it is important to note certain discrepancies. Moschella extracted the external obliqui abdominis, whereas Bogossian included at least its fascia. Contrary to what was previously believed, our experience has shown that it is not necessary to remove or destroy the muscle or its fascia. This is because the survival of the flap is guaranteed by the great size of the pedicle and the abundant blood supply provided by the muscle perforators. The dissection of the flap can be conducted only inside the subcutaneous layer, utilizing the trajectory of the cutaneous branches originating from intercostal, subcostal, and lumbar arteries. Preserving both muscle and fascia reduces the negative effects on the donor site and does not compromise function, while still allowing for a full range of flap size and rotation. This flap is the largest ever observed in this area. Despite significant undermining, it is generally safe and rarely results in tissue death. The generous mobility and the "back-cut" incision, which should be limited to the emergence of the distal perforator, facilitate the advancement and rotation of the flap. This allows the surgeon to successfully close large defects, up to 600 cm2 in size, extending as far as the second intercostal space. Furthermore, this flap provides a remarkable match in terms of skin color and texture. It eliminates the necessity for repositioning the patient on the operating table throughout the reconstruction process. Additionally, it allows for the donor site to be closed without significant displacement of the umbilicus [1-6].

Additional drawbacks of the cutaneous thoracoabdominal flap include the presence of lengthy scars on the abdominal wall and the inability to perform a subsequent musculocutaneous transverse rectus abdominal flap, while it does not hinder the execution of a contralateral vertical rectus abdominal flap. It is important to highlight that scars in the omolateral hypochondriac region, which cause a disruption in blood flow, serve as a significant constraint to the method. The procedure appears to be a beneficial tool, particularly for patients with a poor prognosis, because to its low complication rate, speedy patient recovery, and ability to provide further or simultaneous adjuvant therapy [6].

CONCLUSION

The aforementioned cutaneous flap is an excellent choice for covering extensive chest wall abnormalities in patients with advanced breast cancer, radionecrosis, and who decline rapid breast reconstruction. Additional comparison research are necessary in order to make any definitive conclusions regarding the superiority of the approach being discussed.

REFERENCES

I. Chang, R. R., Mehrara, B. J., Hu, Q. Y., Disa, J. J., & Cordeiro, P. G. (2004). Reconstruction of complex oncologic chest wall defects: a 10-year experience. Annals of plastic surgery, 52(5), 471-479.

II. Khalil, H. H., Kalkat, M., Malahias, M. N., Rhobaye, S., Ashour, T., Djearaman, M. G., & Naidu, B. (2018). Chest wall reconstruction with porcine acellular dermal matrix (Strattice) and autologous tissue transfer for high risk patients with chest wall tumors. Plastic and Reconstructive Surgery–Global Open, 6(5), e1703.

III. Persichetti, P., Tenna, S., Cagli, B., & Scuderi, N. (2006). Extended Cutaneous' Thoracoabdominal 'Flap for Large Chest Wall Reconstruction. Annals of plastic surgery, 57(2), 177-183.

IV. Munhoz, A. M., Gemperli, R., & Filassi, J. R. (2012). Reply: Chest Wall Reconstruction for Locally Advanced Breast Cancer with the VY Thoracoabdominal Perforator Flap. Plastic and Reconstructive Surgery, 129(2), 362e-364e.

V. Wee, S. J., Hsu, S. Y., Shih, P. K., Chen, J. X., & Chang, C. C. (2022). Free extended anterolateral thigh myocutaneous flap versus combined pedicled pectoralis major–latissimus dorsi myocutaneous flaps in deep and extensive sternal wound reconstruction. Microsurgery, 42(8), 810-816.

VI. Clemens, M. W., Evans, K. K., Mardini, S., & Arnold, P. G. (2011, February). Introduction to chest wall reconstruction: anatomy and physiology of the chest and indications for chest wall reconstruction. In Seminars in plastic surgery (Vol. 25, No. 01, pp. 005-015). © Thieme Medical Publishers.