PUB: 22/2012

Review Article

Breast Conserving Surgery In Early Breast Cancer Evidence Based Review

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ABSTRACT

Surgical treatment of breast cancer has changed significantly in the past century from mastectomy to breast conserving procedures, including reconstructive procedures. The diagnostic armamentarium has been made easy by introducing Fine-needle aspirations & Trucut needle biopsies with conventional technique to image guided procedures, which help in diagnosis and prognostification for planning multimodality treatment.

The preferred method of treatment for many women with early breast cancer is conservative surgical therapy (principally lumpectomy and axillary dissection) followed by breast irradiation. Sentinel node biopsy though not the standard of care one can still practice it & offer the technique to the select subtype of population.

All these patients have to complete the treatment with radiation &adjuvant chemo, hormone therapy including target therapy.

Keywords : *breast cancer , conservative treatment, reconstruction, adjuvant therapy.*

INTRODUCTION

Breast Cancer has become the most common cancer among women in urban India (34% of all cancers).[1] It nearly constitutes 15% of all the cancers diagnosed. Among US Women, the lifetime risk for being diagnosed with breast cancer is 12.2% or 1 in 8.[2] In India 90% new cases of breast cancer are diagnosed per year. Incidence ranges from 17 to 40 per 100 000 (NCRP).[3]

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MAGNITUDE OF THE PROBLEM

There are 90,000 new cases every year, 17 40 per 1, 00,000 population and 40 to 60% of Breast Cancer diagnosed constitute LABC (locally advanced breast cancer). The 5 year overall survival is 42.3% - 46.8%. There seems to be an increasing trend of breast cancer in India over a period of 20 years and cancer is seen in younger women as compared to post menopausal women .By the year 2020 this may become the number 1 cancer in women in Urban Indian population.

DEFINITION OF EARLY BREAST CANCER - NCI DICTIONARY OF CANCER.

Breast cancer that has not spread beyond the breast or the axillary lymph nodes. This includes ductal carcinoma in situ, stage I, stage IIA, stage IIB, and stage IIIA breast cancers.

Stage I &Stage II breast cancers are early cancers that are not fixed to the skin or muscle. If lymph nodes are involved, they are not fixed to each other or to underlying structures.

Modified radical mastectomy continues to be appropriate for some patients, but breast conservation therapy is now regarded as the optimal treatment for most. [24]

EVIDENCE FOR BREAST CONSERVATION SURGERY (BCS):

Six prospective randomized trials have shown no difference in survival when mastectomy is compared with breast conservative surgery plus radiation for Stage I and Stage II breast cancer (Table 1).

CS & R = conservative therapy and radiation; NS = not significant; NSABP = National Surgical Adjuvant Breast and Bowel Project; EORTC = European Organization for Research and Treatment of Cancer.[4]

Randomized trials also have compared breast conservation surgery alone with surgery plus radiation therapy. These trials have shown a higher recurrence rate in women who did not receive radiation.[5,6] Standard breast conservation therapy should therefore include radiation therapy.[20]

THERAPEUTIC STRATEGIES FOR MANAGEMENT OF EARLY BREAST CANCERS

This should include clinical breast examination, staging work up, breast imaging, tissue biopsy followed by surgery.

CBE: CLINICAL BREAST EXAMINATION

Clinical breast examination is of paramount importance; it helps in making a good clinical diagnosis, in clinical staging, metastatic

TABLE 1 - Survival Rates of Conservative Surgery Plus Radiation Therapy Compared with Mastectomy Alone

		Overall survival (%)		
Trial	***Endpoint (years)***	***CS & R***	***Mastectomy***	***(P value)***
Milan Cancer Institute Trial (n = 701)	18	65	65	(NS)
Institut Gustave-Roussy (n = 179)	15	73	65	(.19)
NSABP B-06 (n = 1,843)	12	63	59	(.12)
National Cancer Institute (n = 237)	10	77	75	(.89)
EORTC (n = 903)	8	54	61	(NS)
Danish Breast Cancer Group(n = 905)	6	79	82	(NS)

work up and planning therapy.

STAGING WORK UP:

The staging work up includes, clinical examination, Bilateral mammogram, Chest Xray, USG abdomen pelvis, Bone scan to rule out bone metastasis

MAMMOGRAPHY:

The types of mammography include Sono-Mammography, Digital Mammography, Mammo Scintigraphy& MR Mammogram. These help in diagnosis, planning of breast conservation, to rule out multicentric disease and to evaluate the opposite Breast.

WHEN TO DO A MAMMOGRAM ?

It is usually done in symptomatic woman above the age of 30, high risk group,in women with family history of Breast cancer, history of opposite Breast cancer and in women on H R T (Hormonal therapy).

It may also be done in women with phobia of breast cancer, for follow-up of patients of opposite breast cancer, and in patients who have who have undergone breast conservation therapy and as a Screening modality in the general population.

Ideal ages to do a mammography to pick up the early lesions are, age 40-49 years and age 50-59 years wherein the pickup rates are higher.

ULTRASOUND

Ultrasonography is frequently used to differentiate benign cysts from solid lesions, and to assess axillary lymph node involvement. It also serves as a localizing imaging modality when biopsy is recommended.[7] High frequency transducers of 5 to 7.5 MHz is used.

The new ABVS (automated breast volume scanner 3D ultrasound) is more useful in detecting intra ductal pathology, early lesion and interval carcinomas.

MR MAMMOGRAM

Its role is under evaluation, when the doubtful lesion on mammography, dense breast, and to identify multifocal disease one can use it. It might be able to identify additional foci of disease in 20-35% of patients. It has been recommended for screening in dense breast, young age and to rule out multicentricity.

PET in Breast Cancer: is not a standard of care or evidence based in management of EBC its role is more useful in metastatic breast cancer. The role of FDG-PET in the routine workup and management of early breast cancer remains limited due to its low sensitivity in detecting smaller tumors and the high cost.

In a large prospective clinical series (N = 144), the sensitivity of detecting tumors more than 1 cm in diameter was 91%, but the sensitivity dropped to 57% when looking at tumors smaller than 1 cm, and to 25% when looking at carcinoma in situ.[8]

TISSUE DIAGNOSIS

Tissue diagnosis is mandatory for planning definitive treatment; this can be performed through simple safe FNAC, TRUCUT biopsy and excisional biopsy of the lump.

FINE NEEDLE ASPIRATION CYTOLOGY

(FNAC)

It is a rapid, painless, inexpensive method, which can be repeated if necessary. With sensitivity of about 87%, it has a false negative rate of 9.6 % and false positive rate < 1%. In cases where FNAC is positive, with high clinical suspicion of malignancy and mammography is positive, one can plan therapy.

DISADVANTAGES:

Insitu cancers can be missed, FNAC doesn't give histological details. And it requires an experienced cytopathologist.

CORE NEEDLE: TRUCUT BIOPSY:

Mandatory in all LABC before starting treatment. It is rapid, inexpensive provides histological details, and with sensitivity ranging from 79 - 94% .False negative and incomplete categorization of lesion can occur. Prognostic factors can be studied.

EXCISION BIOPSY

It is standard technique for diagnosis of breast cancer. It allows complete evaluation of tumor site and histological details. Excision with good margin of normal tissues is recommended thus avoiding need of re-excision as a part of definite breast conservation surgery.

NON PALPABLE LESIONS

Non palpable lesions are approached with the aid of imaging techniques. Biopsy of solid lesions may be performed by core-cutting needles or FNA under ultrasonographic guidance. Areas of clustered micro-calcifications require a core biopsy performed under stereotactic mammographic guidance, or mammographically localized lesions can be needle-localized for excision.

If the calcifications are highly suspicious, it may be most efficient to excise them for diagnosis. If the calcifications are of uncertain significance, a core biopsyespecially with suction core techniques that remove majority of the calcifications can provide effective diagnosis. Magnetic resonance imaging (MRI) can be used to perform localization.

When excisional biopsy with radiographic localization is used, it is essential that the localizing needle or wire be placed within the lesion. A localizing wire that appears to be only a few millimeters away from the lesion with the breast in compression may prove to be 1 or 2 cm away when compression is released.

There is a 1% to 5% risk of failure to excise the mammographically identified lesion. As in any biopsy situation in which the diagnosis fails to explain the physical or radiographic findings, search for evidence of persistence of the lesion on mammogram and repeat biopsy are indicated.[9]

Management of Clinically palpable Breast Cancer. The management of clinically palpable breast lumps includes the primary tumor, axillary lymph nodes, surgery and reconstruction followed by adjuvant therapy.

The surgical practice has changed significantly during the last two decades with better understanding of Tumor biology, emergence of multimodality treatment & increasing emphasis on cosmesis and quality of life

Surgery is the main key in loco regional

control of the disease. It gives reasonable chance of cure in EBC & provides valuable information needed for staging and prognostification of the individual patient..

The types of surgery one can perform are: Breast Conservative surgery, Modified radical mastectomy type I, II, III, Skin sparing mastectomy type I, II, III and reconstruction .

DEFINITION OF BREAST CONSERVING SURGERY - NCI DICTIONARY OF CANCER.

An operation to remove the breast cancer but not the breast itself.

Types of breast-conserving surgery include lumpectomy (removal of the lump), quadrantectomy (removal of one quarter, or quadrant, of the breast), and segmental mastectomy (removal of the cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor). Also called breast-sparing surgery.

The comparative study of various types of BCS followed by radiotherapy has a sufficient evidence based data from the studies of Veronesi et al and B.Fisher et al. [22,23]

INDICATIONS FOR BREAST CONSERVING SURGERY (BCS)

A complete history and physical examination help determine which surgery is best for each individual patient. A family history of breast cancer is not a contraindication to breast-conserving surgery.[10]

Age alone should not be a determining factor in selecting surgical strategy; however elderly women may have co morbid conditions that need to be considered. A woman who is likely to have difficulty with general anesthesia might benefit from a lumpectomy performed under local anesthesia. Conversely, a woman who has difficulty complying with six weeks of radiation treatments may be a better candidate for mastectomy.

Mammographic evaluation performed within the past three months is necessary to plan surgery. The location, size, associated microcalcifications, and any other characteristics of the primary tumor must be determined. Bilateral mammography is also necessary to evaluate the presence of other suspicious lesions in the breast tissue.

Patients with invasive ductal and lobular cancers are candidates for conservative therapy if the tumor is not diffuse and negative surgical margins can be achieved.[11]

The presence of positive axillary nodes is not a contraindication to breast conservation therapy.[12]

Tumors located near the nipple areolar complex may require excision of the nipple, but this also is not a contraindication.[12]

The status of the margins of resection after lumpectomy is important when determining the optimal surgical treatment. When negative margins can be achieved with the preservation of adequate amounts of breast tissue, the patient is a candidate for conservative surgical therapy. If tumor remains at the margin after re-excision, modified radical mastectomy may be the treatment of choice. [13]

The patient's wishes should always be considered when deciding treatment. For most

patients, mastectomy will not influence the likelihood of survival but may impact quality of life. Women whose breasts are preserved have fewer episodes of depression, anxiety, and insomnia.[14]

A recent study of patients with early-stage breast cancer found women who undergo breast conservation therapy have improved body image, higher satisfaction with treatment, and no more fear of recurrence compared with women treated with mastectomy.[15]

CONTRAINDICATIONS FOR BCS:

1. Multicentric breast cancer.
2. Diffuse malignant looking micro calcifications on mammogram
3. Matted (N2) axillary lymph nodes.
4. Recurrence in a previously conserved breast.
5. Collagen vascular disease.
6. Early pregnancy.
7. H/o previous irradiation to chest wall.
8. Positive surgical margins

RELATIVE CONTRAINDICATIONS FOR BCS:

1. Tumour size >5 cm. (T3)
2. High risk of residual tumour or surgical margin positivity on resection.
3. Large tumour in a small breast.
4. Poor histological differentiation.
5. Extensive intraductal component (>25% of tumour is DCIS)

CONTRAINDICATIONS TO CONSERVATIVE SURGERY

ABSOLUTE

When two or more primary tumors are located in different quadrants of the breast or there are associated diffuse microcalcifications which appear malignant, breast-conserving therapy is not appropriate. A woman with previous breast irradiation is also not a candidate.[16] Breast irradiation cannot be given during pregnancy, but it may be possible to perform breast-conserving surgery in the third trimester and administer irradiation after delivery.[17]

As mentioned above, positive surgical margins are also an absolute contraindication.

RELATIVE

Most radiation oncologists consider a history of collagen vascular disease a relative con-traindication because the poor vasculature in the skin leads to unacceptable cosmetic results.[18] Tumor size is not an absolute contraindication, but the presence of a large tumor in a small breast treated with adequate margins might result in an unwanted cosmetic appearance

AXILLARY LYMPHNODE DISSECTION (AXLND)

Axillary Lymphnode dissection refers to removal of Lymphnodes in the axilla. It is important for staging, prognosis and guiding accurate treatment. Complete AXLND is dissection of nodes from levels I to III, Low AXLND refers to dissection of Level I& II lymphnodes.(19) In most cases, metastases to axillary lymphnodes occur sequentially. Level I nodes are usually involved first followed by involvement of nodes level II & then at Level III.

SKIP metastases means involvement of

nodes at levels II or III but not Level I (Veronesi.U et al 4%). Level I LNS are involved in 58%, I & II in 22% & all three levels in 16%.

Thus most authorities recommend a level I & II dissection which generally result in the removal of 10 or more Lymphnodes.

LOW AXLND

Correctly stages 96% of pts with primary breast cancer (as either node +ve or node ve) & rarely gives rise to significant lymphedema of the upper extremity.

The long thoracic (nerve of Bell) runs along the lateral aspect of the chest wall, supplying the serratus anterior muscle. This nerve should be carefully identified & spared, because injury may result in a winged scapula. Care should also be taken to preserve the thoracodorsal nerve, which accompanies the subscapular artery along the posterior aspect of the axilla & Supplies the Lattisimus dorsi muscle. The intercostobrachial nerves are either taken or preserved at the discretion of the surgeon.

WHEN NOT TO DO AXLND

A small sub sect of population may not undergo this procedure.

The indication depends on

- Tumor size
- Type of histology.
- Tubular Carcinoma less than I cm
- T1 lesions in the medial quadrant
- Screen detected lesions
- Micro invasive carcinomas
- DCIS

SENTINEL LYMPHNODE BIOPSY (SLNB) -ASCO GUIDELINES

Sentinel Lymphnode Biopsy is a more conservative approach to the surgical management of the axilla in breast cancer and provides more information from a detailed examination.

Lymphatic mapping and selective Lymphadenectomy is a technically feasible and highly accurate method for staging breast cancer patients.

The technique of SLN localization includes, use of isotope (sulphur colloid), dye like isosulphan blue (in Indian context, one can

MORBIDITY AFTER AXLND

EARLY COMPLICATIONS	LATE COMPLICATIONS
Injury to axillary vein	Thrombosis of axillary vein
Injury to motor nerves in axilla	Hyperesthesia 0.7%,
Seroma formation	Numbness 70%,
	Shoulder dysfunction 9%,
	Lymph edema 15%

use methylene blue dye) a combination of these two techniques is more accurate.

The lymphnodes should be evaluated both by conventional staining techniques and IHC.[21] The macro metastasis of SLN should undergo complete axillary dissection.The controversy remains, what to do for micrometastasis? The morbidity associated with SLN is minimal compare to complete axillary dissection.

FOLLOW UP VISITS AFTER COMPLETION OF THERAPY

Patient will come for follow up visits every 3 months in the first year, every six months in the next year & subsequently every year.

Following tests need to be done during the follow up visit:

Complete Clinical Examination

Heamogram

Chest xray

Ultrasound abdomen and pelvis

Serum Alkaline phosphatase

Mammography of the other breast every year.

Bone scan if patient is symptomatic.

CONCLUSION

Though there is a lack of screening programs in this country to make an early diagnosis, public education and pro active screening programs help in early detection of tumors in a greater percentage of women. Studies have shown that women diagnosed at early stages of invasive breast cancer have equivalent outcomes when they are treated by lumpectomy and radiation therapy or modified radical mastectomy.

All patients of Breast cancer who undergo BCS should complete their treatment with radiation, adjuvant chemotherapy, target therapy and hormone therapy depending upon the status of prognostic factors in various sequential manner as described.

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Source of Support: Nil Conflict of Interest: Nil