

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

บทคัดย่อ: การวิเคราะห์ความถูกต้องในการตัดเนื้อเต้านมตรวจโดยวิธี core needle biopsy ในโรงพยาบาลมหาสารนครราชสีมา
 วัชร โพธิ์กลาง, พ.บ.*
 * กลุ่มงานพยาธิวิทยาภาควิภาค โรงพยาบาลมหาสารนครราชสีมา จ.นครราชสีมา 30000
เวชสารโรงพยาบาลมหาสารนครราชสีมา 2555; 36: 167-72.

วัตถุประสงค์: เพื่อศึกษาความถูกต้องของการตรวจชิ้นเนื้อเต้านมที่ได้จากวิธีใช้เข็มเจาะดูดชิ้นเนื้อ (core needle biopsy) ในผู้ป่วยโรงพยาบาลมหาสารนครราชสีมาที่มีก้อนที่เต้านม และได้ส่งชิ้นเนื้อตรวจทางพยาธิวิทยา
วัสดุและวิธีการ: คัดเลือกสไลด์จากชิ้นเนื้อเต้านมที่ได้จากวิธีใช้เข็มเจาะดูดชิ้นเนื้อ (core needle biopsy) และมีการผ่าตัด (open surgery) ตามมาภายหลัง จากเพิ่มใบรายงานผลการตรวจชิ้นเนื้อทางพยาธิวิทยา โรงพยาบาลมหาสารนครราชสีมา ตั้งแต่วันที่ 1 ตุลาคม 2551 ถึง 30 กันยายน 2553 และบันทึกผลการตรวจทางพยาธิวิทยาแต่ละราย ทบทวนการวินิจฉัยสไลด์จากชิ้นเนื้อที่ย้อมด้วยสีมาตรฐาน (H&E) ในรายที่มีข้อสงสัย เพื่อนำมาวิเคราะห์ทางสถิติ คำนวณค่าความถูกต้อง (accuracy) ค่าความไว (sensitivity) และความจำเพาะ (specificity) โดยแสดงผลเป็นร้อยละ **ผลการศึกษา:** ผลการตรวจทางพยาธิวิทยาสไลด์จากชิ้นเนื้อเต้านมจำนวน 170 ราย พบว่า 160 ราย ได้รับการวินิจฉัยที่ถูกต้อง แบ่งเป็น invasive carcinoma 114 ราย โดยส่วนใหญ่เป็นชนิด invasive ductal carcinoma พบ benign lesion 46 ราย โดยส่วนใหญ่เป็นชนิด fibroadenoma **สรุป:** จากการศึกษาครั้งนี้ค่าความถูกต้องในการตัดเนื้อเต้านมตรวจโดยใช้วิธี core needle biopsy ในโรงพยาบาลมหาสารนครราชสีมาคิดเป็นร้อยละ 94.11 ความไวร้อยละ 91.93 และความจำเพาะร้อยละ 100

คำสำคัญ: ก้อนที่เต้านม, 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 treatment⁽²⁾.

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⁽²⁾. 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

| Core needle biopsy (N=170) | Open surgery (N=170) | | Total |
|----------------------------|----------------------|--------|-------|
| | Malignant | Benign | |
| Malignant | 114 | 0 | 114 |
| Benign | 10 | 46 | 56 |
| Total | 124 | 46 | 170 |

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⁾ concordant 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^(10,24-26).

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^(24,26).

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

1. Wilailak S. Epidemiologic report of gynecologic cancer in Thailand. *J Gynecol Oncol* 2009; 20: 81-3.
2. Luechakietisak P, Rungkaew P. Breast Biopsy: Accuracy of core needle biopsy compared with excisional or incisional biopsy: Prospective study. *Thai Surg* 2008; 29: 6-10.
3. Parker SH, Lovin JD, Jobe WE, Burke BJ, Hopper KD, Yakes WF. Nonpalpable breast lesions. Stereotactic automated large-core biopsies. *Radiol* 1991; 180: 403-7.
4. Dronkers DJ. Stereotaxic core biopsy of breast lesions. *Radiol* 1992; 183: 631-4.
5. Elvecrog EL, Lechner MC, Nelson MT. Nonpalpable breast lesions. Correlation of stereotaxic large-core needle biopsy and surgical

- biopsy results. *Radiol* 1993; 188: 453-5.
6. Parker SH, Burbank F, Jackman RJ, Aucreman CJ, Cardenosa G, Cink TM. Percutaneous large-core breast biopsy. A multi-institutional study. *Radiol* 1994; 193: 359-64.
 7. Liberman L, Dershaw DD, Rosen PPI, Abramson AF, Deutch BM, Hann LE. Stereotaxic core biopsy of breast carcinoma. Accuracy at predicting invasion. *Radiology* 1995; 194: 379-81.
 8. Meyer JE, Christian RL, Lester SC. Evaluation of nonpalpable solid breast masses with stereotaxic large needle core biopsy using a dedicated unit. *Am J Roentgenol* 1996; 167: 179-82.
 9. Nguyen M, McCombs MM, Ghandehari S. An update on core needle biopsy for radiologically detected breast lesions. *Cancer* 1996; 78: 2340-5.
 10. Brenner RJ, Fajardo L, Fisher PR. Percutaneous core biopsy of the breast. Effect of operator experience and number of samples on diagnostic accuracy. *Am J Roentgenol* 1996; 166: 341-6.
 11. Seoudi H, Mortier J, Basile R, Curletti E. Stereotactic core needle biopsy of nonpalpable breast lesions. Initial experience with a promising technique. *Arch Surg* 1998; 133: 366-72.
 12. Jackman RJ, Nowels KW, Rodriguez-Soto J, Marzoni FA Jr, Finkelstein SI, Shepard MJ. Stereotactic, automated, large core needle biopsy of nonpalpable breast lesions: False negative and histologic underestimation rates after long term follow-up. *Radiol* 1999; 210: 799-805.
 13. Fajardo LL, Pisano ED, Caudry DJ, Gatsonis CA, Berg WA, Connolly J. Radiologist Investigators of the Radiologic Diagnostic Oncology Group V: Stereotactic and sonographic large-core biopsy of nonpalpable breast lesions. Results of the Radiologic Diagnostic Oncology Group V study. *Acad Radio* 2004; 11: 293-308.
 14. Brenner BJ, Bassett LW, Fajardo LL. Stereotactic core needle breast biopsy: A multi-institutional prospective trial. *Radiol* 2001; 218: 866-72.
 15. Wiratkapun C, Fusuwanakaya E, Wibulpholprasert B, Lertsittichai P. Diagnostic accuracy of vacuumassisted stereotactic core needle biopsy for breast lesions. *J Med Assoc Thai* 2010; 93: 1058-64.
 16. Ivan D, Selinko V, Sahin AA, Sneig N, Middleton LP. Accuracy of core needle biopsy diagnosis in assessing papillary breast lesions: histologic predictors of malignancy. *Modern Pathol* 2004; 17: 165-71.
 17. Verkooijen HM, Peeters PII, Buskens E, Koot VC, Borel IH, Mali WP, et al. Diagnostic accuracy of large-core needle biopsy for nonpalpable breast disease: a meta-analysis. *Br J Cancer*, 2000; 82: 1017-21.
 18. Youk JH, Kim E, Kim MJ. Missed breast cancers at US-guided core needle biopsy: How to reduce them. *Radio Graphics* 2007; 27: 79-94.
 19. Bilous M. Breast core needle biopsy: issues and controversies. *Modern Pathol* 2010; 23: 36-45.
 20. Darvishian F, Singh B, Simsir A, Ye W, Cangiarella JF. Atypia on Breast Core Needle Biopsies: Reproducibility and Significance. *Ann Clin Lab Sci Summer* 2009; 39: 270-6.
 21. Shannon J, Douglas A, Dallimore N. Conversion to core biopsy in preoperative diagnosis of breast lesions: is it justified by results? *J Clin Pathol*. 2001; 54: 762-5.
 22. Verkooijen HM. Core Biopsy after Radiological Localisation (COBRA) Study Group: Diagnostic accuracy of stereotactic large-core needle biopsy for nonpalpable breast disease. Results of a multicenter prospective study with 95% surgical confirmation. *Int J Cancer* 2002; 99: 853-9.
 23. Jackman RJ, Nowels KW, Shepard MJ, Finkelstein SI, Marzoni, FA Jr. Stereotaxic large-core needle biopsy of 450 nonpalpable breast lesions with surgical correlation in lesion with cancer or atypical hyperplasia. *Radiol* 1994; 193: 91-5.

24. Nath ME, Robinson TM, Tobon H, Chough DM, Sumkin JH. Automated large-core needle biopsy of surgically removed breast lesions: comparison of samples obtained with 14-, 16-, and 18-gauge needles. *Radiol* 1995; 197: 739-42.
25. Rich PM, Michell MJ, Humphreys S, Howes GP, Nunnerley HB. Stereotactic 14G core biopsy of nonpalpable breast cancer. What is the relationship between the number of core samples taken and the sensitivity for detection of malignancy? *Clin Radiol* 1999; 54: 384-9.
26. Liberman L, Dershaw DD, Rosen PP, Abramson AF, Deutch BM, Hann LE. Stereotaxic 14-gauge breast biopsy: how many core biopsy specimens are needed. *Radiol* 1994; 192: 793-5.