Diagnostic Accuracy of Core Needle Biopsy of Breast Lesions in Maharat Nakhon Ratchasima Hospital

Vacharee Poklang, M.D.*

Abstract
Objective: To determine the accuracy, sensitivity and specificity of core needle biopsy of breast lesions in Maharat Nakhon Ratchasima Hospital. Material and Methods: The files of department of pathology, Maharat Nakhon Ratchasima hospital were searched for cases of breast lesions, between 1 October 2008 to 30 September 2010. Hematoxylin-eosin stained slides from manual core needle biopsy and subsequent open surgery specimens of breast lesions and their surgical pathology reports were retrospectively studied. The overall accuracy, sensitivity and specificity were analyzed. Results: One hundred and seventy cases with adequate tissue samples for histopathologic evaluation were included in this study. One hundred and sixty cases (94.12%) were correctly diagnosed by core needle biopsy compared with subsequent open surgery. In 114 cases, invasive carcinomas were correctly diagnosed by core needle biopsy which mostly were invasive ductal carcinoma. Benign lesions were correctly proved in 46 cases which mostly were fibroadenoma. The accuracy of core needle biopsy in diagnosis of breast lesions was 94.11%. Conclusion: In this study, core needle biopsy yielded an accuracy rate of 94.11%. The sensitivity and specificity are 91.93% and 100% respectively. This is in line with several researches which report core needle biopsy as an excellent technique for palpable breast lesion creating high level of accuracy rate, sensitivity and specificity in performing a histological diagnosis of breast lesions. Keywords: Core needle biopsy, Breast lesion, Accuracy

*Department of Anatomical Pathology, Maharat Nakhon Ratchasima Hospital, Nakhon Ratchasima 30000
บทความ: การวิเคราะห์ความถูกต้องในการตัดเนื้อตัวตรวจโดยวิธี core needle biopsy
ในโรงพยาบาลมหาวิทยาลัยทรงธรรม
วัตถุ: โพธิตกลิ่น, พ.บ.*
* กลุ่มงานฟิวชั่นภายในวิธีการ โรงพยาบาลมหาวิทยาลัยทรงธรรม จ.นครราชสีมา 30000
เวชสาร โรงพยาบาลมหาวิทยาลัยทรงธรรม 2555; 36: 167-72.

วัตถุประสงค์: เพื่อศึกษาความถูกต้องของการตรวจเนื้อตัวด้วยวิธี core needle biopsy ในผู้ป่วยโรงพยาบาลมหาวิทยาลัยทรงธรรมที่มีภูมิพื้นเดิม และให้สังเกตเนื้อตัวตรวจทางพยาธิวิทยา วิสัยและวิธีการ: ขนาดกลอกโรคจากเนื้อตัวด้วยวิธี core needle biopsy และมีการผ่าตัด (open surgery) ตามแนวทางทั่วไป และเพิ่มในรายงานผลการตรวจเนื้อตัวตรวจทางพยาธิวิทยา โรงพยาบาลมหาวิทยาลัยทรงธรรม 1 คนในวันที่ 1 ตุลาคม 2551 ถึง 10 ตุลาคม 2553 และยังมีการตรวจทางพยาธิวิทยา แต่ละราย พบว่าการวินิจฉัยเนื้อตัวต่างกันที่เกินกว่าเกียวกันตัวอย่างเนื้อตัวตรวจ (H&E) ในรายที่มีช่องสมัยเพียงหนึ่งมา
วิเคราะห์ทางสถิติ คำว่าความถูกต้อง (accuracy) ที่ก้าวหน้า (sensitivity) และความจำเพาะ (specificity) โดยผลลัพธ์เปรียบเทียบสามารถที่:
ผลการศึกษา: ผลการตรวจทางพยาธิวิทยาโดยวิธี core needle biopsy 170 รายพบว่า 160 ราย ได้รับการวินิจฉัยเนื้อตัวอย่างเป็น invasive carcinoma 114 ราย โดยส่วนใหญ่เป็นชนิด invasive ductal carcinoma และ benign lesion 46 ราย โดยส่วนใหญ่เป็นชนิด fibroadenoma สรุป: จากการศึกษาได้รับความถูกต้องในการตัดเนื้อตัวตรวจโดยวิธี core needle biopsy ในโรงพยาบาลมหาวิทยาลัยทรงธรรมคิดเป็นร้อยละ 94.11 ความถูกต้อง 91.93 และความจำเพาะร้อยละ 100

c: ที่ตัดเนื้องอก, core needle biopsy, วิเคราะห์ความถูกต้อง

Introduction
Breast cancer is the second most common cancer in Thai women. The incidence of the whole country is 20.5/100,000/year and the trend in incidence continues to increase over time. The overall survival rate of Thai breast cancer patients is approximately 80%①. In recent years, the effects of earlier diagnosis have finally led to an overall decreased mortality from breast cancer. A suspicious breast lesion detected on imaging or physical examination needs pathological examination before treatments. Biopsies may be performed by open surgery (excisional or incisional biopsy) or by minimally invasive core needle methods. Core needle biopsy (CNB) involves removing small samples of breast tissue through a hollow large-core needle inserted through the skin. A sufficiently accurate method of performing minimally invasive CNB may allow many women to avoid surgery and reduce the number of surgical procedures that women with cancer undergo during treatment②.

Core needle biopsy has become an integral part for evaluating a suspicious breast lesion. Many breast lesion cases in Maharat Nakhon Ratchasima Hospital were diagnosed using core needle biopsy specimens
and the trend continues to increase in number over time. The objective of the study was to determine the diagnostic accuracy, sensitivity and specificity of core needle biopsy of breast lesion in Maharat Nakhon Ratchasima Hospital.

**Material and methods**

The files of Department of Pathology, Maharat Nakhon Ratchasima hospital were searched for cases of breast lesions, between 1 October 2008 to 30 September 2010. Hematoxylin-eosin stained slides from manual core needle biopsy and subsequent open surgery specimen of breast lesions and their surgical pathology reports were retrospectively studied. The exclusion criterion was inadequate tissue sampling for diagnosis in the core needle biopsy specimen. The overall accuracy, sensitivity and specificity were analyzed.

**Results**

One hundred and seventy cases with adequate tissue samples for histopathologic evaluation were included in this study. One hundred and sixty cases (94.12%) were correctly diagnosed by core needle biopsy compared with subsequent open surgery. In 114 cases, invasive carcinomas were correctly diagnosed by core needle biopsy which mostly were invasive ductal carcinoma. Benign lesions were correctly proved in 46 cases which mostly were fibroadenoma. Ten of 170 cases (5.88%) were negative for malignancy by core needle biopsy but positive for malignancy by open surgery. The accuracy of core needle biopsy in diagnosis of breast lesions was 94.11%. The sensitivity and specificity were 91.93% and 100%, respectively while positive and negative predictive value were 100% and 82.14%, respectively.

**Discussion**

Core needle breast biopsy has come up an important part of work-up for patients with suspicious breast lesions. Normally, women suspected of having breast cancer are referred for breast biopsy to determine whether such lesions are benign or malignant and further treatment is needed or not. Biopsies may be performed by open surgery (excisional or incisional biopsy) or minimally invasive core-needle biopsy. In comparison to open surgical biopsy, core needle biopsy, performed as an outpatient procedure under local anesthetic, is found as causing less trauma, fewer complication and shorter recovery. Definitively diagnosing breast lesions with core needle biopsy brings about several advantages. As for benign lesions, performing a definitive diagnosis eliminates unnecessary surgical excision and protracted follow-up which are costly in psychosocial and resource terms. The definitive diagnosis of cancer helps patients select

**Table 1** Pathological diagnosis of core needle biopsy and subsequent open surgery

<table>
<thead>
<tr>
<th>Core needle biopsy (N=170)</th>
<th>Open surgery (N=170)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malignant</td>
<td>Benign</td>
</tr>
<tr>
<td>Malignant</td>
<td>114</td>
<td>0</td>
</tr>
<tr>
<td>Benign</td>
<td>10</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>46</td>
</tr>
</tbody>
</table>
an informed option and obtain consultation before surgery. It also facilitates the planning of multimodal treatment with respect to neoadjuvant chemotherapy and type of procedure\(^2,3\).

The diagnostic accuracy of CNB has been verified with several reports showing good concordance between CNB and surgical biopsy in the diagnosis of carcinoma ranging from 91-100\%\(^{3,12}\). A long-term, multi-institutional and prospective study has estimated the sensitivity, specificity and accuracy of CNB at 91-92\%, 98-100\%, and 96-97\% respectively (\(N = 100\))\(^{13}\). The accuracy of CNB has been confirmed by many large series more recently\(^{14-21}\) concordantly with what we have found in our study that the accuracy of core needle biopsy in diagnosis is 94.11\%.

However, CNB may miss some particular areas of invasive carcinoma, especially in small lesions like what we have found in our study that invasive carcinoma couldn’t be identified by 10 cases of CNB but in open surgery. These findings supported by many series\(^ {22,23}\) found invasive ductal carcinoma at surgical excision in which core needle biopsy yielded ductal carcinoma in situ or atypical ductal hyperplasia. Obtaining a larger number of core needle specimens in such cases would increase a chance of finding areas of invasive carcinoma\(^ {0,24-26}\).

There are multiple factors which may influence diagnostic accuracy. The number of core biopsy samples taken is important. The sensitivity for detection of malignancy will increase if multiple core samples are taken (six or more)\(^ {10,24,25}\) and the gauge of needle reflects the total amount of tissue obtained\(^ {24,25}\).

The present study has limitations. First, in cases of benign core needle biopsy, results that were not proven by surgical biopsy were excluded. Therefore, a selection bias may exist, and it is possible that there were more false-negative diagnosis in the excluded cases. Second, the core needle biopsy specimens were performed by many operators that the operator’s experience may also be another possible factor which may influence diagnostic accuracy\(^ {10}\).

**Conclusion**

In this study, core needle biopsy yielded an accuracy rate of 94.11\%. The sensitivity and specificity were 91.93\% and 100\%, respectively. This is in line with several researches which report core needle biopsy as an excellent technique for palpable breast lesion creating high level of accuracy rate, sensitivity and specificity in performing a histological diagnosis of breast lesions. We recommend CNB in patients with palpable breast lesion suspected of malignancy to be performed on out patients.

**References**

5. Elvecrog EL, Lechner MC, Nelson MT. Nonpalpable breast lesions. Correlation of stereotactic large-core needle biopsy and surgical
