The Value of Predicting Axillary Lymph Node Status in Breast Cancer by Sentinel Lymph Node

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Abstact **Objective** To investigate the localization of sentinel lymph node in breast cancer and its clinical signficance for predicting axillary lymph nodes status. **Methods** In 72 patients with breast cancer the sentinel lymph nodes were detected using the injection of 2% methylene blue 2~3ml into peritumoral or arround prior biopsy cavity 10 minutes before the surgical procedure. All patients underwent the traditional radical or modified radical mastectomy with axillary dissection. All sentinel lymph nodes, axillary lymph nodes and dissected specimens were submitted separtely to pathological examination. Pathologic characteristics of sentinel lymph node and other axillary nodes were analyzed. **Results** Sentinel lymph nodes were identified in 67(93.1%)cases, the number of lymph nodes ranged from 2 to 5. Sentinel lymph nodes were located in level I of the axilla in 65 patients, and level Ⅱ of the axilla in 2 patients.The overall accuracy of predicting axillary lymph nodes by sentinel lymph nodes was 98.5%, with a sensitivity of 97.4%, specificity of 100%. **Conclusion** Sentinel lymph nodes may accurately show histological status of axillry lymph nodes in patients with breast cancer. Sentinel lymph node biopsy can determine whether axillary lymph nodes dissection should be carried out for early-stage breast carcinoma.

Key word breast cancer; sentinel lymph nodes; axillary lymph node; lymph dyeing

Recently,most studies of sentinel lymph node have been performed in patients with breast cancer.The purpose of this study is to investigate the localization of sentinel lymph node in breast cancer and its clinical value of predicting histopathological status of axillary lymph node.

MATERIALS AND METHODS

From August 2000 to May 2001, a total of 72 female patients with primary breast cancer were referred to our department for surgery, with median age of 48 years old (range 30 to 71). Among all patients, 30 cases were diagnosed with clinial stage I, 29 with clinical stage Ⅱ,and 13 with clinical stage Ⅲ. Tumor size(in diameter) is smaller than 2cm in 33 cases, 2~5cm in 31 cases, and larger than 5cm in 8 cases, respectively. Tumor was located in the upper outer quadrant of the breast in 44 cases, in the inferior outer quadrant in 17 cases, and in inferior medial quadrant in 11 cases.

2% metheylene blue 2~3ml was injected around the area of the tumor, ten minutes before the surgical procedure, and in the patients whose tumor had been previously excised, was injected into the tissue immediately surrounding the biopsy cavity. All patients underwent the traditional modified radical (for stage Ⅰ and Ⅱ) or traditional radical mastectomy (for stage Ⅲ) with axillary dissection. All sentinel lymph nodes stained by methylene blue and other axillary lymph nodes were submitted separately to pathological examination.

RESULTS

Among 72 patients, sentinel lymph nodes were identified in 67 (93.1%) cases (28 cases with stage Ⅰ, 27 cases with stage Ⅱ, and 12 cases with stage Ⅲ). The number of sentinel lymph nodes ranged from 2 to 5, a mean of 3.4. The locations of sentinel lymph nodes were as follows: in the upper outer quadrant of the brest, 42 cases; in the inferior outer quadrant, 16; and in inferior medial quadrant, 9. There was no statistically significant difference between the presence of sentinel lymph nodes and the stage and location of tumor.

Axillary lymph nodes metastases were identified by pathologic examination in 39 patients (54.2%). In 38 of the patients, sentinel lymph nodes was positive for metastasis(52.8%), and one cases was false-negative.In 29 patients(40.3%), only sentinel lymph nodes provided evidence of lymph node metastasis. bath sentinel lymph nodes and axillary lymph nodes were positive for metastasis in 9 patients (12.5%).

Histopathologic characteristics of sentinel lymph node and other axillary nodes were compared. The results showed that the sensitivity of predicting axillary lymph nodes status by sentinel lymph nodes was 97.4% (38/39), the specificity was 100.0% (29/29). It had

100.0% (37/37) positive predictability and 96.7% (29/30) negative predictability of lymph node metastasis. The accuracy of predicting axillary lymph nodes status by sentinel lymph nodes was 98.5% (66/67).

DISCUSSION

At present, surgery is still regarded as the primary therapeutic methods for breast cancer. Traditional radical or modified radical mastectomy is routinely performed, all with axillary lymph node dissection. However, axillary lymph node dissection is associated with some complications, including damage of blood vessel, nerve and lymphatics ,and postoperative arm lymphedema, hypesthesia of arm, decreased range of motion of shoulder joint, seroma formation and so on, which affect the quality of life of the patients. Now, there is a controversial issue that axillary lymph node dissection is necessary or not in routine management of early breast cancer without axillary lymph node metastasis[2,3]. Fisher et al[1] reported their results of a prospective trial for ten year, demonstrating equivalent survivals between the patients with level Ⅰ to Ⅲ underwent axilary lymph node dissection or not and treated by radiotherapy. Wood et al[2] and Cady[3] are also agreed that axillary lymph node dissection would not be beneficial for the patients with early breast cancer. On the contrary, it may increase complication and reduce the quality of life. Some scholars suggested that sentinel lymph node biopsy was a accurate method of predicting the status of axillary lymph node.

Sentinel lymph nodes are the first regional draining lymph nodes. They were firstly studied in penis cancer in 70s of the 20th. Recently it was widely applied in the area of breast cancer study. Snider et al[4], Nwariaku et al [5] and Rubio et al[6] reported that they injected preoperatively with Technetium-99(99Tc) sulfur colloid around the primary tumor or prior biopsy cavity. Intraoperative localization of sentinel lymph node was performed using a hand-held gamma detector probe. After the sentinel lymph node was identified and removed for pathological examination, axillary lymph node dissection was performed routinely. Compared outcomes in sentinel lymph node versus axillary lymph node, it showed that sentinel lymph node accurately predicted axillary metastases or not. In accordance with the methods reported by Ollila et al[7], we injected 2% methylene blue 2~3ml aroud tumor or prior biopsy cavity. Sentinel lymph node was stained blue when lymph drained into the first (nodal) station. Our studies demonstrated that the success rate for identifing sentinel lymph node using the injection of methylene blue was 93.1%, similar to the rate (range from 65.5% to 99.0%) reported by others.The accuracy, sensitivity and specificity of predicting ALNs by SLNs were 98.5%, 97.4% and 100% respectively, which are also similar to 96%, 99%and 100% respectively reported by others.Therefore, We conclude that sentinel lymph node biopsy using the injection of methylene blue is simple, economical and effective. Sentinel lymph node may accurately show histological status of ALNs. Routine Sentinel lymph node biopsy should be performed in patients with early breast cancer in order to determine whether axillary lymph node dissection should be performed or not, because axillary lymph node dissection appears to cost more and have more complications and affect the quality of life.

REFERENCE

1. fisher B, Redmond C, Fisher ER, et al. Ten-year results of a randomized clinical trial comparing radical mastectomy and total mastectomy with or without radiation. N Engl J Med, 1985, 312(11):674-681.
2. Wood WC. Should axillary dissection be performed in patients with DCIS? AnnSurg Oncol, 1995 2(3):193-194.
3. Cady B. Is axillary lymph node dissection necessary in routine management of breast cancer? Breast J, 1997, 76(3):246-260.
4. Snider H, Dowlatshahi K,Fan M, et al. Sentinel node biopsy in the staging of breast cancer. Am J Surg, 1998, 176(4):305-310.
5. Nwariaku FE, Euhus DM,Beitsch PD, et al, Sentinel lymph node biopsy, an alternative to elective axillary dissection for breast cancer. Am J S urg 1998, 176(6):529-531.
6. Rubio IT, Korourian S, Cowan C, et al. Sentinel lymph node biopsy for staging breast cancer. Am J Surg,1998, 176(6): 532-537.
7. Ollila DW, Giuliano AE. Intraoperative lymphatic mapping and sentinel lymphadenectomy using isosulfan blue dye. Breast Dis, 1998, 8(3):292-300.