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Evolution in the Management of the Axilla in Cancer Breast

Rahul Khanna

Department. of Surgery, Banaras Hindu University, Varanasi, Uttar Pradesh, India

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INTRODUCTION

Appropriate management of the axillary lymph nodes is an important component in the management of a patient with breast cancer. Over the last 3-4 decades, the surgical treatment of the breast has become less radical. Also, with wider dissemination of medical services and better education of the population at large, breast cancer is being diagnosed at an earlier stage. Accordingly, the management of axillary nodes has undergone a paradigm shift.

A Landmark Event in the Hi Story of Axillary Surgery for Breast Cancer

- More than 100 years ago Rudolf Virchow (1821-1902) described axillary lymph node involvement in breast cancer. He was a German pathologist and described his finding on autopsy studies.[1]
- William Halsted in 1894 described radical mastectomy which involved resection of the breast with a pectoralis major and minor muscle and the axillary lymph nodes.[2]
- David Patey in 1948 described the preservation of the pectoralis major muscle in the modified version of radical mastectomy.[3]
- Madden and Auchincloss in 1970, showed that the pectoralis minor muscle can also be preserved while achieving axillary lymph node clearance with similar results.[4]
- Kennedy and Millar in 1953, described the simple mastectomy as a treatment of breast cancer.[5] This was due to a better understanding of the disease biology and advancement in adjuvant therapy.
- Toth and Lappert in 1991, described skin-sparing mastectomy which felicitated breast reconstructions with better cosmetic results.
- The National Surgical Adjuvant Breast and Bowel Project (NSABP) trial B-04 reported that 40% of a patient undergoing axillary lymph node dissection (ALND) had negative model involvement. [6]
- Proportion of negative axillary nodal involvement increased with the introduction of mammographic breast cancer screening in the 1980's which led to an increase in early diagnosis of breast cancer.
- By the late 1990's the concept of axillary staging with sentinel lymph node biopsy started gaining acceptance. This was based on the principle that lymphatic drainage from the breast to the regional lymph nodes follows an orderly pattern, initially reaching a node or few nodes know as the sentinel lymph node (SLN).[7]
- Subsequent studies demonstrated that irrespective of site of the tumor in breast, all lymph drains into the same SLN through the subareolar plexus of Sappey.
- Further studies have shown that peri-areolar or intradermal injections of mapping agents are superior to peri-tumoral injections. [8]
- The risk of involvement of internal mammary nodes without axillary nodal involvement even in deep situated tumors, was found to be minimal.[9]

Axillary Staging with Sentinel Lymph Node Biopsy in Breast Cancer

Clinical examination of the axilla is influenced by body habitus and has a 50 % false negative rate (FNR). Ultrasound has a higher sensitivity and can guide needle biopsy from suspicious nodes. SLNs are identified by the blue dye technique (Methylene blue or isosulphan blue), a radioactive technetium 99m- labeled colloid, or a combination of both dyes. The detection rates of SLN with blue dye is 90% and when combined with radioactive tracer, is 95%.[11]

Never techniques for SLN identification are indocyanine green fluorescence, contrast-enhanced ultrasound using microbubbles and superparamagnetic iron oxide nanoparticles enhanced MRI.

Management of Clinically Negative Axilla

The NSABP B-32, ALMANAC and Milan trials reported a significant reduction in shoulder stiffness, lymphedema and upper limb stiffness when SLN biopsy was used instead of axillary lymph node dissection for axillary staging in clinically negative axilla.

*Author for Correspondence: rahulkhanna@gmail.com

Contributions by Author in Axillary Evaluation of Breast Cancer Patients

In a study performed on 108 breast cancer patients, the methylene blue dye technique was safe, accurate and cost-effective for sentinel lymph node identification. Further the intraoperative assessment of the harvested sentinel lymph node by touch imprint cytology was found to accurate and user-friendly.[13]

Immunohistochemistry for epithelial membrane antigen (EMA) was able to detect micrometastasis (<2.0 mm) in sentinel lymph nodes which were missed on conventional histopathology. The authors recommended combining IHC for EMA with histopathology for accurate assessment of harvested SLN.[14]

Ultrasound-guided FNAC of the axillary lymph nodes was performed on 102 breast cancer patients in whom there was no clinically palpable lymph node in the axilla. Ultrasound was able to visualize an axillary node in 55 patients. On correlation with post-modified radical mastectomy histopathology, the preoperative USG-guided FNAC had a sensitivity of 60%, specificity of 100%, and overall diagnostic accuracy of 58%. It was concluded that patients with a positive for malignancy USG report on the axilla should be treated as such.[12]

Biopsy-proven 86 breast cancer patients with clinically negative axilla were evaluated with 7.5 mHz doppler ultrasound. It was found to be possible to identify the subset of patients at high risk of harboring nodal metastasis and these patients can be offered axillary surgery upfront.[15]

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