Recent Trend in Breast Reconstruction After Mastectomy

An Essay
Submitted for partial fulfillment of master degree
in General Surgery
Submitted By

Nancy Alfarazdaq Moosa Alsebaiy
M.B., B.Ch.

Under supervision of

Prof. Dr. IMAM ELSAYED EZZAT FAKHR
Professor of General surgery
Faculty of medicine, Ain-Shams University

Dr. HAITHAM MOSTAFA ELMALEH
Lecturer of General surgery
Faculty of medicine, Ain-Shams University

Dr. AHMED MOHAMED ABD ELSALAM
Lecturer of plastic surgery
Faculty of medicine, Ain-Shams University

Ain-Shams University
2013

Acknowledgement

First of all, I thank **Allah** who gave me the power to finish this work which I hope, can be a humble contribution to research in the field of breast surgery.

I would like to express my deepest gratitude and appreciation to ***Prof. Dr. IMAM ELSAYED EZZAT FAKHR***, Professor of general surgery, Faculty of Medicine, Ain Shams University, for his guidance and supervision.

I would also express my deepest appreciation and greatest thanks to ***Dr. HAITHAM MOSTAFA ELMALEH,*** Lecturer of general surgery Faculty of Medicine, Ain Shams University, who was very kind and patient to me, saving no time nor effort helping me through this work.

And my warmest thanks to ***Dr. AHMED MOHAMED ABD ELSALAM*** , Lecturer of Plastic and Reconstruction Surgery, Faculty of Medicine, Ain Shams University, for his help and encouragement through this work.

Lastly, I will never forget how much my husband stands by me. And of course I would like to dedicate the honor of this research to my beloved mom who supported me to continue my persistent ambition to complete this work.

List of Contents

page

1. **Introduction……..13**
2. **Aim of work……..15**
3. **Anatomy of the female breast…….....16**
   a. Microscopic & macroscopic anatomy..…16
   b. Breast development……..…20
4. **Breast Cancer……....35**
   a. Histological classification…….....35
   b. Pathogenesis……39
   c. Genetic & hormonal effects……52
   d. Clinical presentation…….……...58
   e. Mastectomy: types & techniques…..……73
   f. Axillary lymph nodes management.....83
5. **Breast reconstruction ……..……....85**
   a. Breast reconstruction contraindications.....87
   b. Latissmus dorsi muscle flap……..…….....94
   c. Trans Rectus Abdominus muscles flap…...105
   d. Reconstruction of nipple-areola complex…129
   e. Contralateral breast adjustment……..133
6. **Breast implants……..135**
   a. Tetured and smooth implants……...135
   b. Saline versus Silicone implants…….....141
   c. Surgical approaches… ……158
7. **Summary and conclusion…….…..…186**
8. **References…….……189**
9. **Arabic summary…….……212**

List of Figures

f1	Position of breast in relation to ribs &pectoralis muscle.	p17
f2	Sagittal section through the non-lactating female breast and anterior thoracic wall showing the anatomy of the breast.	p19
f3	A.The milk lines in a generalized mammalian embryo. Mammary glands form along these lines. B.Common sites of formation of supernumerary nipples or mammary glands along the course of the milk lines in the human.	p21
f4	Blood supply of breast	p23
f5	Diagrammatic representation of important peripheral nerves encountered during mastectomy	p28
f6	The lymph nodes of the axilla	p33
f7	Lobular carcinoma insitu	p41
f8	Invasive ductal carcinoma a) The tumor forms an irregular, gray-white mass with irregular infiltration into parenchyma b) cut surface shows area of hemorrhage and necrosis	p43
f9	Infiltrating ductal carcinoma A:comedo type B: papillary type	p43

f10	Invasive Lobular carcinoma	p45
f11	Invasive Tubular carcinoma	p47
f12	Inflammatory breast cancer is typically characterized by diffuse redness of the skin	p49
f13	Histologic appearance of inflammatory breast carcinoma:Tumor emboli in dilated parenchymal and dermal lymphatics	p49
f14	Paget's disease of the nipple. Nipple and surrounding	p50
f15	Skin biopsy shows clusters of paget cells Skin showing eczematous change	p50
f16	Mammogram showing a carcinoma	p63
f17	Ultrasound of the breast showing carcinoma	p64
f18	Fine needle aspiration of a palpable breast mass	p66
f19	a)Fine needle puncture: normal breast epithelial complex . b)Fine needle puncture: tumor cells from solid breast cancer	p66
f20	Using the vacuum-assisted breast biopsy system	p68
f21	a) Exicisional / needle localized Biopsy b) Stereotactic Biopsy	p68
f22	Needle-localized biopsy	p69

f23	Appearance of a patient after breast augmentation with loss of the inframammary fold in association with inferior implant malposition.	p74
f24	Area to be removed in Lumpectomy	p75
f25	Partial Mastectomy of upper lateral quadrant	p76
f26	Types of incision in SSM	p78
f27	SSM with axillary dissection	p79
f28	Area removed in Modified Radical Mastectomy	p81
f29	Incision for modified radical (Patey) mastectomy	p82
f30	a) Preoperative view, delayed reconstruction. b) Postoperative view, delayed reconstruction and contralateral reduction	p86
f31	Deformity of the breast after wide excision without reconstruction of the glandular defect	p89
f32	Semicircular incision in the lower quadrant for breast-conserving surgery is not recommended	p90

f33	During and post operative reconstruction after conservative mastectomy	p91
f34	Breast reconstruction with latissimus dorsi flap, blood supply and possible skin paddles	p96
f35	Preoperative marking of latissimus dorsi muscle	p98
f36	The skin island is diagrammed in the center of the latissimus dorsi muscle	p100
f37	The flap after elevation showing the diffuse deep layer of Fat extending over the entire surface area of muscle	p100
f38	Trocar positioning during endoscoping harvesting of L.D muscle flap	p102
f39	Folding of the latissimus dorsi muscle to provide bulk for the breast mound	p103
f40	Reconstruction with muscular LDMF after quadrantectomy	p104
f41	Pedicle TRAM flap reconstruction	p108
f42	Hartrampf's classification of TRAM flap zonal blood supply	p110
f43	Epigastric aa.in pedicle TRAM flap reconstruction	p111
f44	Abdominal tissue is transferred to the chest wall while attached to the contralateral rectus muscle	p113
f45	Mobilization of both Recti muscles	p114

f46	Unipedicled and bipedicled TRAM	p115
f47	Preoperative marking for a bipedicled TRAM flap	p115
f48	Deep Inferior Epigastric vessels	p118
f49	DIEP flap after harvesting	p118
f50	a) the SIEA pedicle b) harvested hemiflap based on the SIEA pedicle	p120
f51	Cross section of the Ruben's flap.	p123
f52	Preoperative marking of TUG flap	p124
f53	The free TUG flap, the neurovascular pedicle on the blue tape	p124
f54	a) Superior gluteal vessel dissection through b) Preoperative marking of SGAP	p127
f55	Intraoperativeview of IGAP flap	p128
f56	Skate flap design	p132
f57	The "Velcro" effect	p137
f58	Permanent puckering (folding into ridges) of prosthesis	p137
f59	Gel-filled Mentor implant cut open	p142

f60	*Left:* Shape-stable cohesive gel-filled implant maintains its shape when upright *Right:* Standard gel filled implant sags toward the bottom	p142
f61	Under filled saline implant	p145
f62	overfilled implant with scalloping on the edges	p145
f63	a)A moderate-profile Mentor 325ml b) Same implant filled with stated maximum of 375 ml	p146
f64	a)Gel-filled implant has no ripples on surface or scallops on edges. b)Gel-filled implant maintains smooth contour when patient is lying down	p147
f65	Tissue has grown around protective strap of a saline filled implant	p150
f66	Schematic diagram of subglandular breast augmentation	p156
f67	Schematic diagram of subfascial breast augmentation	p157
f68	Breast augmentation planning	p160
f69	Incision locations for breast augmentation	p161
f70	Periareolar Incision for breast augmentation	p164
f71	The axillary scar is vertically unpredictable	p167
f72	Axillary incision location	p169

f73	Retractor positions for pocket dissection in Axillary incision	p170
f74	Bilateral complete capsulectomy	p176
f75	After the capsule is removed	p177
f76	upward displacement with distortion after subpectoral breast augmentation	p178
f77	Rotation with an anatomic implant	p179
f78	Spontaneously ruptured semi-cohesive,textured, anatomically shaped silicone gel implant	p181
f79	Hematoma on left breast	p182
f80	Infection of right infra-mammary wound with improper scar position	p183

List of Abbreviations

Abb.	Description
AF	Activating function
ALND	Axillary lymph node dissection
AS	Areola sparing
BCT	Breast conservation therapy
BRCA1	Breast cancer antigen 1
BRCA2	Breast cancer antigen 2
CK	Cytokeratin
DCIS	Ductal carcinoma in situ
DIEP	Deep inferior epigastric perforator flap
DSEA	Deep superior epigastric artery
E2	Estrogen
ER	Estrogen receptor
FDA	US Food and Drug Administration.
FISH	Fluorescence in situ hybridization
GAP	Gluteal artery perforator flap.
HER2	Human epidermal growth factor receptor 2
IGAP	Inferior gluteal artery perforator flap.
IHC	Immunohistochemistry
LABC	Locally advanced breast cancer
LDMF	Latissimus dorsi muscle flap
MDOT	Modified double opposing tab flap.
MRM	Modified radical mastectomy
NAC	Nipple areola complex
NAS	Nipple areola sparing
NCI	National Cancer Institute
NOS	No otherwise specified
PMRT	Post mastectomy radiotherapy
PR	Progesterone receptor
SGAP	Superior gluteal artery perforator flap.
SIEA	Superficial inferior epigastric artery flap
SLN	Sentinal lymph node
SLNB	Sentinel lymph node biopsy

SLNB	Sentinal lymph node biopsy
SPECT	Single photon emission CT
SSM	Skin sparing mastectomy
TGF	Tumour growth factor
TNM	Tumor-nodes-metastasis
TRAM	Transverse rectus abdominis myocutaneous flap
TUG	Transverse upper gracilis musculocutaneous flap.
VRAM	Vertical rectus abdominus myocutaneous flap

Introduction

Breast cancer is the most common malignancies in females. Prognosis and survival rate varies greatly depending on cancer type and staging. The treatment depends on staging as 10 years disease free survival varies from 10% to 98%. Treatment includes surgery, drugs (hormonal therapy and chemotherapy) and radiation ***(Krueger et al, 2001).***

Mastectomy involves the removal of breast tissue, varying amounts of skin and invariably the nipple-areola complex. The removal of these tissues results in the loss of volume, shape and contour of the breast. Breast reconstruction aims to restore these attributes and uses the opposite breast as an aesthetic reference point ***(Snelllinget al, 2005).***

Different approaches for breast reconstruction include:using breast expanders, implants, using body's own tissue (autologous tissue reconstruction) or using a combination of tissue reconstruction and implants ***(Spear et al, 2007).***

Breast reconstruction generally consists of two stages: restoration of the breast mound and reconstruction of the nipple–areola complex. The choice of technique is dictated by a variety of factors that include the size and shape of the native breast, the location and type of cancer, the availability of tissues around the breast and at other sites, the age of the patient, the patient's medical risk factors, and the type of adjuvant therapy. The final decision is often made on the basis of the patient's preference. The patient's selecting thetechnique and understanding its nature will result in the best aesthetic result and, more importantly,

maximize her satisfaction and quality of life ***(Cordeiro, 2008).***

In the era of oncoplastic breast surgery, reconstruction techniques represent an important field of research and development aiming to find the most suitable pathway to manage such a disease with diverse clinical scenarios in order to have the most suitable option for every single patient.

Aim of the Work

To Study the recent trends in breast reconstruction following mastectomy, regarding their techniques, advantages and limitations.