Immediate Implant Based Breast Reconstruction after Prophylactic Mastectomy in High Risk Women

Essay

Submitted for Partial Fulfillment of Master Degree in General Surgery

By

Ahmed Mohamed Ramzy Taha

Under Supervision of

Prof. Dr. Ashraf Al-zoghaby

Professor of General Surgery

Faculty of Medicine, Ain Shams University

Prof. Dr. Salah Nasser Mohammed

Professor of Plastic, Burn and Maxillofascial Surgery

Faculty of Medicine, Ain Shams University

Prof. Dr. Wael Abdel Azeem

Professor of General Surgery

Faculty of Medicine, Ain Shams University

Faculty of Medicine

Ain Shams University

2019

سورة البقرة الآية: ٣٢

Acknowledgement

*First and above all thanks to **Allah,** the most beneficial and merciful for helping me to bring this work to light.*

I am greatly honored to express my deepest thanks, gratitude and respect to **Prof. Dr. Ashraf Al-zoghaby,** *Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his kind guidance, supervision and advice.*

My deepest thanks and appreciation go to **Prof. Dr. Salah Nasser Mohammed,** *Professor of Plastic, Burn and Maxillofascial Surgery, Faculty of Medicine, Ain Shams University, for his unlimited help, keen supervision and valuable advice.*

Also I am so grateful to **Dr. Wael Abdel Azeem,** *Assistant Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his sincere assistance, encouragement, continuous support and it was really a great privilege to me to work under his precise supervision.*

Finally my special thanks go to my family for their lovely support and encouragement and thanks to all my friends and colleagues in the plastic surgery department for their kind help.

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List of Abbreviations

ADM	Acellular dermal matrix
ASPS	
BC	Breast cancer
BCT	Breast conservative therapy
CPM	Conservative prophylactic mastectomy
HRT	Hormone replacement therapy
IBR	Immediate breast reconstruction.
IMF	Infra-mammary fold
MRI	Magnetic resonance imaging
NAC	Nipple and areola complex
NSABP	
NSM	Nipple areola complex sparing mastectomy
PM	Prophylactic mastectomy.
QOL	Quality of life.
SSM	Skin-sparing mastectomies.
SN	Sentinel node
TNBC	Triple negative breast cancer
LCIS	Lobular carcinoma in situ
BRCA1	Breast cancer gene 1
BRCAII	Breast cancer gene 2

PTEN	Phosphatase and tensin homolog
TP53	Tumour protein 53
CDH1	Cadherin 1
STK 11	Serine/theronine kinase 11
USA	United states of America

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Immediate Implant Based Breast Reconstruction after Prophylactic Mastectomy in High Risk Women

Abstract

Background: Breast cancer is the most common malignancy in women and only second to lung cancer, with more than 249,000 new cases expected in the United States in 2016. Moreover the incidence of breast cancer increasing although survival appears to be increasing. Nipple-sparing mastectomies (NSM) and skin-sparing mastectomies (SSM) followed by immediate alloplastic breast reconstruction have emerged as oncologically safe treatment options yielding excellent cosmetic results.

Nipple-sparing mastectomies (NSM) is a surgical approach for breast cancer, and produces a good cosmetic outcome; however, the oncological safety of this technique is still controversial. Some investigators have reported no difference in the local recurrence rates and overall survival rates between NSM and conventional total mastectomy in curative cases, NSM provides good results in term of cosmetic, sensory, and patient QOL outcomes.

Aims: The aim of this work is to highlight on the high risk groups of women who can benefit from the advances in breast reconstruction procedures and to elaborate on the immediate one stage implant based breast reconstruction after prophylactic mastectomy.

Nowadays NSM can be considered the best surgical option for BC treatment when the mastectomy becomes inevitable. NSM is also assessed as an elective indication in risk reduction mastectomy. This surgery allows for an excellent cosmetic results ensuring, at the same time, a correct and complete oncological radicality.

The preservation of the entire skin envelope makes this surgical procedure less traumatic from the psychological point of view of the patient and the reconstruction becomes better and more physiological. The commitment of the scientific community should aim to experiment and explore new surgical techniques that can extend the application of this procedure to an increasing number of patients.

The discovery of the BRCA1 and BRCA2 genes was an important milestone in breast cancer research. Women carrying inherited mutations in BRCA1 and BRCA2 have an extremely high lifetime risk for developing breast cancer.

Keywords: Breast Reconstruction, Prophylactic Mastectomy, Nipple-sparing mastectomies

Introduction

Breast cancer is the most common malignancy in women and only second to lung cancer, with more than 249,000 new cases expected in the United States in 2016. Moreover the incidence of breast cancer increasing although survival appears to be increasing.(1)

The number of women undergoing breast reconstructive surgery has increased dramatically over the past 30 years, and the trend for immediate breast reconstruction after mastectomy has grown from 10% in the 1980s to about 90% today.(2) Nipple-sparing mastectomy is performed when the surgeon believes that nipple-areola complex as well as all of the breast skin can be preserved.

In the last several decades, remarkable progress has been made in the management of breast cancer, with indidualized treatment regimens currently deemed to provide the best care for patients. The goal of breast cancer surgery is not only curative treatment, but also maintenance of good quality of life (QOL) based on cosmetic outcome. Furthermore, advances in diagnostic imaging and gene diagnosis have made it possible to customize surgical approaches according to individual patient characteristics.(3)

Nipple-sparing mastectomies (NSM) and skin-sparing mastectomies (SSM) followed by immediate alloplastic breast reconstruction have emerged as oncologically safe treatment options yielding excellent cosmetic results. (4)

Nipple-sparing mastectomies (NSM) is a surgical approach for breast cancer, and produces a good cosmetic outcome; however, the oncological safety of this technique is still controversial. Some investigators have reported no difference in the local recurrence rates and overall survival rates between NSM and conventional total mastectomy in curative cases, NSM provides good results in term of cosmetic, sensory, and patient QOL outcomes.(5)

These techniques minimize breast deformity and optimize aesthetic outcome through preservation of the native skin envelope and restoration of a naturally looking breast mound using tissue similar in color, texture and sensation.(4)

Over the years, implant technology and surgical techniques have evolved, resulting in the improved outcomes in breast reconstruction. The National trends have moved away from total submuscular coverage towards "dual-plane" positioning of implants. Dual-plane

placement provides multiple advantages including decreased chest wall morbidity and increased patient comfort. However, limitations of dual- plane positioning include lack secure coverage of the inferior pole of the implant, less control over the position of the inframammary fold (IMF), and a tendency towards superior migration of the pectoralis major muscle and expander during expansion.[6]

In the last decade the Acellular Dermal Matrix (ADM) has been used and successfully reported into the implant-based reconstruction especially in US. [7] Moreover ADM significantly adds a cost to the two-stage IBR and hence but only few publications suggest single stage implant-based immediate breast reconstruction (IBR) with ADM in a positive way. Theoretically it would be expected that ADM can facilitate the IBR in one stage, i.e. without using temporary expander. [8,9].

The lifetime risk of breast cancer for women in the United States has increased from 1 to 11 in the 1970s to 1 in 8 in 2013, a change related to shifting breast cancer risk factor demographics and the increased use of screening mammography. [10]

Prophylactic mastectomy (PM) is defined as the removal of the breast in the absence of malignant disease to reduce the risk of breast cancer occurrence. PMs may be considered in women though to be at high risk of developing breast cancer, either due to a family history, presence of genetic mutations such as BRCAI or BRCA2, having received radiotherapy to the chest, or the presence of lesions associated with an increased cancer risk such as lobular carcinoma in situ (LCIS).[11]

LCIS is both a risk factor for all types of cancer, including bilateral cancer, and in some cases, a precursor for invasive lobular cancer, for those who develop invasive cancer, up to 35% may have bilateral cancer.[11]

Some BRCAI or BRCA2 mutation carriers and women with a strong family history may choose this option to ease worries about getting breast cancer. It may also make them feel they have done all they can do to lower their risk of developing breast cancer.[12]

Bilateral prophylactic mastectomy may lower the risk of breast cancer in women at high risk by at least 90 percent.[12]

Therefore, bilateral PM may be performed to eliminate the risk of cancer arising elsewhere;

chemoprevention and close surveillance are alternative risk reduction strategies. PMs are typically bilateral but can also describe a unilateral mastectomy in a patient who has previously undergone or is currently undergoing a mastectomy in the opposite breast for an invasive cancer.[11]

According to National Comprehensive Cancer Network (NCCN) guidelines the risk-reduction mastectomy should generally be considered only in women with a genetic mutation conferring a high risk history for breast cancer (BRCA 1/2, PTEN, TP53, CDH1, STK 11), compelling family history, or possibly with LCIS or prior thoracic radiation therapy at < 30 years of age. The value of risk-reduction mastectomy in women with deleterious mutations in other genes associated with a 2-fold or greater risk for cancer (based on large epidemiologic studies) in the absence of a compelling family history of breast cancer is unknown.[13]

For women who do undergo mastectomy, whether for therapeutic or for prophylactic reasons, the side effects of mastectomy can be significant. Anxiety and depression, poor body image, sexual issues and phantom breast syndrome have been well documented.[14] However, breast reconstruction may alleviate some of the post mastectomy distress experienced by these patients.