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Ultrasonography-Guided Vacuum Assisted Biopsy for Breast Lesions: Clinical Performance and Complications

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Abstract

The objective of this article is to evaluate the usefulness and complications of an USG-guided vacuum assisted biopsy (USG-VAB) for the removal of benign breast lesions.From January-2016 to May-2017, 90 sonographically benign lesions in 70 patients were sampled via USG-VAB. We prospectively evaluated the sonographic findings 1 week and 6 months after VAB. We evaluated the prevalence of hematoma, pain, skin dimpling, fibrotic scarring and residual tumors after US-guided VAB, and analyzed the correlation between the complications, size and pathologic results of the lesions. The pathologic diagnoses were fibroadenomas, fibrocystic changes, fibroadenomatoidhyperplasias, adenoses, hamartomas and phyllodes tumors. The complications 1 week after the US-guided VAB included hematomas (n=32, 33.3%), pain (n=23, 25.5%), fibrotic scars (n=20, 22.2%) and skin dimplings (n=1, 1,1%). Residual tumor after US-guided VAB existed in association with 10.8% of fibroadenomas (5/46), 16.7% of fibrocystic changes (4/24), 13.3% of fibroadenomatoidhyperplasias (2/15), and 100% of phyllodes tumors (1/1). USG- VAB is the useful procedure for removal of benign breast lesion. Periodic follow up studies after the USG-VAB are necessary to evaluate the complication after the VAB.

Keywords: Breast. Ultrasonography, Benign breast lesion, Breast biopsy, Vacuum assisted biopsy.

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Introduction

With increasing enlightenment and interest in breast diseases and recent improvements in living standards, diagnosis of breast lesions is rapidly increasing, and among several methods for

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diagnosis, methods of non-invasive biopsy of breast lesions have been developed. Non-invasive percutaneous biopsy is a convenient and economical method for diagnosing malignant and benign lesions of breast lesions, and it has a great role in reducing unnecessary surgery by showing excellent diagnostic accuracy and low breast deformation in the follow-up image. Core biopsy is most popular method of biopsy for suspicious breast nodule, but core biopsy has the disadvantage that they can be underestimated due to inadequate specimens or insufficient diagnosis for accurate diagnosis if the lesion is small (Liberman L*et al*., 1997;Philpotts LE*et al.*, 1999). n the other hand, ultrasound-guided vacuum assisted biopsy (USG-VAB), unlike core biopsy, can obtain a large amount of tissue continuously by inserting a needle once, thereby eliminating false negative diagnosis and reducing histological underestimation (Parker SH*et al.*, 2001). USG-VAB is designed to obtain tissue using a negative pressure by accurately inserting a needle of a large diameter into a tumor, so it has the advantage of being relatively easy to perform without requiring large-scale wounds and hospitalization. However, complications such as hematoma, pain, postoperative scar, skin atrophy, and residual tumor after USG-VAB have been reported in each paper (Kim SH*et al.*, 2003;Park JM *et al.*, 2001). USG-VAB using negative pressure, which has begun to be used to test for malignancy of breast lesions, has shown satisfactory diagnostic utility in previous studies (Smallwood JA*et al.*, 1991;Liberman L *et al.*, 1997). In addition to the advantages that there is no need for hospitalization or general anesthesia, tissue can be collected from the lesion multiple times through a single incision, while the scar is small after the procedure, the complications are minor, and the deformation of the breast form is small, making it easy to follow up (Burak WE Jr *et al.*, 2000;Kim DY *et al.*, 2003; Fine RE *et al.*, 2001). Therefore, the purpose of this report is to understand the changes in ultrasound findings by performing a short-term follow-up test after USG-VAB for the removal of benign breast lesions, and to investigate the complications and usefulness of an USG-VAB.

Materials and Methods

From January-2016 to May-2017, 90 sonographically benign lesions in 70 patients were sampled via USG-VAB. The ultrasonic device used was a 12 MHz linear probe with IU22 (W.A.U.S.A., Philips ultrasound). For the ultrasonically induced vacuum assisted biopsy, a vacuum assisted handheld device (Mammotome Biopsy. Ethicon endosurgery INC, Johnson &Johnsono Co. Cincinati.OH) was used. The treatment site was disinfected and anesthetized with 1% lidocaine around the skin, needle path and lesions. 0.1 cc of epinephrine was injected into 10 cc of 2% lidocaine, and the tissue was collected after the needle was inserted under the lesion so that the needle was parallel to the long axis of the lesion through the skin incision. The biopsy was started at the position where the needle was inserted, and when the lesion

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disappeared from the ultrasound image, the probe was moved to find the remaining lesion, and the needle was rotated, and tissue was collected until the lesion visible on the ultrasound was completely eliminated. We prospectively evaluated the sonographic findings 1 week and 6 months after VAB in all patients to determine the complilcations. We evaluated the prevalence of hematoma, pain, skin dimpling, fibrotic scarring and residual tumors after USG-VAB.We analyzed the correlation between the complications, size and pathologic results of the lesions.

Results and Discussion

The age of the patients was 17 - 62 years, with a mean age of 38.6 years. The pathologic diagnoses were fibroadenomas (51.1%, n=46), fibrocystic changes (26.7%, n=24), fibroadenomatoidhyperplasias (16.7%, n=15), adenoses (2.2%, n=2), hamartomas (2.2%, n=2) and phyllodes tumors (1.1%, n=1) (Table 1). The complications 1 week after the US-guided VAB included hematomas (n=32, 33.3%), pain (n=23, 25.5%), fibrotic scars (n=20, 22.2%) and skin dimplings (n=1, 1,1%). Residual tumor after USG-VAB existed in association with 10.8% of fibroadenomas (5/46), 16.7% of fibrocystic changes (4/24), 13.3% of fibroadenomatoidhyperplasias (2/15), and 100% of phyllodes tumors (1/1). Incidence of total residual tumor was 13.3% (12/90) (Table 2). In this study, the most common complication after USG-VAB was hematoma, which occurred in 32 cases (33.3%) of 90 cases 1 week after the procedure (Fig. 1). No additional invasive treatment was required. Pain after VAB complained of pain in 23 cases (25.5%) of 90 cases 1 week after the procedure. Incidence of total residual tumor after USG-VAB was 13.3% (12 cases of 90 cases. In 13mm phyllodes tumor case, 7mm residual tumor was confirmed in 6months after the USG-VAB (Fig. 2).

Table 1: Benign pathologic Results of USG-Vaccuum Assisted Biopsy

Pathology	Frequency (%)
Fibroadenoma	46 (51.1)
Fibrocystic change	24 (26.7)
Fibroadenomatoid hyperplasia	15 (16.7)
Adenosis	2 (2.2)
Hamartoma	2 (2.2)
Phyllodes tumor	1 (1.1)
Total	90

Table 2: Pathologic Results of Residual Tumor after USG - Vaccuum Assisted Biopsy

Pathology	Frequency (%)
Fibroadenoma	5 / 46 (10.8)
Fibroadenomatoid hyperplasia	2 / 15 (13.3)
Fibrocystic change	4 / 24 (16.7)
Phyllodes tumor	1 / 1 (100)
Total	12 / 90 (13.3)

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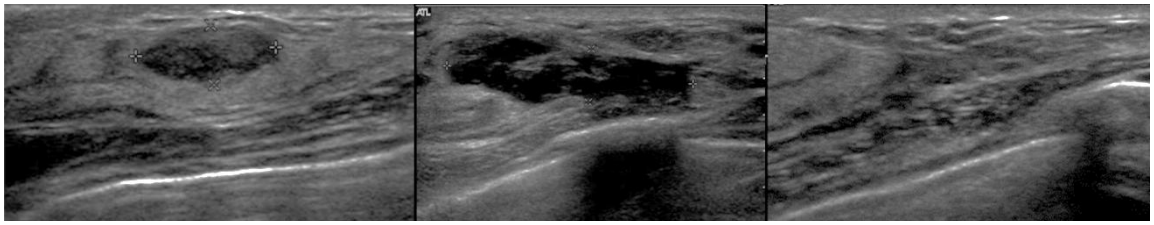

Figure 1: 24-year-old female with histopathologically-proven fibroadenomatoidmastopathy on US guided vacuum assisted biopsy.

1-A. Breast US shows a 15x10mm circumscribed ovoid hypoechoic nodule in the left breast mid outer portion. US guided vacuum assisted biopsy (USG-VAB) for removal of the breast lesion was performed using an 11-gauge needle.

1-B. Breast US obtained 1week after the USG-VAB shows large hematoma collection.

1-C. Breast US obtained 1 month after the USG-VAB shows marked resolution of the hematoma.

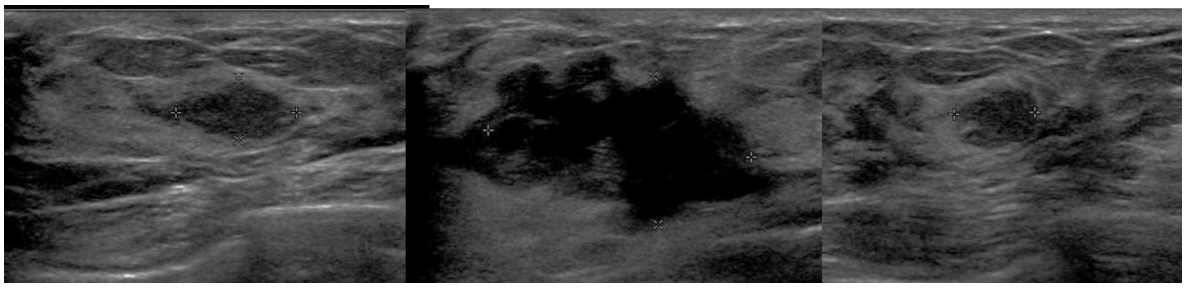

Figure 2: 40-year-old female with histopathologically-proven phyllodes tumor on US guided vacuum assisted biopsy.

2-A. Breast US shows a 13x9mm circumscribed ovoid hypoechoic nodule in the left breast mid outer portion. USG-VAB for removal of the breast lesion was performed using an 11-gauge needle.

2-B. Breast US obtained 1week after the USG-VAB shows large hematoma collection.

2-C. Breast US obtained 6 months after the USG-VAB shows a 7mm ovoid recurred tumor at the VAB site.

Conclusion

USG-VAB, unlike core biopsy, can obtain a large amount of tissue continuously by inserting a needle once, thereby eliminating false negative diagnosis and reducing histological underestimation. Tissue biopsy using USG-VAB is gradually increasing due to advantages such as fine needle aspiration cytology or core biopsy, which allows more tissue to be obtained and more accurate diagnosis. In conclusion, USG- VAB is the useful procedure for removal of benign breast lesion. Periodic follow up studies after the USG-VAB are necessary to evaluate the complication after the VAB.

References

1. Liberman L, LaTrenta LR, Dershaw DD, Abramson AF, Morris EA, Cohen MA., 1997. Impac t of core biopsy on the surgical management of impalpable breast cancer. *AJR*,168, pp.495-49 9.
2. Philpotts LE, Shaheen NA, Carter D, Lange RC, Lee CH.,1999.Comparison of rebiopsy rates a

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Received 15 December 2020; Accepted 05 January 2021.

fter stereotactic core biopsy of the breast with 11-guage vacuum suction probe versus 14-guag e needle and automatic gun.*AJR*,172, pp.683-687.

3. Parker SH, Klaus AJ, McWeyPJ.,2001. Sonographically guided directional vacuum assisted br east biopsy using a handheld device.*AJR*,177, pp.405-408.
4. Kim SH, Choi JW, Ko EY, Lee KS, Min SK, Kim IK, et al., 2003. Minimally Invasive Excisi on of Benign Breast Tumor Using Ultrasound Guided VacuumAssisted Mammotome. *J Kore an SurgSoc*,65, pp.279-283.
5. Park JM, Yoon JY, Yoon KS, Kong KY, Ann SH.,2001. Ultrasonography-guided Mammotom e Biopsy of Breast Lesions: Early Experience. *J Korean RadiolSoc*,44, pp.545-551.
6. Smallwood JA, Roberts A, Guyer DP, Taylor I., 1991. The natural history of fibroadenoma. *B r J ClinPathol*,95, pp.614-622.
7. Liberman L, Feng TL, Dershaw DD, Morris EA, Abramson AF.,1998. Ultrasound-guided core breast biopsy: utility and cost effectiveness. *Radiology*,208, pp.717-723.
8. Burak WE Jr, Owens KE, Tighe MB, Kemp L, Dinges SA, Hitchcock CL, Olsen J.,2000. Vac uum-assisted stereotactic breast biopsy: histologic underestimation of malignant lesions. *Arch Surg*,135, pp.700-703
9. Kim DY, Lee BC, Jang SY, Ryu JK, Park SY, Kim JK.,2003. Usefulness of ultrasound guided vacuum-assisted mammotome biopsy for breast lesion..*J Korean SurgSoc*,64, pp.109-114.
10. Fine RE, Israel PZ, Walker LC, Corgan KR, Greenwald LV, Berenson JE, et al., 2001. A pros pective study of the removal rate of imaged breast lesions by an 11-guage vacuum-assisted bio psy probe system. *Am J Surg*,182, pp.335-340.