مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SURGERY FOR BREAST CANCER

Négib GEAHCHAN MD, FEBS

Professor of Surgical Oncology

St Joseph University & Balamand University, Beirut, LEBANON

&

Vice-President of MANOSMED

NEUROSPINAL HOSPITAL

ONCOLOGY DEPARTMENT

Dubai, UAE

May 2023

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SURGERY FOR BREAST CANCER

- Treatment Modalities
- Surgery for Diagnosis
- Surgery for Treatment
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

SURGERY FOR BREAST CANCER

- Treatment Modalities
  - Surgery for Diagnosis
  - Surgery for Treatment
  - Justifications of Conservative Treatment
  - Indications & Contraindications of Conservative Treatment
  - Lymph Node Management

TREATMENT MODALITIES FOR BREAST CANCER

- Surgery
- Chemotherapy
- Target Therapy and Immunotherapy
- Radiotherapy
- Hormonotherapy

The multimodality approach is becoming universal and a golden standard

SURGICAL MODALITIES FOR BREAST CANCER

- Incisional Biopsy
- Excisional Biopsy
- **Partial Mastectomy**
- Subcutaneous Mastectomy
- Total Simple Mastectomy
- **Modified Radical Mastectomy**
- Halsted Radical Mastectomy
- Extended Radical Mastectomy
- Supraradical Mastectomy

SURGERY FOR BREAST CANCER

- Treatment Modalities
- **Surgery for Diagnosis**
- Surgery for Treatment
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

SURGICAL PROCEDURES USED FOR DIAGNOSIS

- Fine needle Aspiration

18 to 22 gauge needle; 10 ml syringe; no anesthesia; 0% to 4% false-positive; 2% to 10% false-negative

- Tru-cut needle Biopsy

Removal of a core of tissue measuring 0.2 to 2.0 cm; local anesthesia; use of stereotactics for small tumors; 0% false-positive; risk of ecchymosis

- Incisional Biopsy

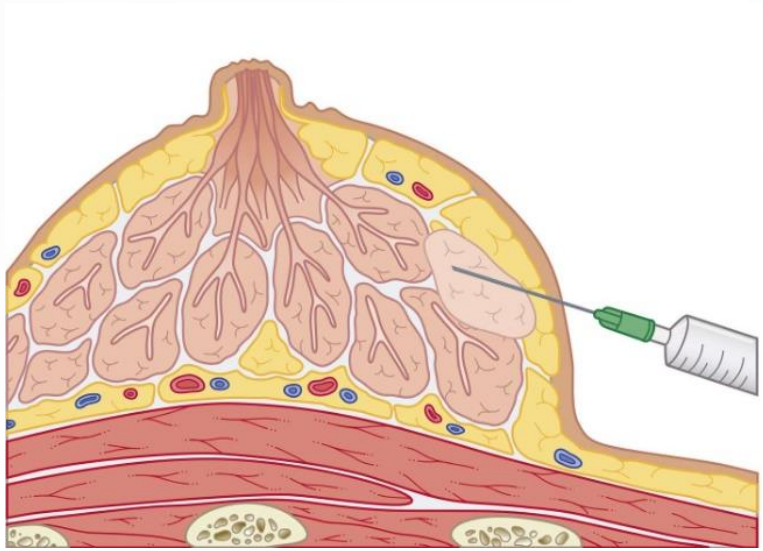
Used for tumors > 4 cm; in inflammatory cancers; when radical surgery is planned

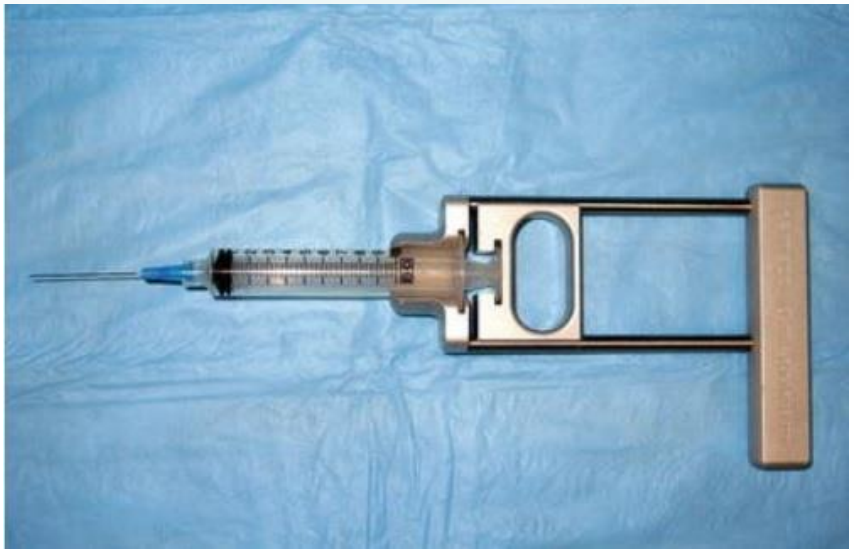
- Excisional Biopsy

Used for superficial tumors < 2 or 3 cm ; if no further treatment is planned;

SURGICAL PROCEDURES USED FOR DIAGNOSIS

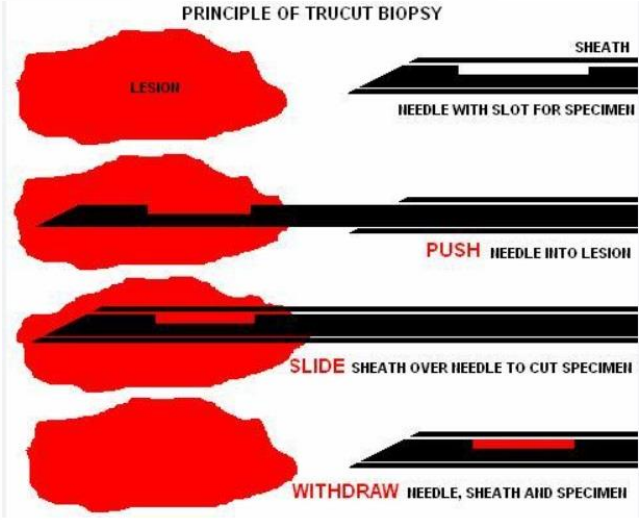
- Fine needle Aspiration

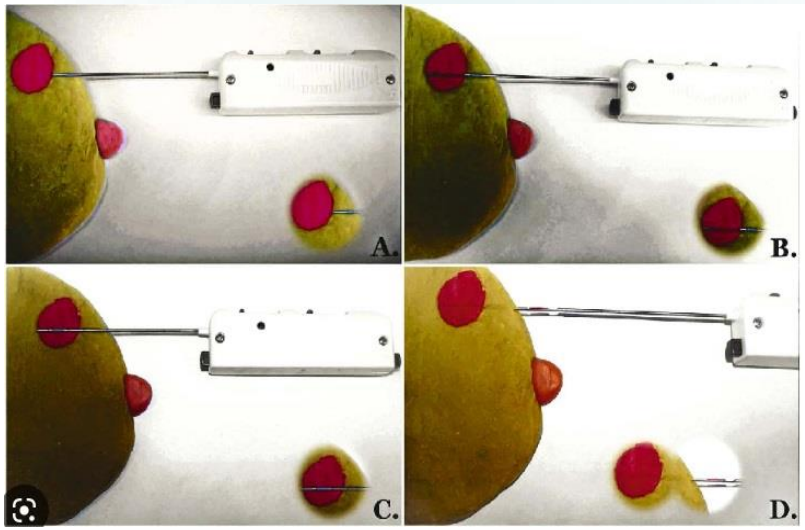




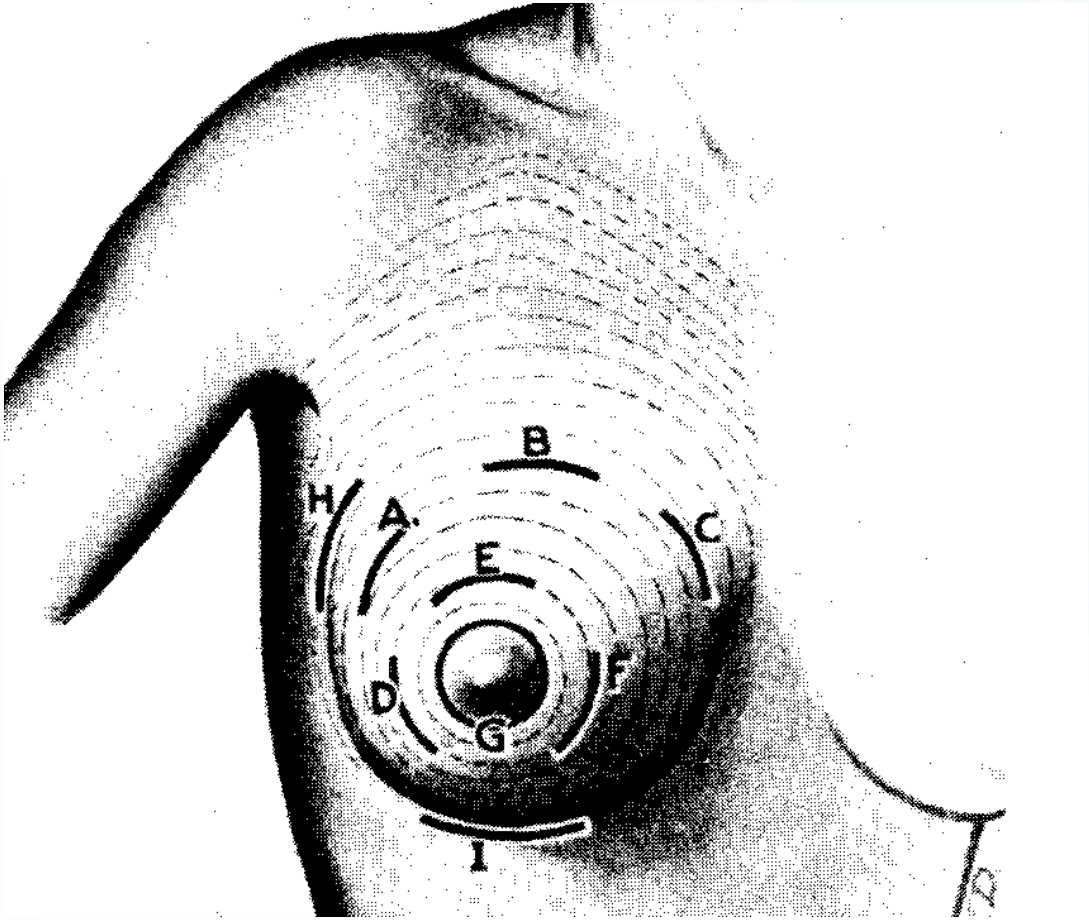
SURGICAL PROCEDURES USED FOR DIAGNOSIS

- Tru-Cut Needle Biopsy

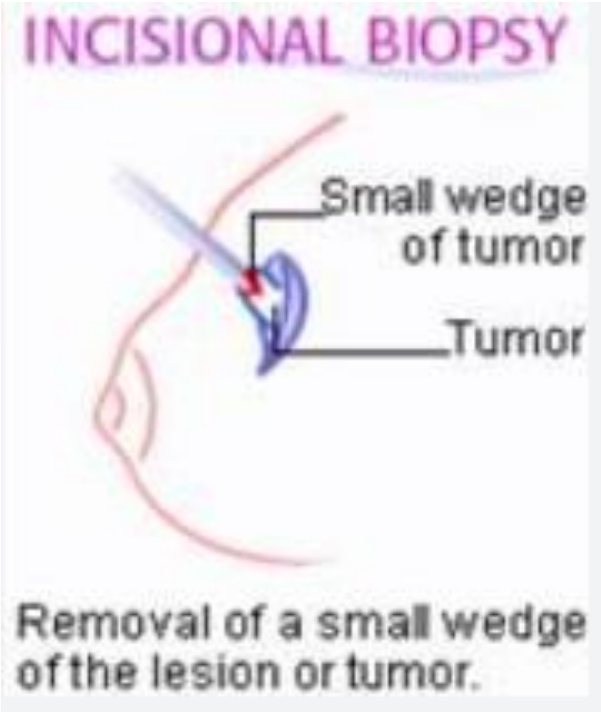




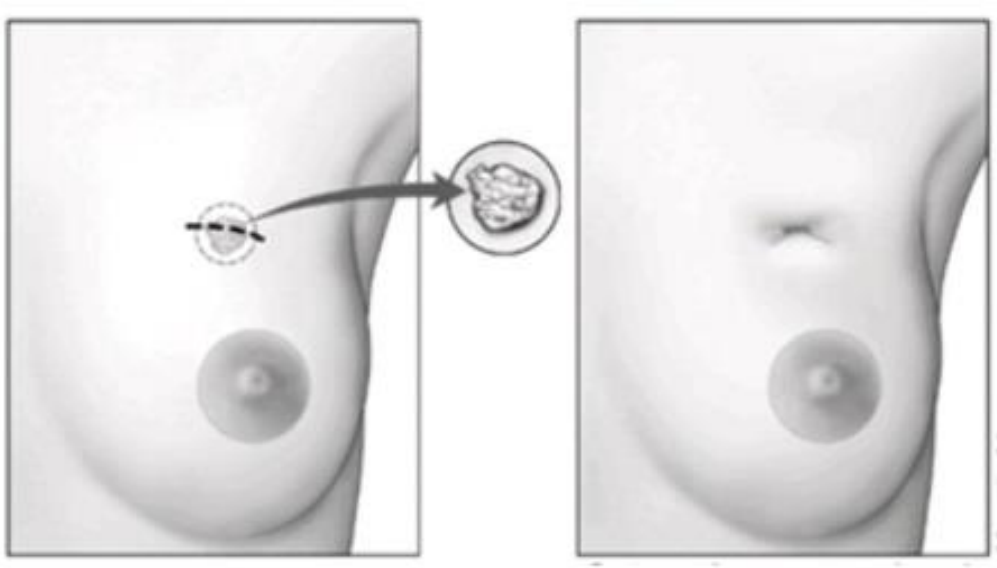
BIOPSIES OF BREAST CANCERS



BIOPSIES OF BREAST CANCERS



EXCISIONAL BIOPSY



SURGERY FOR BREAST CANCER

- Treatment Modalities
- Surgery for Diagnosis
- **Surgery for Treatment**
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

PRINCIPLES OF SURGICAL TREATMENT OF BREAST CANCER

- Any sign of gravity of the cancer contraindicates primary curative surgical therapy:
  - ✓**metastasis**
  - ✓**fixed axillary lymph nodes**
  - ✓**Supraclavicular or internal mammary lymph node**
  - ✓**Extensive peau d'orange**
  - ✓**Inflammatory carcinoma**
  - ✓**Satellite nodules**
  - ✓**Skin ulceration**
  - ✓**Arm edema**
  - ✓**Tumor fixed to the chest wall**
  - ✓**Large tumor (> 5 cm)**

PRINCIPLES OF SURGICAL TREATMENT OF BREAST CANCER

- The mobility of the breast mass should be determined prior to surgery:
  - ✓**To the skin ?** ***Is it a locally advanced T4 tumor*** ***Neoadjuvant Chemotherapy***
  - ✓**To the pectoralis muscles ?** ***The pectoral fascia or a part of the muscle can be removed***
  - ✓**To the chest wall ?** ***It is an absolute contraindication***
    Chemotherapy + Radiotherapy

PRINCIPLES OF SURGICAL TREATMENT OF BREAST CANCER

- There is a risk of 7 to 37 % of multicentricity in operable breast cancer:
  - ✓**Either radical surgery removing all the breast**
  - ✓**Or a conservative surgery followed by radiation therapy**

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

PRINCIPLES OF SURGICAL TREATMENT OF BREAST CANCER

- Cosmesis is a major consideration in the choice of a conservative surgery:
  - ✓**When the nipple-areola complex has to be removed, a total mastectomy is recommended**
  - ✓**A large partial mastectomy yields a very bad cosmesis and must give place to a total mastectomy, or be supplied by Oncoplastic Surgery**
  - ✓**Neoadjuvant chemotherapy increases the possibilities of conservative surgery**
  - ✓**Circumareolar incisions in the upper half, and radial incisions in the lower half of the breast should be used.**

PRINCIPLES OF SURGICAL TREATMENT OF BREAST CANCER

- A surgical act on axillary lymph nodes is still mandatory:
  - ✓**Whenever cN+: An axillary dissection of levels I & II ?**
  - ✓**Whenever cN-: A sentinel lymph node biopsy ?**
  - ✓**Whenever pN+ after SNB: Axillary dissection, but new recommendations to avoid this dissection**

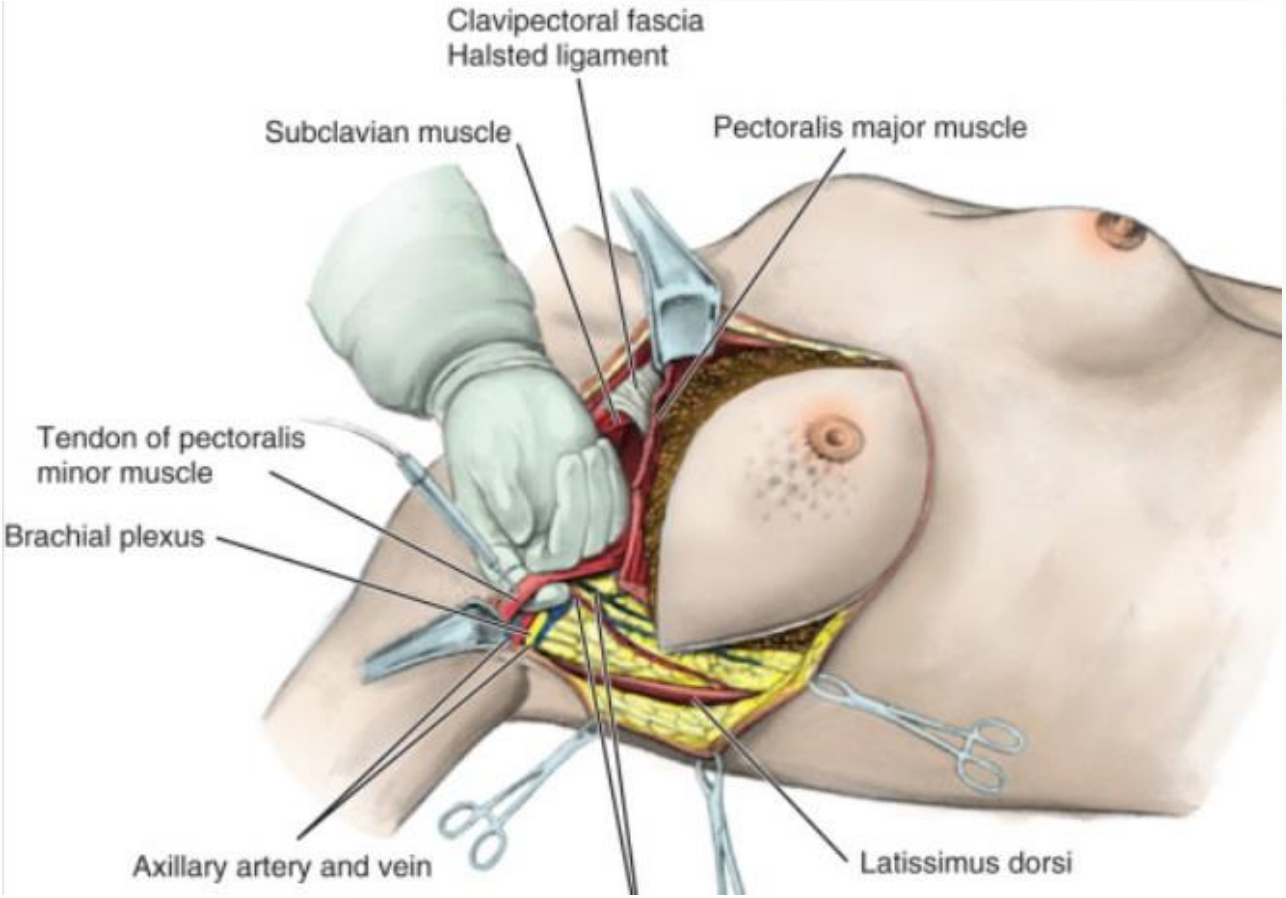
RADICAL MASTECTOMY

Martyrdom of Saint Agatha

of Sicily

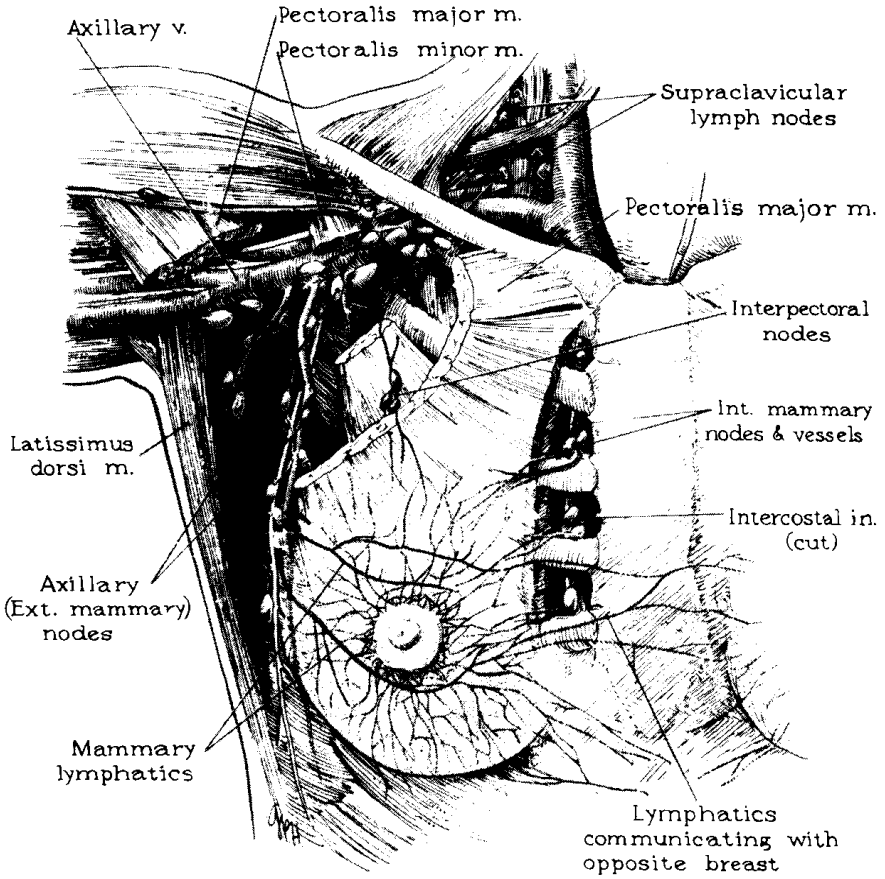
RADICAL MASTECTOMY

HALSTED OPERATION



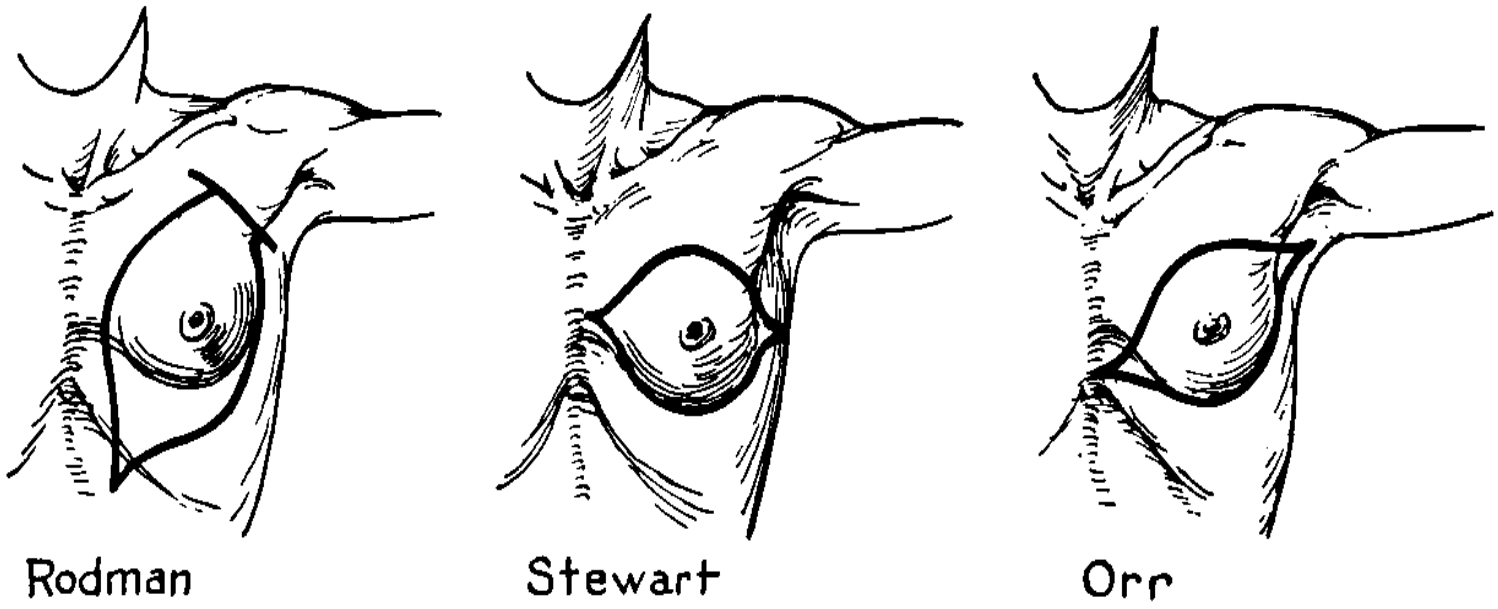
RADICAL MASTECTOMY

EN BLOC RESECTION OF AXILLARY LYMPH NODES



RADICAL MASTECTOMY

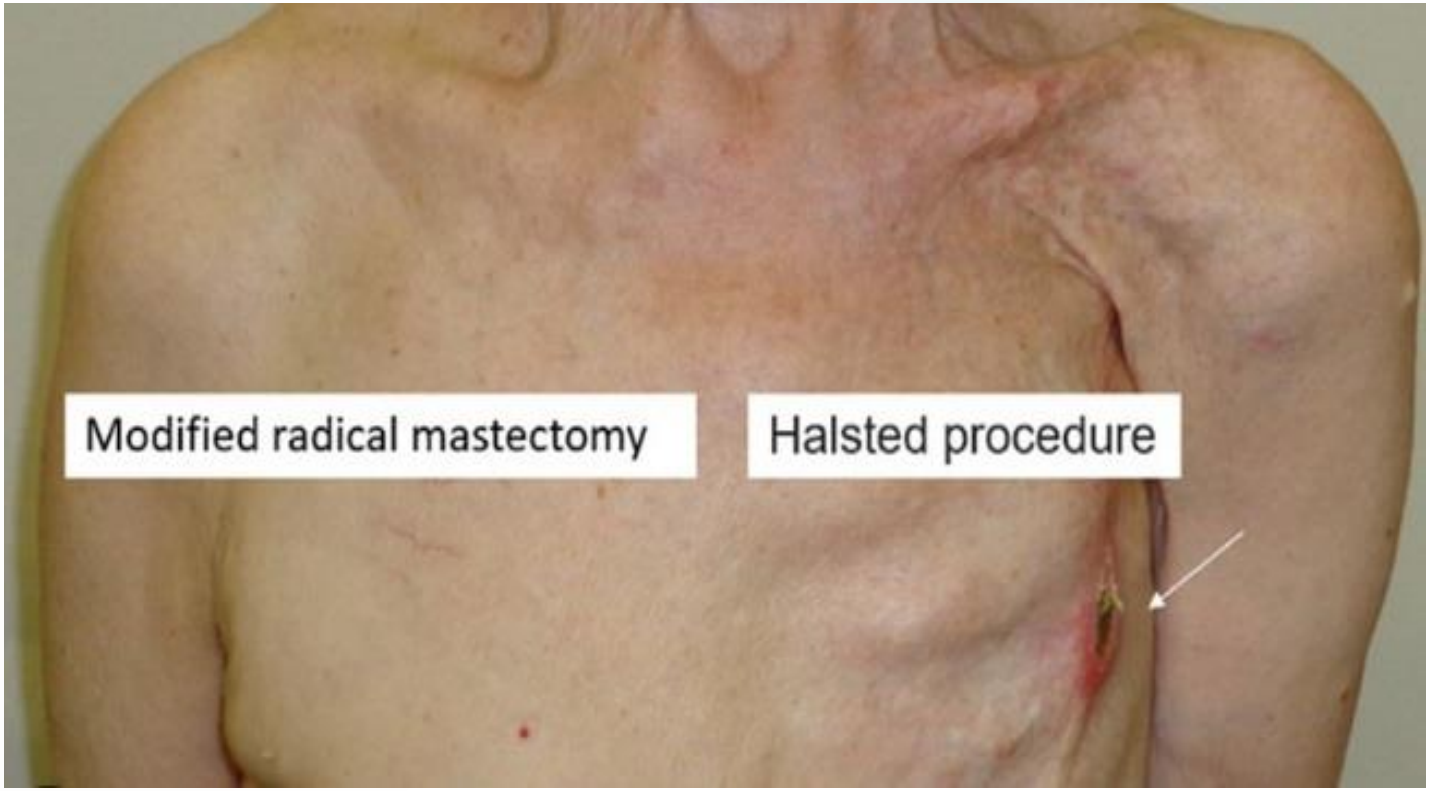
MODIFIED RADICAL MASTECTOMY



Conservation of the Pectoralis Major muscle

RADICAL MASTECTOMY

Difference between Halsted and Modified Radical



Conservation of the Pectoralis Major muscle

PARTIAL MASTECTOMY
(CONSERVATIVE SURGERY)

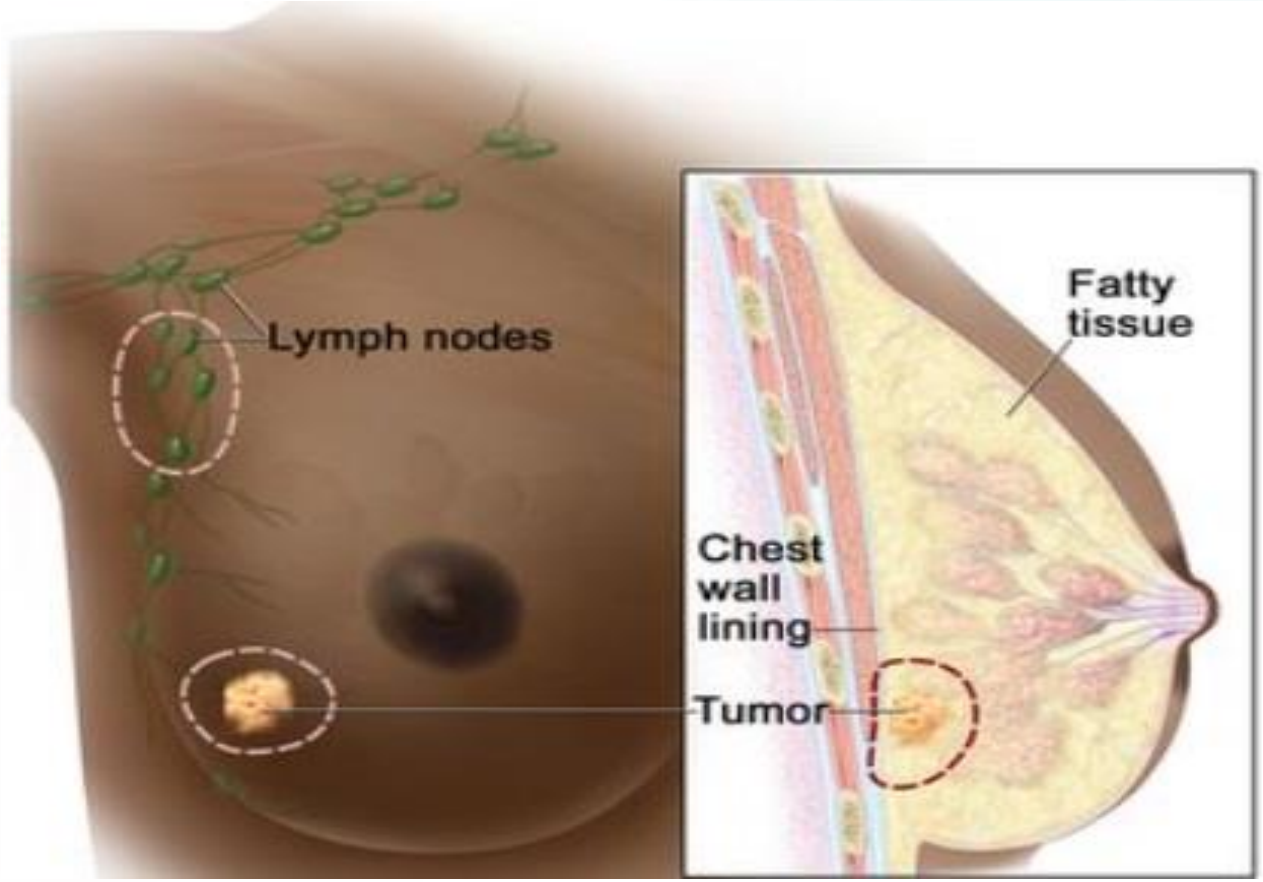
The most current definition of this treatment includes:

- A partial mastectomy: lumpectomy, tylectomy, limited excision, wide excision, partial mastectomy, segmentectomy, quadrantectomy.

- Axillary sampling or dissection: sentinel lymph node biopsy, axillary sampling, level I dissection, levels I and II dissection.

- Radiation therapy of the breast alone, or of the breast and axillae

PARTIAL MASTECTOMY
(CONSERVATIVE SURGERY)



SURGERY FOR BREAST CANCER

- Treatment Modalities
- Surgery for Diagnosis
- Surgery for Treatment
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

JUSTIFICATIONS FOR BREAST CONSERVATION

These justifications have gone a long evolution since 1894, when Halsted described the radical mastectomy (complete removal of the breast, the muscles, the axillary and internal mammary lymph nodes)

JUSTIFICATIONS FOR BREAST CONSERVATION

Evolution of these justifications

- 1927 – 1973: Anecdotical descriptions of personal experiences
- 1974 – 1985: Prospective randomized trials
- 1985 – 2013 : Consolidation of results

JUSTIFICATIONS FOR BREAST CONSERVATION

ANECDOTICAL DESCRIPTIONS OF PERSONAL EXPERIENCES

1

About 30 Publications:

- Hirsch (1927)
- Pfahler (1932)
- Keynes (1937)
- Porrit (1964)
- Mustakallio (1972)
- Atkins (1972)
- Peters (1973)

JUSTIFICATIONS FOR BREAST CONSERVATION

1

ANECDOTICAL DESCRIPTIONS OF PERSONAL EXPERIENCES

What were the most important results ?

Radiation alone or with partial mastectomy is able to give the same or a better survival rate than radical mastectomy: 70% at 10 years for all breast cancers, better survival for stage I

JUSTIFICATIONS FOR BREAST CONSERVATION

2

PROSPECTIVE RANDOMIZED TRIALS

1. Veronesi (NCI, Milan)
2. Sarrazin (Institut Gustave Roussy, Villejuif)
3. NSABP 06
4. EORTC Trial 10801
5. Danish Breast Cancer Cooperative Group

JUSTIFICATIONS FOR BREAST CONSERVATION

2 Methodology of Prospective Randomized Trials

Two groups of identical patients randomized to two-arm treatments:

- *Modified radical mastectomy*
- *Partial mastectomy (quadrantectomy, segmentectomy) + axillary disection + radiation therapy*

JUSTIFICATIONS FOR BREAST CONSERVATION

2 Prospective Randomized Trials Important results

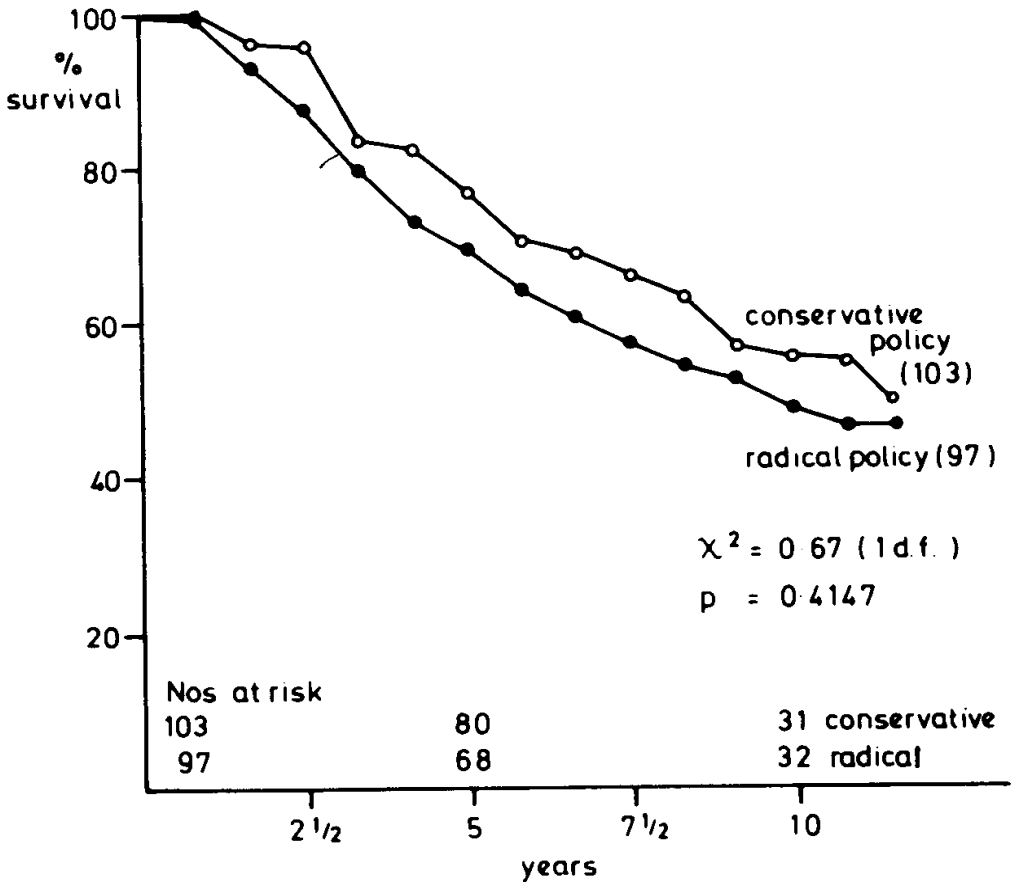
- Same survival at 5 and 10 years
- Same local recurrence rates if radiation therapy is added to partial surgery (otherwise 28% v/s 8%)
- Better patient satisfaction with conservative treatment

JUSTIFICATIONS FOR BREAST CONSERVATION

2

Prospective Randomized Trials

Important results



JUSTIFICATIONS FOR BREAST CONSERVATION

3

CONSOLIDATION OF RESULTS

1985 - 2013

Long-run comparison of the two-arm treatments (randomized trials)

- Early Breast Cancer Trialist's Collaborative Group (EBCTCG) 1995 meta-analysis

  EBCTCG new meta-analysis in 2000
- NSABBP B-06 (Fisher): 20 years follow-up in october 2002
- Milan Institute (Veronesi): 20 years follow-up in october 2002

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

JUSTIFICATIONS FOR BREAST CONSERVATION

3

CONSOLIDATION OF RESULTS

• NSABBP B-06 :

20 years follow-up in october 2002

Total Mastectomy	Lumpectomy alone	Lumpectomy + irradiation
589 patients	634 patients	628 patients

3

NSABBP B-06 SURVIVAL

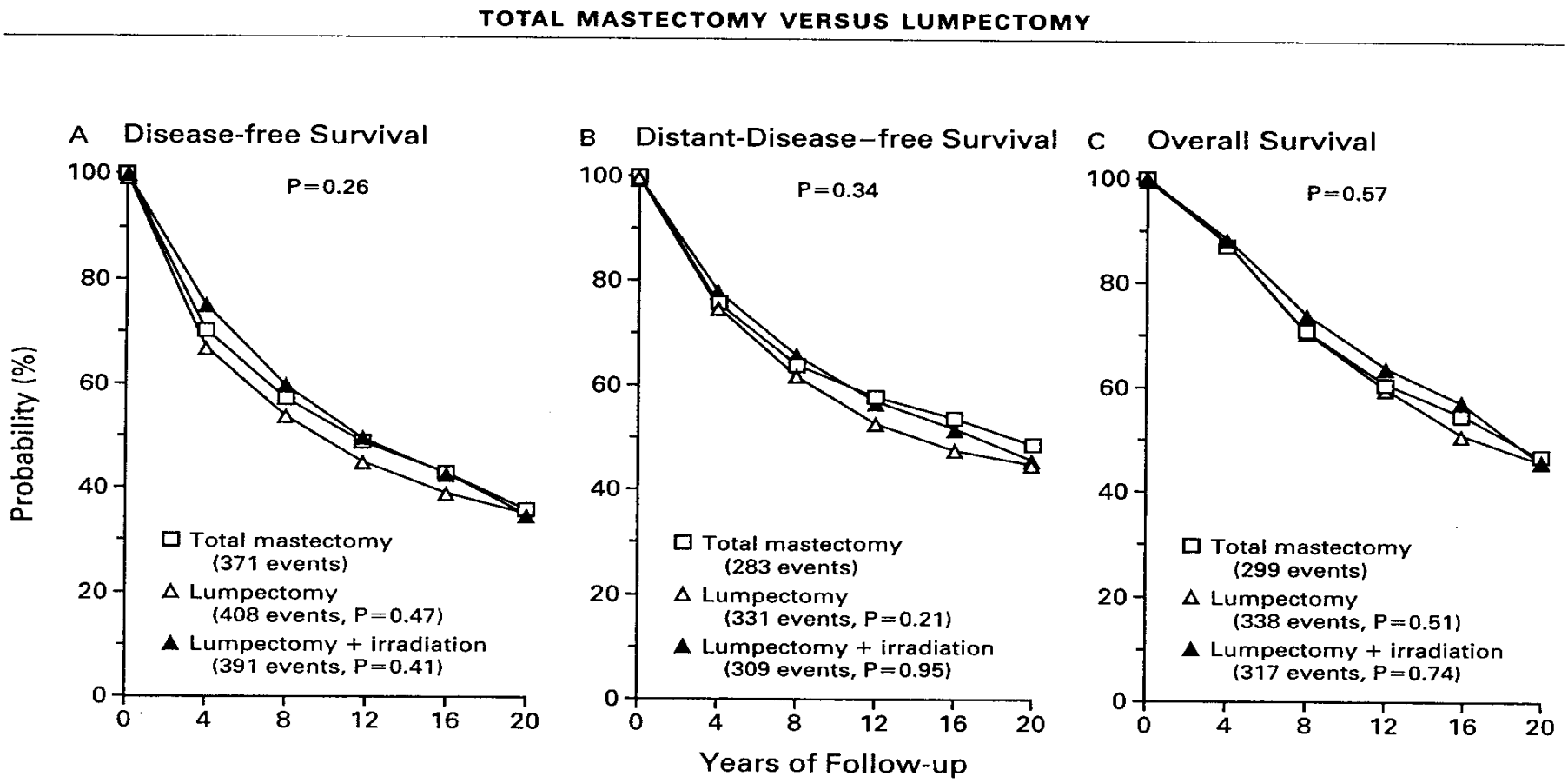


Figure 2. Disease-free Survival (Panel A), Distant-Disease–free Survival (Panel B), and Overall Survival (Panel C) among 589 Women Treated with Total Mastectomy, 634 Treated with Lumpectomy Alone, and 628 Treated with Lumpectomy plus Irradiation.

In each panel, the P value above the curves is for the three-way comparison among the treatment groups; the P values below the curves are for the two-way comparisons between lumpectomy alone or with irradiation and total mastectomy.

MILAN ONCOLOGY INSTITUTE SURVIVAL

3

No significant difference in overall survival between the two groups:

- 58.9% with radical mastectomy
- 58.3% with quadrantectomy

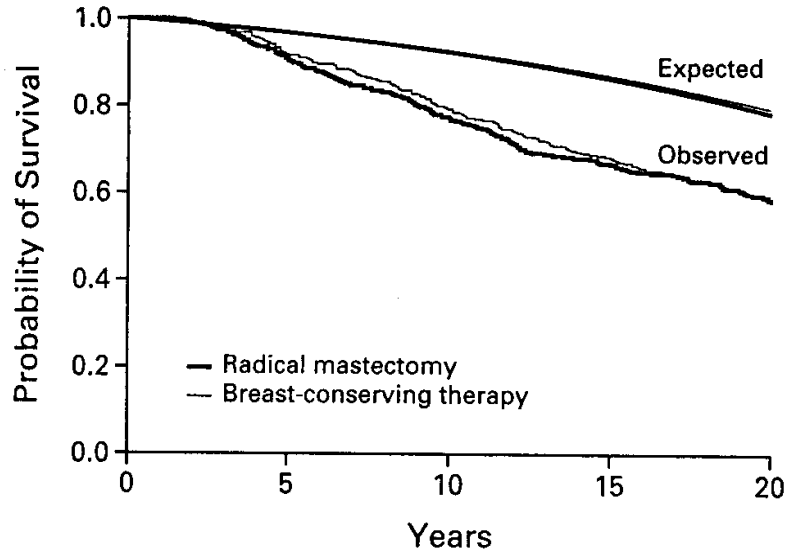


Figure 2. Kaplan–Meier Estimates of Survival after Radical Mastectomy or Breast-Conserving Therapy.

The two lower curves correspond to observed survival, taking into account deaths from any cause. The upper curves (which are almost identical in the two groups) show the expected survival rate on the basis of mortality rates in age-matched cohorts of Italian women.

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

3

NSABBP B-06 LOCAL RECURRENCE

- Significant difference between women treated by lumpectomy alone and those treated by lumpectomy and irradiation: 39.2% vs 14.3%

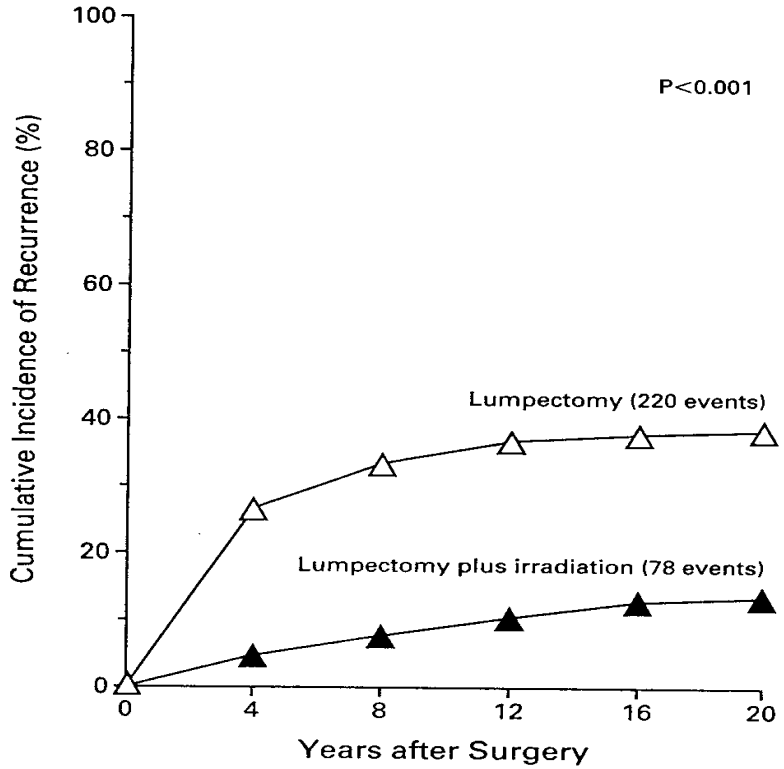


Figure 1. Cumulative Incidence of a First Recurrence of Cancer in the Ipsilateral Breast during 20 Years of Follow-up among 570 Women Treated with Lumpectomy Alone and 567 Treated with Lumpectomy plus Breast Irradiation.

The data are for women whose specimens had tumor-free margins.

MILAN ONCOLOGY INSTITUTE LOCAL RECURRENCES

3

- More recurrences happen in conservative surgery:
  - 2.3% with radical surgery
  - 8.8% in conservative surgery
- 2/3 of local recurrences in quadrantectomies are second cancers

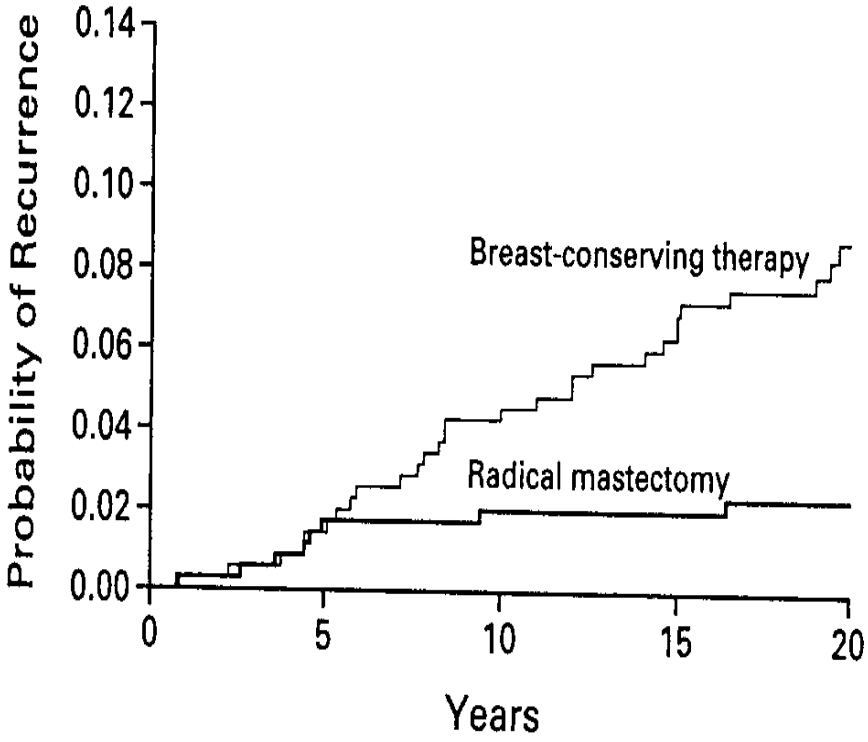


Figure 1. Crude Cumulative Incidence of Local Recurrences after Radical Mastectomy and Recurrences in the Same Breast after Breast-Conserving Therapy.

MILAN ONCOLOGY INSTITUTE
SURVIVAL AND SIZE OT TUMOR

3

- The size of the tumor influences on survival
- When stratified on size of the tumor, survival does not differ between conservative and radical surgery

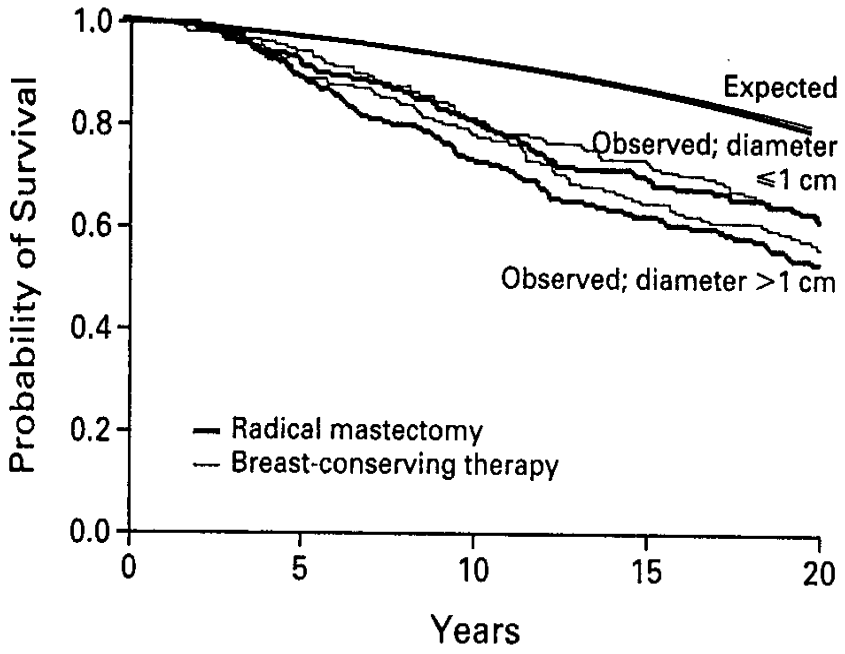


Figure 3. Kaplan–Meier Estimates of Survival after Radical Mastectomy or Breast-Conserving Therapy, According to the Size of the Primary Carcinoma.

The two upper curves (which are almost identical in the two groups) show the expected survival rate on the basis of mortality rates in age-matched cohorts of Italian women. The four lower curves show the survival rates in the two groups stratified according to the maximal diameter of the breast cancer at base line.

JUSTIFICATIONS FOR BREAST CONSERVATION

3

CONSOLIDATION OF RESULTS

Newer modalities of treatment:

1. Sentinel lymph node biopsy replacing axillary dissection
2. Extension of indications to larger tumors : downstaging by neoadjuvant treatment
3. New modalities of imaging and radiation therapies

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SURGERY FOR BREAST CANCER

- Treatment Modalities
- Surgery for Diagnosis
- Surgery for Treatment
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

INDICATIONS AND CONTRAINDICATIONS FOR CONSERVATIVE TREATMENT

1. Tumor size
2. Tumor location
3. Axillary node status
4. Tumor histology
5. Patient characteristics

INDICATIONS FOR BREAST CONSERVING SURGERY

Classically the conservative treatment is contraindicated in:

- Pregnancy because of radiation risks
- Multicentric disease in the breast
- Prior radiation to the breast or chest
- Positive surgical margins after attempts of reexcision
- Collagen vascular disease or autoimmune disease because o high sensitivity to radiation
- A large tumor in a relatively small breast

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

INDICATIONS FOR BREAST CONSERVING SURGERY

What are the most recent recommendations on the indications and contraindications to BCT ?

Consensus Meetings of St Gallen

INDICATIONS FOR BREAST CONSERVING SURGERY

- ✓ No more absolute contraindications to Conservative surgery
- ✓ The remaining relative contraindications to Conservative Surgery are:
  - ➢ Multicentric disease
  - ➢ BRCA 1 and 2 positivity
  - ➢ Involved margins after repeated excisions (including DCIS)
  - ➢ Contraindications to breast irradiation that would follow BCT

INDICATIONS FOR BREAST CONSERVING SURGERY

The surgical margin of tumor resection is becoming simply the absence of ink (installed by the surgeon or the pathologist) on invasive tumor

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

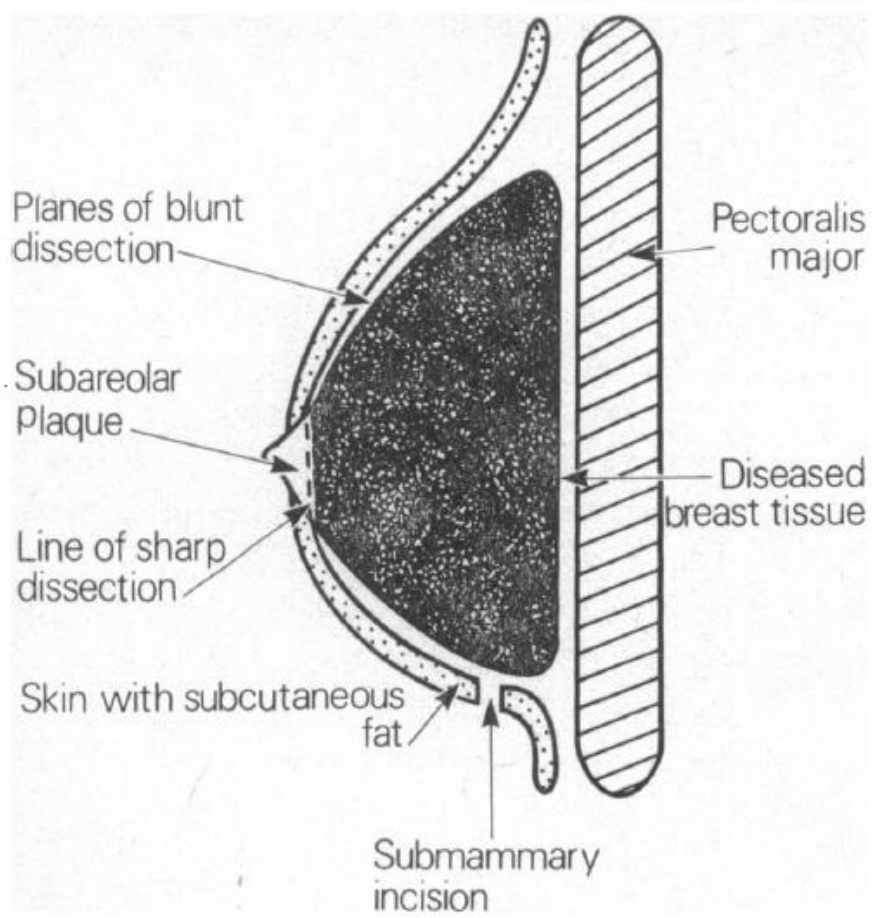
INDICATIONS FOR BREAST CONSERVING SURGERY

OTHER ALTERNATIVES

NIPPLE & SKIN SPARING MASTECTOMY

- ✓ Skin and areola sparing mastectomy may be proposed as an alternative to Breast Partial Mastectomy, without delivering adjuvant radiotherapy
- ✓ The absolute indication of this skin and areola sparing mastectomy is to have a free margin toward the nipple

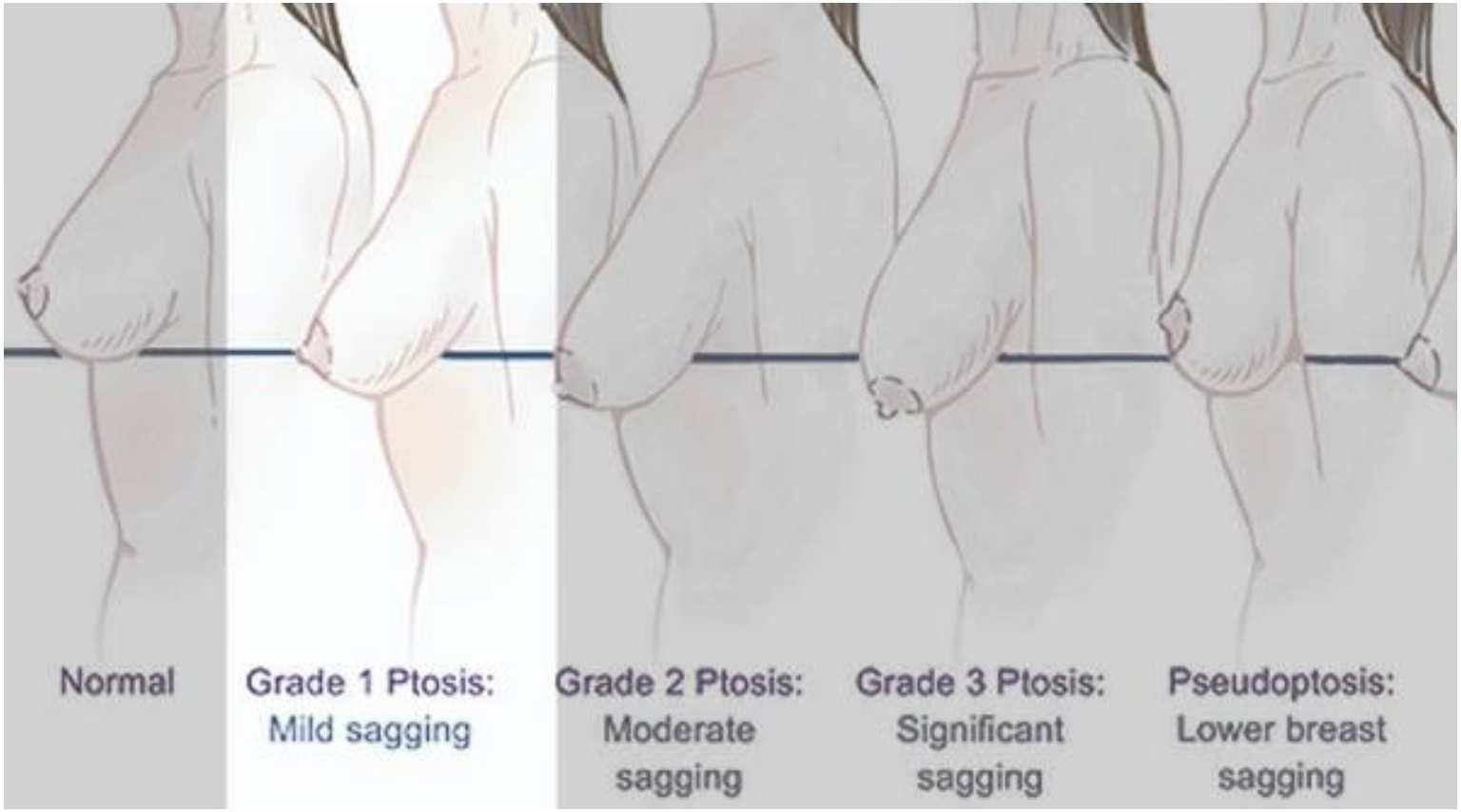
SKIN & NIPPLE SPARING MASTECTOMY



مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SKIN & NIPPLE SPARING MASTECTOMY

SKIN & NIPPLE SPARING MASTECTOMY



NSM is used in ptotic grades I and 2 of the breast

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SKIN & NIPPLE SPARING MASTECTOMY

Personal Case

INDICATIONS FOR BREAST CONSERVING SURGERY

OTHER ALTERNATIVES

ONCOPLASTIC SURGERY

Many situations are leading to more extensive resections in BCT:

- ✓demand of younger women
- ✓extended DCIS ± invasive cancer
- ✓centrally located tumors
- ✓tumors located to lower quadrants
- ✓neoadjuvant treatment with a high clinical response rate

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

THE SOLUTION ?
ONCOPLASTIC SURGERY

Oncoplastic Surgery

proposed in 1998 by W. Audrestch to define a novel approach for treatment of breast cancer in women. This approach combines a plastic surgical procedure with breast conserving therapy.

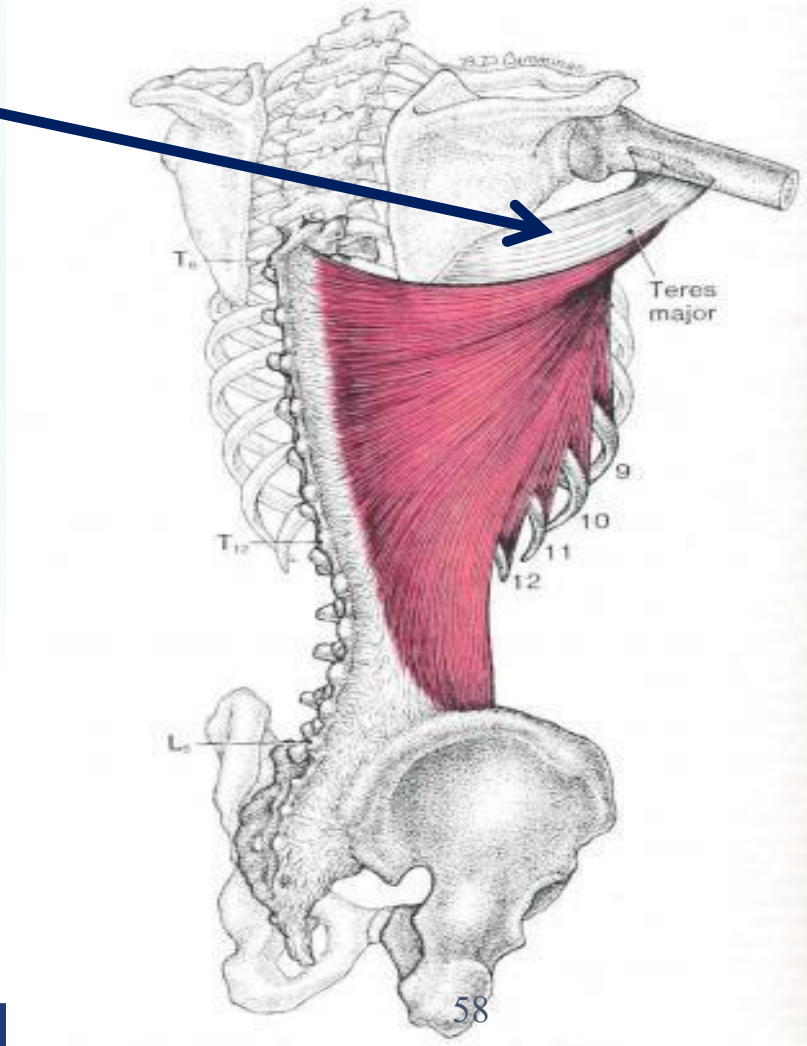
INDICATIONS FOR BREAST CONSERVING SURGERY
OTHER ALTERNATIVES
ONCOPLASTIC SURGERY

New developments permit conservative treatment for breast lesions, since reconstructive surgery gives better results than that achieved by any prosthesis: J.Y. Petit (European Institute of Oncology, 2002)

- **Local glandular flap**
- **Areola transposition**
- **Mastopexy**
- **Round block technique**
- **Prosthesis insertion**
- **Distal musculocutaneous flaps (LD flap, TRAM flap)**

LATISSIMUS DORSI FLAP

Origin of its blood supply



triangular-shaped muscle of the back, large, tall and well vascularized

Drawing of the surgical landmarks

Epithelialized LD flap
Pedicled elevated flap ready to be used

Perfect Symmetry

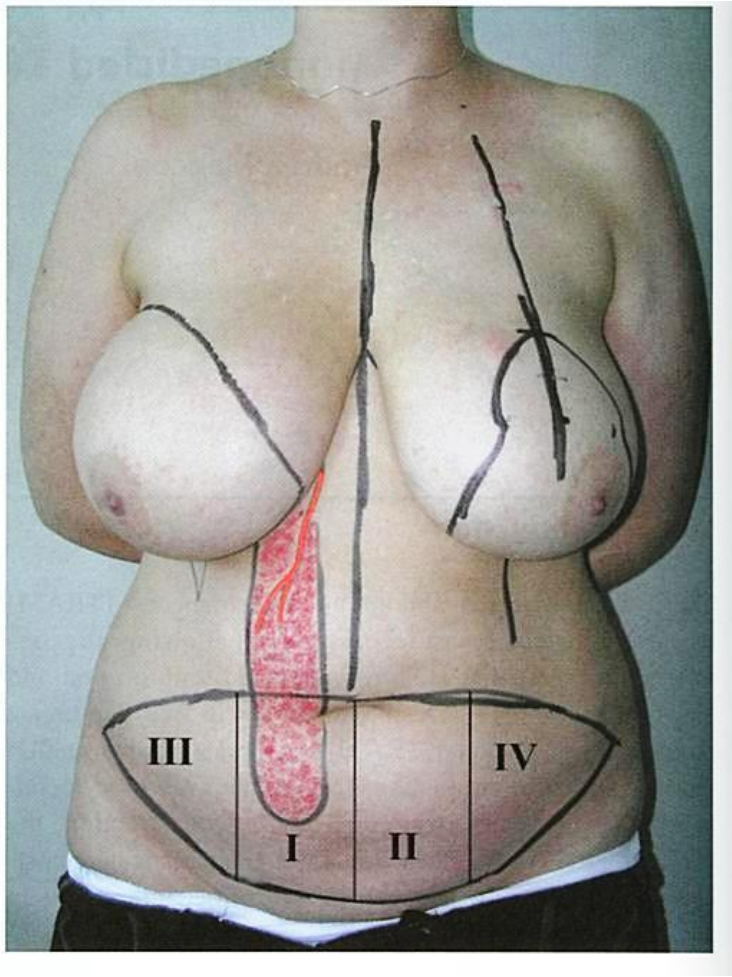
Perfect mould and contour

Perfect mould, contour and symmetry

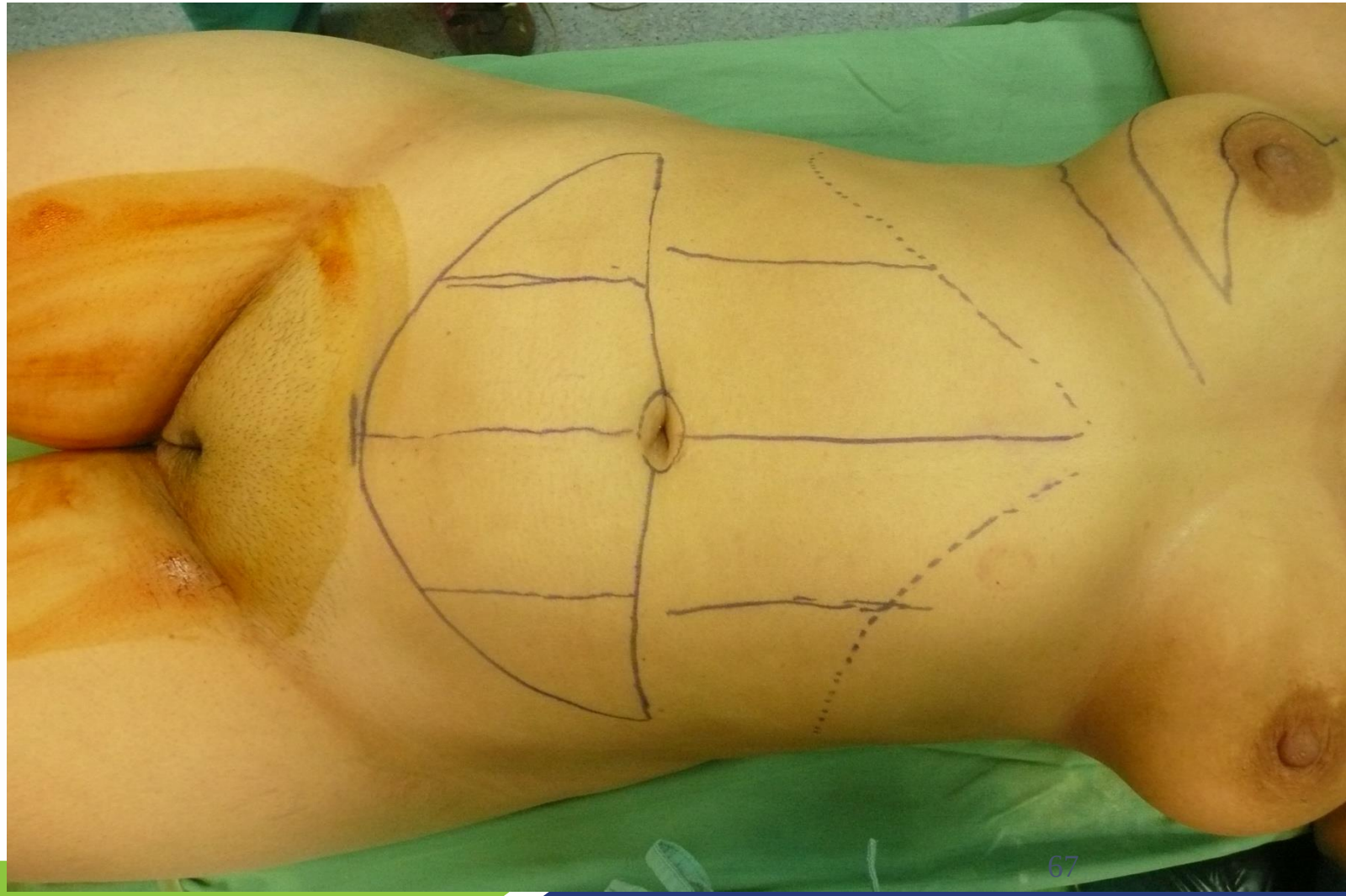
Perfect symmetry and elasticity

TRAM Flap Anatomy

- The flap is divided into 4 segments according to the quality of its vascularization
- Segment I is the most reliable portion
- Segment IV is the less viable portion and should be discarded routinely
- Because of this unequal viability, it has been recommended to use bipedicled TRAM flap



TRAM Flap Surgical Procedure



TRAM Flap Surgical Procedure

TRAM Flap Surgical Procedure

TRAM Flap Surgical Procedure

مستشفى الجراحة العصبية والعمود الفقري
NEURO SPINAL HOSPITAL

SURGERY FOR BREAST CANCER

- Treatment Modalities
- Surgery for Diagnosis
- Surgery for Treatment
- Justifications of Conservative Treatment
- Indications & Contraindications of Conservative Treatment
- Lymph Node Management

LYMPH NODE MANAGEMENT

AXILLARY NODE STATUS

What is the rationale of axillary dissection?

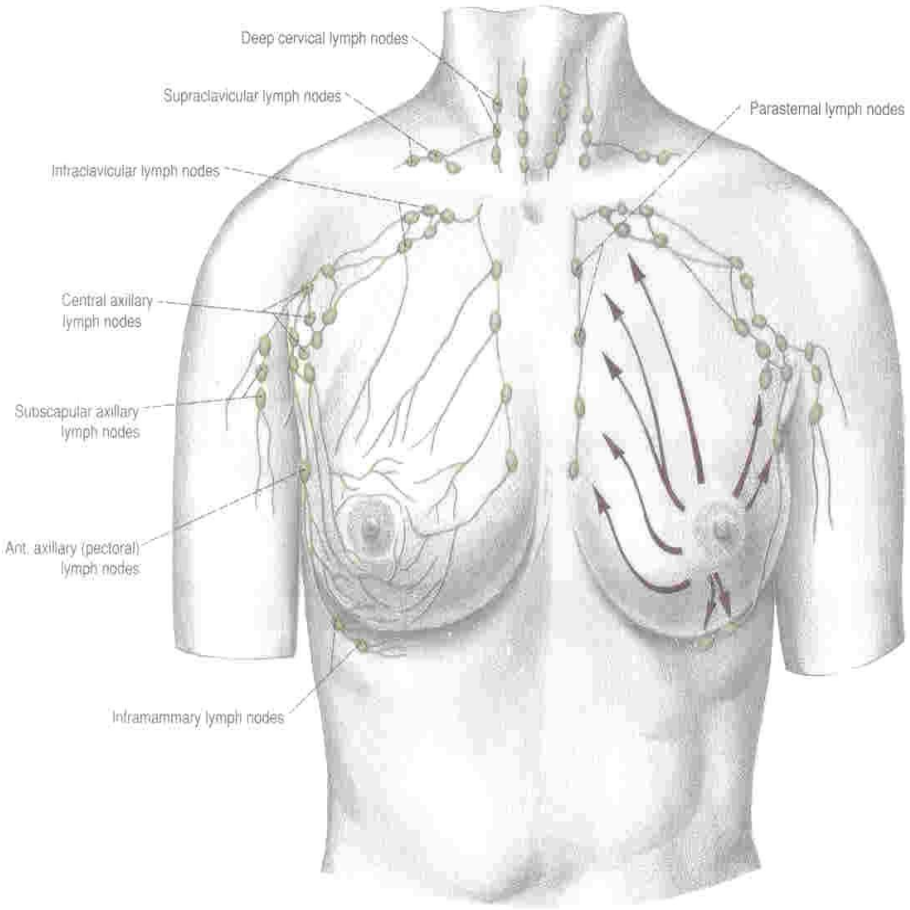
1- locoregional control of cancer

2- better disease free survival

3- the most reliable staging and prognosting indicator

DE-ESCALATION OF AXILLARY DISSECTION

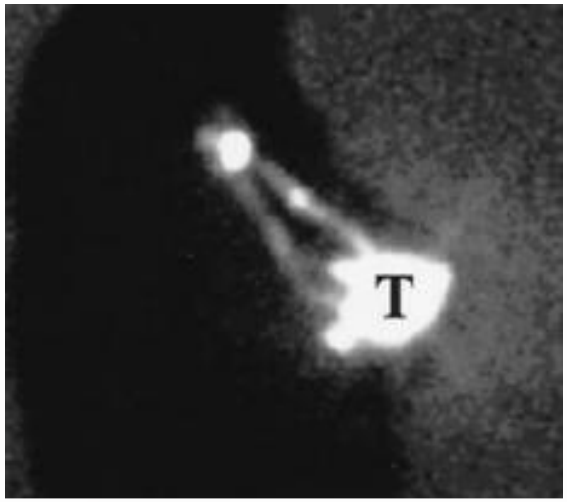
SENTINEL NODE BIOPSY

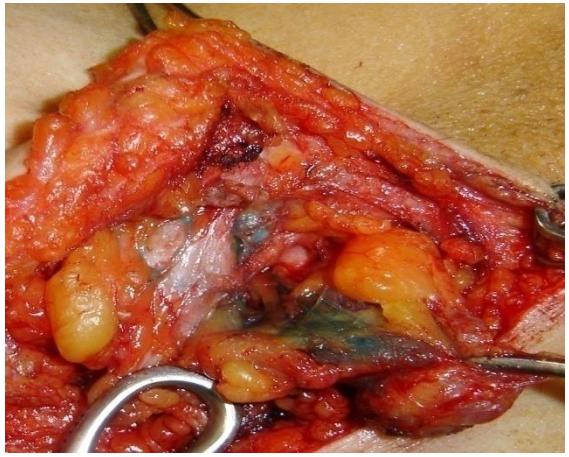


The sentinel node is the first node to be invaded by cancerous cell coming from the breast.

The sentinel node may be located in any group of nodes draining the breast.

SENTINEL NODE BIOPSY





The sentinel node is detected by:

1. Radioactive substances injected in the tumor, around the tumor, or underneath the skin, many hours prior to surgery.

2. Blue dyes injected in the same place and way, some minutes prior to surgery.

SENTINEL NODE BIOPSY

The sentinel node is biopsied prior to excision of the primary tumor.

If the sentinel node is positive for metastasis, a lymphatic dissection is mandatory, because there is a high risk of extension of cancerous cells to other nodes.

Do we need an axillary dissection if pN0 ?

It has been demonstrated earlier that lymph node dissection is not needed in all pN0, including pN0 (i+) and pN0 (mol+)

DE-ESCALATION OF AXILLARY DISSECTION

What are the new recommendations on the indications of Axillary Dissection after SNB ?

DE-ESCALATION OF AXILLARY DISSECTION

There is a trend to avoid axillary dissection when SNB shows 1 or 2 positive nodes (not clinically detected) if you are planning radiotherapy after surgery

DE-ESCALATION OF AXILLARY DISSECTION

There is still a need to axillary dissection when SNB shows ≥ 3 positive nodes or when the nodes are clinically detectable or when your decision of chemotherapy depends on

<u>the number of involved nodes</u>

LYMPH NODE MANAGEMENT

AXILLARY NODE STATUS

The technique of sentinel lymph node biopsy

- Is highly reliable > 95%
- Has very low morbidity
- Is economically safe
- But needs practice and a multidisciplinary approach

TAKE-HOME MESSAGES

1. Surgery remains a major treatment modality for breast cancer.
2. Radical mastectomy is still indicated in locally advanced large tumor with clinically absent or clinically mobile axillary lymph nodes.
3. Radical surgery is indicated in advanced cancers partially or non responding to other treatment modalities (neoadjuvant chemotherapy).
4. Radical surgery removes the whole breast with all or a part of the axillary lymph nodes.

TAKE-HOME MESSAGES

5. Conservative surgical treatment of breast cancer has become a standard modality for stages I and II infiltrating carcinoma.
6. Conservative treatment is possible in selected cases of DCIS.
7. Conservative treatment may be successfully applied in some advanced cancers responding to neoadjuvant treatment (chemotherapy ± target therapy, hormonotherapy).

TAKE-HOME MESSAGES

8. Sentinel lymph node biopsy may replace axillary dissection in No patients, and is not followed by axillary dissection in pNo patients, and some selected pN+ patients.
9. Conservative surgical treatment is to be followed, in most cases, by radiation therapy of the breast (with boost on the tumor bed).
10. Cosmesis is a subjective consideration, that may intervene in the selection of individual cases.
11. Oncoplastic surgery plays an increasing role in the conservative treatment of breast cancer.

TAKE-HOME MESSAGES

12. Reconstruction of the breast may be necessary during conservative treatment or after radical surgery.
13. Frozen section is often needed during conservative surgical treatment, and in sentinel lymph node biopsy.
14. Conservative surgical treatment of breast cancer does not absolutely modify the adjuvant medical treatment of the disease.