CIRUGÍA ESPAÑOLA

www.elsevier.es/cirugia

Special article

Rotational Flaps in Oncologic Breast Surgery. Anatomical and Technical Considerations☆

Benigno Acea Nebril, Sergio Builes Ramírez, Alejandra García Novoa, Cristina Varela Lamas*

Unidad de Mama, Servicio de Cirugía General, Complexo Hospitalario Universitario A Coruña, La Coruña, Spain

ARTICLE INFO

Article history:
Received 18 January 2016
Accepted 18 March 2016
Available online 3 September 2016

Keywords:
Breast cancer
Breast reconstruction
Oncoplastic surgery
Flap

ABSTRACT

Local flaps are a group of surgical procedures that can solve the thoracic closure of large defects after breast cancer surgery with low morbidity. Its use in skin necrosis complications after conservative surgery or skin sparing mastectomies facilitates the initiation of adjuvant treatments and reduces delays in this patient group. This article describes the anatomical basis for the planning of thoracic and abdominal local flaps. Also, the application of these local flaps for closing large defects in the chest and selective flaps for skin coverage by necrosis in breast conserving surgery.

Colgajos por rotación en la cirugía oncológica de la mama. Fundamentos anatómicos y técnicos para su planificación quirúrgica

Palabras clave:
Cáncer de mama
Reconstrucción mamaria
Cirugía oncoplástica
Colgajo

RESUMEN

Los colgajos por rotación constituyen un grupo de procedimientos quirúrgicos que permiten solventar el cierre de grandes defectos torácicos después de la cirugía oncológica de la mama con una menor morbilidad y dificultad técnica respecto a los colgajos a distancia. Su utilización en las complicaciones por necrosis cutánea después de una cirugía conservadora o mastectomías preservadoras de piel permite el inicio de los tratamientos adyuvantes y disminuye las demoras en este grupo de pacientes. Este artículo describe los fundamentos anatómicos para la planificación de colgajos por rotación torácicos y abdominales. Asimismo, se muestra la aplicación de estos colgajos para el cierre de grandes defectos en el tórax y de colgajos selectivos para la cobertura cutánea después de una necrosis durante la cirugía conservadora de mama.

☆ Please cite this article as: Acea Nebril B, Builes Ramírez S, García Novoa A, Varela Lamas C. Colgajos por rotación en la cirugía oncológica de la mama. Fundamentos anatómicos y técnicos para su planificación quirúrgica. Cir Esp. 2016;94:372–378.

* *Corresponding author.*
E-mail addresses: baceneb@sergas.es, baceneb@gmail.com (B. Acea Nebril).

Introduction

Currently, oncologic surgery intends to preserve the body image of most women who are treated surgically for breast cancer, which is made possible by the preservation of anatomical structures in breast-conserving surgery or high-quality breast reconstruction.[1,2] These techniques are possible thanks to the improvements made in the early diagnosis of the disease and the evolution of therapeutic measures that provide better locoregional control of the process.

Nonetheless, there are certain clinical situations in which the excessive loss of local structures makes it necessary to use local anatomical resources for the closure of surgical wounds. These clinical situations are based on 2 different contexts. The first refers to those clinical presentations of breast cancer in locally advanced stages (T3 and T4 tumors) that require extensive excisions in which the closure of the surgical defect is encumbered by the elevated tension on the surgical edges and the high rate of necrosis. These situations involve locally advanced carcinomas that do not respond to neoadjuvant chemotherapy, such as breast sarcomas, whose only therapeutic option is extensive excision of the breast and adjacent structures.[3,4] The second scenario entails complications due to ischemia that would cause a loss of skin coverage and complicate wound closure. This complication affects both conservative surgery, generally associated with oncoplastic procedures,[5] as well as mastectomies, especially in skin preservations.[6] In both situations, the absence of skin coverage would cause a delay in the start of adjuvant treatments (chemotherapy, radiotherapy) (Table 1).

Rotational flaps are a group of surgical procedures that enable surgeons to close large defects with a lower morbidity compared to muscle flaps, be these either pedicled or free. Planning for this technique requires an adequate length-to-width ratio and knowledge of the vascular anatomy of the donor region.

This article describes the anatomical principles for planning thoracoabdominal flaps and the applicability of rotational (or local) flaps during oncologic breast surgery.

Vascular Anatomy of the Anterior Thoracic and Abdominal Wall

Irrigation of the anterior wall of the thorax and abdomen is provided by a complex assembly of interconnected vascular components that contribute to the blood supply of adjacent muscles and teguments. This capacity is based on 2 anatomical structures that guarantee the viability and use of any local flap: the perforating artery trunks and the subdermal plexus. The perforating arteries are responsible for the origin of the blood supply. Knowledge of their locations and distribution is the most important element for the success of a local flap.[7] The subdermal plexus is comprised of an intricate network of microvessels dispersed throughout the skin of the abdomen and thorax, which distributes the blood supplied by the perforating arteries over an extensive skin surface.[8] The subdermal plexus is not affected by the surgical technique. Thus, the most important aspect in designing a local flap is understanding the distribution of the perforating arteries, which allows for flap planning, manipulation during surgery and viability in the postoperative period.

Table 1 – Anatomical Characteristics and Clinical Applications of the Rotational Flaps.

Type of flap	Flap subtype	Origin of vascularization	Clinical applications
Breast flaps	Upper breast flap	– Perforating branches of the internal thoracic artery (main) – Axillary vessels	– Locally advanced tumors of the lower pole – Skin–preserving mastectomy in breast ptosis
	Lower breast flap	– Sixth perforating branch of the internal thoracic artery – Posterior intercostal perforating branches	– Locally advanced tumors of the upper pole – Lower coverage of the breast implant (nonepithelized)
Bilateral advancement flap	Bilateral advancement flap	– Perforating branch of the epigastric artery – Posterior intercostal perforating branches – Groin system	– Locally advanced breast tumors – Breast sarcomas – Thoracic wall sarcomas
Thoracoepigastric flap	Thoracoepigastric flap	– Perforating branch of the superior epigastric artery	– Locally advanced tumors at the lateral region of the breast
	Thoracoepigastric axial flap	– Sixth perforating branch of the internal thoracic artery	– Tumors of the lower–inner quadrant with skin involvement – Cutaneous necrosis in the lower-inner quadrant – Limited necrosis after skin-preserving mastectomy
Thoracoabdominal flap	Thoracoabdominal flap	– Posterior intercostal perforating branches	– Locally advanced tumors in the medial breast region
	Thoracoabdominal axial flap	– Posterior intercostal perforating branches	– Tumors of the lower-outer quadrant with skin involvement – Skin necrosis in the lower-outer quadrant – Limited necrosis after skin-preserving mastectomy