Comparison of open and closed biopsies in the diagnosis of breast lumps

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ABSTRACT

Introduction: The breast cancer diagnosis and treatment is based on a less invasive, more accurate and effective strategy but the key factor in respect of these new standards is to confirm cancer before going to the operating room. Closed biopsies by means of Tru-cut biopsy needle have replaced the more traditional incisional or excisional biopsies for the diagnosis of palpable breast lumps and have a definite role in the histological diagnosis of majority of palpable breast lumps. These biopsies can be performed under local anesthesia in the office or in outpatient setup. The technique is reliable, simple, and reproducible, and inexpensive; it can be adapted even for low-income developing countries. Objective: This study is designed mainly to compare the diagnostic accuracy of Tru-cut needle biopsy with that of excision biopsy. Materials and Methods: The original study is carried from July to December 2014 in Surgical Unit-1, Baqai Medical University Hospital Karachi, Pakistan. Among women with palpable breast lumps came to the outpatient, 140 patients selected and Tru-cut needle biopsy along with excision biopsy was performed and the result of both the modalities recorded and compared with each other. Results: The diagnosis given by Tru-cut needle biopsy is confirmed by means of excision biopsies. Therefore, it may be said that out of 49 malignant lumps 45 (91.83%) and out of 91 benign lumps 87 (95.60%) are correctly diagnosed with a total of 132 (94.28%) correct diagnosis. Conclusion: As the diagnostic accuracy of closed biopsies is considerable and very close to that of excision biopsies, the closed biopsies can be performed routinely on an outpatient basis on women with palpable breast lumps.

KEY WORDS: Breast lumps, Closed biopsies, Tru-cut needle

INTRODUCTION

To obtain a histological diagnosis in patients with palpable breast lumps excision biopsy is usually performed under general anesthesia which requires hospital admission. Each woman is subjected to the significant psychological trauma of consenting for possible mastectomy in the case during surgery lump is found characteristically malignant.

Finally, to exclude the presence of metastasis patient with suspicious malignant lumps requires intensive investigations before the surgery. If the suspected diagnosis is not confirmed by histopathological examination, these investigations may have been unnecessary performed. Therefore, it is only when the histopathology confirms the malignancy it is reasonable to go for the staging of the disease so that an appropriate treatment strategy may be planned.

For these reasons, emphasis has been placed on improving method for establishing the histopathological diagnosis of breast masses before surgery. Compared to open surgery, Tru-cut biopsy is much less invasive. The volume of tissue removed, breast deformity and the effect on mammography are much reduced, and for malignant lesions, cancer surgery can be done in a single session. Closed biopsies have a definite role in histological diagnosis of majority of palpable breast lumps, and these biopsies can be performed under local anesthesia in the office or in outpatient by means of Tru-cut biopsy needle. The procedure is safe and can be done with minimal surgical instruments taking less than ten minutes. Although breast cancer assessment by Tru-

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Received on: 12-07-2017; Revised on: 27-08-2017; Accepted on: 25-09-2017
cut biopsy has been considered a standard of care for more than one decade,\textsuperscript{2} it is still not a routine procedure in many developing countries. With pre-operative confirmation of cancer, the number of surgeries is significantly decreased.\textsuperscript{3}

For small non-palpable lesions detected in screening programs, Tru-Cut biopsy has replaced FNA because sample insufficiency is rare for Tru-Cut biopsy even for these lesions.\textsuperscript{4}

The aim of closed biopsies is to minimize invasion to the patient while increasing the accuracy and quality of care. Despite cost-effectiveness and all the other advantages of this new concept, it is still not respected in many developing countries.\textsuperscript{5-8} Combined with the elimination of unnecessary surgery just to rule out cancer, the total cost of breast cancer diagnosis and treatment is decreased.

This method when biopsy performed by an experienced surgeon and interpreted by experienced pathologist has an acceptable level of sensitivity and is comparable to a more commonly used method of excision biopsy.

This study is designed mainly to compare the diagnostic accuracy of Tru-cut needle biopsy with that of excision biopsy and is conducted in Surgical Unit-I of Baqai Medical University Hospital Karachi, under the supervision of Dr. Khalid Ahmed, Professor of Surgery, Baqai Medical University Karachi, Pakistan.

**MATERIALS AND METHODS**

About 2–3 thousand patients visit every year the “Breast Diseases Diagnostic Centre” run by Surgical Unit-I, Baqai Medical University Hospital, Karachi.

The present study includes 140 patients presented with breast lumps of varying sizes. Among women with palpable breast lumps requiring excision biopsy, patients selected and Tru-cut needle biopsy performed on an outpatient basis under local anesthesia and the specimen subjected to histopathological examination. The patient sent home with advice to come in next OPD. The same patient who attends the next OPD is admitted, and as the Tru-cut needle biopsy has already been performed and the histopathological reports are available, the patient undergo a definitive surgical procedure on the next elective list. The specimen of excision biopsy is again sent for histopathological examination.

The result of excision biopsy compared with that of Tru-cut needle biopsy of the same patient and data are maintained. Finally, the accuracy of Tru-cut needle or closed biopsy may be determined, and in case of considerable accuracy, the procedure may be advised for the histopathological diagnosis of palpable breast lumps on an outpatient basis.

**Inclusion Criteria**

1. All the patients with clinically malignant palpable breast lumps
2. All the patients with clinically benign breast lumps more than 2 cm in size.

**Exclusion Criteria**

1. Patients with clinically benign breast lumps <2 cm in size.

**RESULTS**

The original study is carried out in Surgical Unit-I from July 2014 to December 2014 under the Supervision of Dr. Khalid Ahmed, Professor of surgery, Baqai Medical University Karachi.

**Age Incidence**

One hundred and forty patients with breast lumps are included in this study. The youngest among them is 17 years of age, while the oldest is about 60 years.

The maximum incidence of breast lumps found in 26–35 years age group as 54 patients presented in this group. Out of 54 lumps, 37 were benign 17 were malignant. Another high incidence noted in patients of 15–25 years of age, as 42 of the 140 patients, presented in this age group, which is also the maximum incidence group for benign lumps. The second incidence for benign lumps found in 26–35 years age group which includes 37 patients.

Out of total 47 malignant lumps, 19 are found in 36–45 years age group while the second high incidence of malignancy is seen in 26–35 years age group which includes 17 lumps. In patients between 56 and 65 years of age, all the eight patients were having malignant lumps [Table 1].

**Marital Status, Menstrual Status and Parity**

Among 140 patients included in the study 82 are married while 54 are unmarried and 4 are widows, 111 patients are premenopausal while rest of the 29 patients are post-menopausal. Out of 29 post-menopausal patients, 21 were having malignant lumps, and the remaining 8 lumps were benign. All the married women have more than one child [Table 2].

**Breast Affected and Quadrant Involvement (Site)**

The incidence of involvement of the left breast is markedly high 70.71%, while the right breast involvement is considerably low 20.77%, bilateral breast lump was 8.57%. Most of the lumps found in outer quadrant, i.e., 99 lumps. Among these 99 lumps,
52 were in upper outer quadrant while rest of the 47 were found in the lower outer quadrant. 29 lumps were found in the inner quadrant, 14 of them were in upper inner and 15 in the lower inner quadrant of breast. 12 of the lumps found in the central region [Table 3].

Size of the Lump and Presenting Complaints

The size of the lump varies between 2 and 5 cm in diameter. 78 lumps were 2–3 cm while 32 lumps were 3–4 cm in size. 12 lumps were 4–5 cm in size and 8 were more than 5 cm. 115 of the patients presented with a lump in their breast, which is the single most common presenting symptom while 21 patients presented with mastalgia the second most common presenting complaint. Four of the patients presented with nipple discharge from the affected side along with the lump in the breast [Table 4].

Duration between Discovery of the Lump and Presentation

Most of the patients with breast lumps visit the clinic as soon as they discover that they have a lump or some other abnormality in their breasts. Except two patients, all of the patients included in this study visited the breast clinic within 3 months of first noticing the lump. 95 patients consulted within 2–3 weeks 29 between 4 and 6 weeks while 12 patients between 6 and 12 weeks after first noticing the lump in their breast. Four patients presented after 12 weeks.

Tru-cut Needle Biopsies

During Tru-cut needle biopsies 87 of 140 lumps found to be benign and 45 malignant. These results are the same as those of excision biopsies except that in eight cases Tru-cut needle biopsy failed to obtain the sufficient tissue from the lump for proper histopathological examination. On excision biopsy, four of these lumps found benign and the remaining four as malignant.

In our study, Tru-cut needle biopsies proved successful in correctly diagnosing 132 lumps (94.28%) out of 140 lumps with 45 lumps as malignant and 87 lumps as benign out of 49 malignant and 91 benign lumps, respectively.

No false negative or false positive is noted during the study; therefore, the sensitivity of Tru-cut needle biopsies for malignancy is 91.83%, and specificity is 95.60% [Table 5] according to the EUSOMA[2] the suggested preferred threshold for false negative is 10% and of 1–2% in the Parker review article.[2]

Excision Biopsies

On excision biopsy out of 140 breast lumps, 91 lumps proved benign while 49 lumps turned to be malignant [Table 6].

DISCUSSION

In cases of malignant lumps, it is necessary to have the histopathological report of the lump in hand before

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Table 1: Age incidence (n=140)

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benign</td>
</tr>
<tr>
<td>15–25</td>
<td>42 (49.28)</td>
</tr>
<tr>
<td>26–35</td>
<td>37 (26.42)</td>
</tr>
<tr>
<td>36–45</td>
<td>8 (5.71)</td>
</tr>
<tr>
<td>46–55</td>
<td>4 (2.85)</td>
</tr>
<tr>
<td>56–65</td>
<td>-</td>
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</tbody>
</table>

Table 2: Marital status, menstrual status and parity (n=140)

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Menstrual status</th>
<th>Parity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married (n=82)</td>
<td>Pre-menopausal (n=111)</td>
<td>No children (n=0)</td>
</tr>
<tr>
<td>Unmarried (n=54)</td>
<td>Post-menopausal (n=29)</td>
<td>1–2 children (n=33)</td>
</tr>
<tr>
<td>Widow (n=4)</td>
<td></td>
<td>3–4 children (n=16)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 or more children (n=33)</td>
</tr>
</tbody>
</table>

Table 3: Breast affected and quadrant involvement (n=140)

<table>
<thead>
<tr>
<th>Side</th>
<th>Number of patients (%)</th>
<th>Quadrant involvement</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>29 (20.77)</td>
<td>Central</td>
<td>12</td>
</tr>
<tr>
<td>Left</td>
<td>99 (70.71)</td>
<td>Upper outer quadrant</td>
<td>52</td>
</tr>
<tr>
<td>Bilateral</td>
<td>12 (8.57)</td>
<td>Lower outer quadrant</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upper inner quadrant</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower inner quadrant</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 4: Size of the lump and presenting complaint (n=140)

<table>
<thead>
<tr>
<th>Size of the lump in cm</th>
<th>Number of patients</th>
<th>Presenting complaint</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–3</td>
<td>78</td>
<td>Lump</td>
<td>115</td>
</tr>
<tr>
<td>3–4</td>
<td>37</td>
<td>Pain (Mastalgia)</td>
<td>21</td>
</tr>
<tr>
<td>4–5</td>
<td>17</td>
<td>Nipple discharge</td>
<td>04</td>
</tr>
<tr>
<td>More than 5</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Comparison of sensitivity, specificity, and diagnostic accuracy of Tru-cut needle and excision biopsies (n=140)

<table>
<thead>
<tr>
<th>Modality</th>
<th>Tru-cut needle biopsy (%)</th>
<th>Excision biopsy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>91.83</td>
<td>100</td>
</tr>
<tr>
<td>Specificity</td>
<td>95.60</td>
<td>100</td>
</tr>
<tr>
<td>Diagnostic accuracy</td>
<td>94.28</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6: Histological findings of Tru-cut needle and excision biopsies (n=40)

<table>
<thead>
<tr>
<th>Histological findings</th>
<th>Tru-cut needle biopsy (%)</th>
<th>Excision biopsy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign (%)</td>
<td>87 (62.14)</td>
<td>91 (65)</td>
</tr>
<tr>
<td>Malignant (%)</td>
<td>45 (32.14)</td>
<td>49 (35)</td>
</tr>
<tr>
<td>Inadequate material</td>
<td>08 (4 benign, 4 malignant)</td>
<td>08 malignant (5.71%)</td>
</tr>
</tbody>
</table>

the surgery. These are the patients requires admission to the hospital and formal excision biopsy to obtain a definite histopathological diagnosis of their ailment.

For excision biopsy first and then the definitive surgical procedure the patient not only has to go through anesthesia and surgery twice but also she has to remain in the hospital for a longer period of time. This is the most fearful period for the patient as she is not sure about the diagnosis of her disease. This results in a tremendous psychological burden on the patient. In addition to that, the excision biopsy disrupts the lymphatics, and it is not possible to do sentinel node biopsy, and the patient is condemned to axillary dissection and its side effects. By this approach, the number of surgeries is much higher.\[3,4,9\]

The complications of the procedure are rare, and the only one deserves some attention is the possibility of hematoma formation which could very effectively be prevented by mere compression of the biopsy site for a few minutes. Tru-cut biopsy has some limitation that could result in a diagnostic error. To overcome these errors, multidisciplinary teamwork with close collaboration between the surgeon, radiologist and pathologist is essential.\[2,4,6\]

In case of excision biopsy, both the sensitivity and specificity are 100% as well as diagnostic accuracy which is also 100%.

**SUMMARY AND CONCLUSION**

The present study is designed to compare the diagnostic accuracy of mainly Tru-cut needle biopsy with the excisional biopsies. The results of Tru-cut needle biopsies are compared with that of excisional biopsies, and as the diagnostic accuracy of the procedures is considerable and very close to that of excision biopsies, the closed biopsies can be performed routinely on an outpatient basis on women with palpable breast lumps and it is a cheaper alternative with considerable diagnostic accuracy in comparison with excision biopsy. The procedure leads to a significant decrease in patient invasion and-it also produces less radiological scarring, which can interfere with future imaging.\[10\]

The basic aim of this study is to determine the accuracy of these needle biopsies by comparing their results with those of the excision biopsies. The histopathological examination of Tru-cut biopsy specimens revealed that out of 140 breast lumps 87 are benign and 45 lumps are malignant. In eight patients the biopsy specimen found inadequate for histopathology. The diagnosis given by Tru-cut needle biopsy is confirmed by means of excision biopsies. Therefore, it may be said that out of 49 malignant bumps 45 (91.83%) and out of 91 benign lumps 87 (95.60%) are correctly diagnosed with a total of 132 (94.28%) correct diagnosis. No false positive or false negative result was seen. The sensitivity of Tru-cut needle biopsy for malignancy, therefore, calculated to be 91.83%, while the specificity is 95.60% and the diagnostic accuracy found to be 94.28%. The sensitivity and specificity of conventional percutaneous core needle biopsy can reach up to 97% and 100%, respectively.\[11-14\] In eight lumps the biopsy specimen was inadequate for proper histopathological examination. This difficulty was experienced during the initial stages of the study, but as soon as we learned about the minimal amount of tissue required for histopathology and became familiar with the technique of Tru-cut needle biopsy the difficulty never experienced again.

Closed biopsies not only will reduce the unnecessary hospital admissions but also the patients will remain in her own environment during her biopsy report is awaited. After the availability of histopathological report, the definite surgery may be planned before hand and nature of operation may be discussed with the patient. The surgeon also played the critical role in diagnostic and therapeutic planning and the final decision for further steps (follow-up alone or surgery).\[4,5\]

Compared with open surgical biopsy, core needle biopsy is reported to be safer, more cost-effective, less psychologically distressing, and less disfiguring;
diagnostic error and total costs in favor of patients and
the health economy.[2,5,8]

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Source of support: Nil; Conflict of interest: None Declared