Original Article

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Ultrasound Guided Therapeutic Excisional Vacuum Assisted Biopsy in Breast Fibroadenomas

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ABSTRACT

Objective: The aim of this study was to evaluate the performance of ultrasound (US) guided Vacuum Assisted Biopsy (VAB) in the therapeutic excision of breast fibroadenomas.

Materials and Methods: Patients who underwent excisional US guided VAB of their fibroadenomas between December 1999-May 2001 were retrospectively evaluated. Seventy-eight patients with BI-RADS category 3 and 4a lesions (one lesion per patient) with a maximum diameter smaller than 3 cm were enrolled in the study. Fifty-one of those were diagnosed with fibroadenoma. Biopsies were performed with a 11G needle using the Mammotome (Johnson & Johnson, New Jersey, USA) vacuum biopsy device. Patients were followed up with US for three years. Follow-ups were done semiannually in the first year and annually afterwards.

Results: Ten patients (19%) were found to have residual lesions in the first week after the biopsy. Additional eight patients (15%) were found to have residual-recurrent lesions in their annual follow up. However, none of these eight lesions demonstrated growth during the three year follow-up. The initial size of the FA was not found to be significantly different between the lesions which were completely excised with no residue or recurrence and those which were not ($p>0.05$).

Conclusion: The VAB method for the therapeutic excision of small FAs or other benign lesions is practical and easily tolerated by patients. Lesions smaller than 3 cm should be preferred for VAB. A multidisciplinary clinical environment is necessary for each step of the treatment.

Keywords: Fibroadenoma, needle biopsy, image-guided biopsy, ultrasonography

Introduction

Sixty nine percent of breast lesions undergoing open surgical biopsy are found to be benign (1) and fibroadenomas (FA) constitute about 50% of those lesions (2). Vacuum assisted excisional biopsy (VAB) utilizes 8G or 11G large bore needles and can extract larger tissue samples compared to fine needle biopsy and core biopsy. This leads to a decrease in the rate of negative biopsies as well as a decrease in discordance between the biopsy material and surgical specimen. In addition, some invasive lobular carcinomas grow in an infiltrative pattern, rather than forming a mass and require larger tissue samples for accurate diagnosis. VAB is also recommended for lesions located close to the thoracic wall or nipple, since it does not employ a forward moving needle (3). Benign lesions may need to be removed if they grow, are symptomatic or produce anxiety in the patient. However, surgical excision is costly, since it requires an operating room and sometimes hospitalization (4). Because it can extract large volumes of tissue, VAB can also be used for the excision of benign breast lesions (3, 4). The purpose of our study is to investigate the usefulness of VAB in the excision of benign breast lesions.

Materials and Methods

We retrospectively evaluated breast lesions excised using VAB between December 1999-May 2001 in our center, which had a proven diagnosis of FA. An informed consent form was obtained from each patient for the procedure and the retrospective review was approved by our university ethics committee.

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Fifty-one cases with a diagnosis of FA were found and analyzed in a study group of 78 patients with one BI-RADS (Breast Imaging - Reporting and Data System) category 3 or 4A breast lesion in each patient. This study group consisted of women between 22-72 years of age (average 34 years) with eventual diagnoses of 51 FA, 15 fibrocystic change, 9 adenosis and 3 intraductal papilloma. Lesions were smaller than 3 cm in size. Lesions larger than 2 cm had histopathological diagnoses before the procedure, whereas smaller ones did not. Lesions were excised because of patient anxiety or at the recommendation of the treating surgeon.

Biopsies were performed using a 11G needle with the Mammotome vacuum assisted breast biopsy device (Johnson & Johnson, New Jersey, USA). The biopsy area was covered using proper biopsy technique. Ten ml of local anesthetic (2% prilocaine) were injected into the incision site and biopsy tract. A 5 mm incision was made and the needle was advanced to the posterior of the lesions using ultrasound (US) guidance (Logiq 700, GE Healthcare - Milwaukee, USA). The lesion was aspirated until no residue was observed on the US image. This required a minimum of 4 and a maximum of 24 aspirations. A metallic marker was placed before withdrawing the needle. Hemostasis was achieved with manual compression of the biopsy site for approximately 15 minutes. A compression bandage was applied and patients were informed about possible complications. All patients were examined with US one week after the procedure.

After the procedure, all patients were followed up for residues and recurrences for 3 years with US, bi-annually in the first year and annually in the following two years.

Statistical analysis

Differences between lesions exhibiting any residue or recurrence and those which did not were analyzed using Student t-test with SPSS v22 software (Armonk, NY: IBM Corp).

Results

Of the total 51 FAs, 13 were smaller than 1 cm, 32 were between 1-2 cm and six between 2-3 cm. Residual lesions were detected on the one week control US exam in 10 (19%) patients. Recurrent lesions were detected within the first year of the follow-up in eight (15%) patients. None of those eight lesions demonstrated further growth in the following two years of the follow-up.

A total of 18 (35%) of patients had residual or recurrent lesions. The initial lesion sizes in these patients were smaller than 1 cm in six, 1-2 cm in 11 and 2-3 cm in one. Initial lesion size in the 33 (65%) patients without any residue or recurrence were smaller than 1 cm in seven, 1-2 cm in 21 and 2-3 cm in five (Table 1). There was no statistically significant difference between the initial lesion size in patients with residue/recurrence and those without ($p>0.05$).

None of the patients experienced significant enough pain to require the cessation of the procedure. At the one week control, 17 (33%) patients reported taking paracetamol for pain. In four of them (5%) the pain was strong enough to interfere with sleep. Eight (10%) patients returned in the first week with ecchymosis. None of the patients developed a large enough hematoma requiring aspiration. Two patients (2.5%) developed infection which was controlled with oral antibiotics.

Table 1. Initial size of fibroadenomas which were completely or partially removed

Size	Completely removed (n=33)	Partially removed (n=18)
< 1 cm	7	6
1-2 cm	21	11
2-3 cm	5	1

Discussion and Conclusion

Open surgical biopsies are still widely used. A study analyzing approximately 26 thousand breast biopsies in the US revealed that 34% of benign lesions had undergone open surgical biopsy (5). Lesions, if not excised, require follow-up and can cause anxiety in patients (6). US guided VAB of breast lesions does not require hospitalization, is less invasive and cosmetically more pleasing (7). Especially in lesions smaller than 2 cm in size, success rates of 95-100% are reported. The method provides significant time and cost savings (8). Unfortunately, we did not record procedure durations in our study. However, the procedure took around 30 minutes on average, as reported in the literature (8).

The method is also well tolerated by patients. Thurley et al. (9) reported that 94% of their patients preferred VAB over surgery and would also recommend it to others. Eighty five percent of patients were completely satisfied with cosmetic results. Fifty-four percent did not experience any pain during the procedure. Although not recorded, most of our patients tolerated the procedure well and were satisfied with the result.

Residual lesions are the main disadvantage of VAB. We found ten patients with residual lesions at the one week control. The main reason for this is that hematomas and edema impair the US image during or immediately after the procedure and mask any residual tissue (7). In the literature, residual lesions are reported in 2-38% of the excisions (9-11). Our experience is similar to the literature with 19% of patients having residual lesion and 15% developing recurrent lesion within one year.

One of the most comprehensive studies on this subject has been performed by Lee et al. (12). They reported 1522 excisions with VAB and followed up all patients for more than a year. No residual or recurrent lesion was seen in 84.9% of their patients. Residual lesion was found in 12.7%, while recurrent lesion was found in 2.3%. The rates are higher in our study. This could be due to our smaller sample size. It should also be kept in mind that every procedure has a learning curve. In the study by Park et al. (13), complication rates and procedure time decreased significantly after 20 patients and 28 lesions.

We did not find any correlation between recurrence rates and initial lesion size. In the literature there are studies reporting this as the only correlation (6, 7, 14), but there are also studies which did not find this relationship (9).

The study by Grady et al. (14) is similar to ours in terms of follow-up duration. They followed up 52 FAs for periods between 7-59 months. However, the follow-up period was not the same for every lesion. They report that every case of recurrence was found after the first 6 months. The reason for this may be that Grady et al. (14) used a larger 8G bore needle.

An interdisciplinary consensus published in 2012 in Germany declared that benign lesions smaller than 2 cm in diameter can be excised using VAB. They also noted that the procedure should be performed in specialized breast centers with multidisciplinary evaluation and that patients should be followed up afterwards, but no longer than 12 months (8).

Another method for percutaneous excision of breast lesions is BLES (Breast Lesion Excision System, Intact Medical Corporation, Natick, MA, USA). In this method, a 6-8 mm incision is made and a radiofrequency (RF) probe is advanced close to the lesion. Then, a metal basket is advanced around the lesion and RF energy is used to separate the lesion from its surroundings. The main advantage of this method is that it can remove lesions 10-20 mm in size without fragmenting them. However, because it uses RF energy, its use is limited in small breasts and lesions located close to the skin or thoracic wall (15). The ABBI system (Advanced Breast Biopsy Instrumentation, United States Surgical, Norwalk, CT, ABD) is no longer commercially available (4).

In conclusion, VAB is a practical and well-tolerated method in the treatment of benign breast lesions, like fibroadenomas. Per consensus, only lesions that are smaller than 2 cm should be excised in this manner. A multidisciplinary evaluation and decision making process is required beforehand.

Ethics Committee Approval: Ethics committee approval was received for this study.

Informed Consent: Informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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