

CLINICAL INVESTIGATION

Tru-Cut and Fine Needle Aspiration Biopsy Diagnosis of Lesions of the Jaws

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Received: October 14, 2002

Abstract: Nowadays, modern biopsy techniques such as fine and wide needles are used instead of invasive biopsy techniques for examining malign and benign lesions.

This study examines whether wide needle biopsy (Tru-cut) possesses advantages as an alternative method to open biopsy.

This study was performed on 40 patients with suspicious intra-jaw lesions. An 18-gauge, three-piece biopsy device was used.

All the samples were sent to the tumor pathology unit at the oncology institute for histopathologic and cytopathologic examination. Thirty-seven of the 40 samples were adequate for diagnosis and three inadequate were.

When we considered the results of Tru-cut and fine needle biopsy, the diagnostic value increased to 62.5%.

In each lesion, the success rate of open biopsy is 92.5%, the success rate of Tru-cut biopsy is 55% and that of fine needle biopsy is 42.5%.

According to our results, if we can support the study of this technique with new studies and can improve the specific apparatus for the maxillo-facial region, this can be a good alternative technique for open biopsy applications.

Key Words: Biopsy, Tru-cut, Fine needle

Introduction

Histopathological examinations are the most definitive methods in diagnosing the type, characteristic and prognosis of a pathologic lesion (1).

The successful diagnosis and treatment of a pathologic lesion within the bone must be applied by a multidisciplinary approach by pathologists, radiologists and surgeons. Biopsy is defined as obtaining material from a living tissue for microscopic examination. Various biopsy methods are currently applied in daily medical practice. These methods include:

- Excisional biopsy
- Incisional biopsy

- Fine needle aspiration biopsy (FNAB)
- Tru-cut biopsy (2-4)

The American Musculo-Skeletal Tumor Association and Mankin et al. (4) have emphasized the following areas in order to minimize biopsy-related complications and achieve optimum care:

I. Biopsy should be planned as a routine surgical procedure without underestimating the operation.

II. Maximum attention should be paid to sepsis, hemostasis and primary closure of the wound site.

III. Any major surgical procedure should be taken into consideration when planning the incision line.

IV. Sufficient material must be obtained in order to achieve histopathological diagnosis (4-7).

The aim of this study is to compare two biopsy methods (FNAB and excisional methods) in achieving prompt pre-diagnosis of pathologic lesions concerning the maxillo-mandibular complex.

Materials and Methods

Fifteen males and 25 females with suspicious intra-bony lesions diagnosed at radiographic examination were selected for this study. A total of 40 individuals with a mean age of 33.5 (range between 10 and 65) were examined at the İstanbul University, Faculty of Dentistry, Dept. of Oral Surgery.

A three-piece 18-gauge Tru-cut biopsy needle was used in the study. The first piece is the positioning needle passing within the Tru-cut needle. A cylindrical handle makes manipulation of the device easier. The second piece is an 18-cm, sewing-tipped longer needle. A cylindrical handle affording the practitioner easy manipulation in exerting pressure is placed on the biopsy needle.

Sufficient material from a depth of 2.5 cm can be obtained with this needle. The third piece is designed to excise the biopsy material within the Tru-cut needle.

The patients were informed about the procedure and agreement was obtained from each individual. Individuals with cardiac disease, diabetes and hypertension were excluded from the study. The eliminated individuals were motivated to maintain a high level of oral hygiene and prescribed an antiseptic mouth rinse.

The surgical procedure was carried out with local anesthesia (articain HCl or prilocain-octopressin). The patients were advised to rinse their oral cavities with KMnO4 solution. A 1 cm full thickness flap incision was made and the flap was lifted up. The Tru-cut biopsy was performed with the device by exerting sufficient pressure in order to penetrate through the bone into the lesion, which had been localized clinically and radiographically. Following the collection of the Tru-cut biopsy material, an aspiration needle biopsy was performed and smear sections were prepared (Figures 1,2).

The aspiration biopsy injector was rinsed with saline solution and placed in a centrifuge machine in order to obtain cellblocks. The saturate was fixed with Holland solution and was sent for histopathological tissue examination.

Finally, an excisional biopsy of the lesion was performed.

The materials obtained from the Tru-cut biopsy method and excisional biopsy operation were fixed with 10% formaline solution. The samples containing hard tissue (bone) were decalcified with 50% formic acid and sodium citrate solution. Paraffin blocks 5-7 µm thick were prepared from the treated samples. The samples were stained with hematoxyline and were sent for histopathological investigation under light microscope at the İstanbul University Department of Tumor Pathology.

Results

Twenty-seven (67.5%) of the lesions investigated in this study were localized in the mandible and 13 (32.5%) in the maxilla.

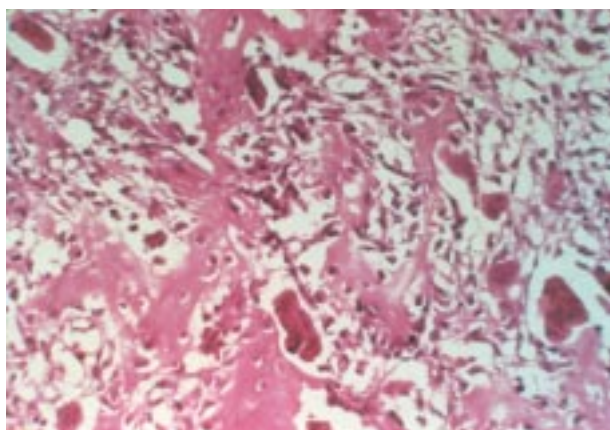


Figure 1. Tru-cut biopsy section (HEX250).

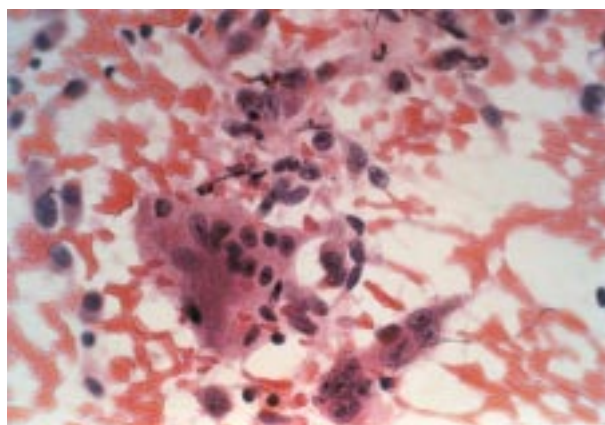


Figure 2. Smear section (HEX 400).

The mandibular lesions were within the ramus and the molar site, whereas the maxillary lesions were observed in the incisor and premolar site.

Thirty-seven (92.5%) of the 40 cases were histopathologically diagnosed. The remaining three (7.5%) could not be histopathologically diagnosed due to a lack of sufficient material. The histopathological investigation of the materials obtained by excisional biopsy under light microscope presented the following data: 17 (45.9%) cystic formation, seven (19%) apical granuloma, three (8.1%) fibrous dysplasia, three (8.1%) osteomyelitis, one (2.7%) giant-cell granuloma, one (2.7%) eosinophilic granuloma, one (2.7%) aggressive osteoblastoma, one (2.7%) trabecular bone and one (2.7%) lymphoma.

The histopathological investigation of the materials obtained by the Tru-cut biopsy method presented data consistent with 22 (59.4%) of the cases listed above (Table).

Table. The positive and negative results of the biopsy methods.

	Tru-cut biopsy	Fine needle aspiration biopsy
Cyst	9	10
Apical granuloma	3	1
Fibrous dysplasia	3	-
Osteomyelitis	2	1
Giant-cell granuloma	2	2
Lymphoma	1	1
Eusinophilic granuloma	1	1
Aggressive osteoblastoma	1	1

These consistent results are as follows: Nine (52.9%) cystic formation, three (100%) fibrous dysplasia, one (100%) eosinophilic granuloma, three (42.8%) apical granuloma, two (66.7%) osteomyelitis, two (66.7%) giant-cell granuloma, one (100%) osteoblastoma and one (100%) lymphoma.

The results of the Tru-cut biopsy and FNAB performed together presented a higher consistency rate of 25 lesions (62.5%) than excisional biopsy results.

FNAB alone revealed 17 (45.9%) successfully diagnosed samples compared with the excisional biopsy results. These data are as follows: One (100%) eosinophilic granuloma, 10 (58.8%) cystic formation, two (66.7%) giant-cell granuloma, one (100%) aggressive osteoblastoma, one (33.3%) osteomyelitis,

one (14.3%) apical granuloma and one (100%) lymphoma.

The diagnosis rate for excisional biopsy, Tru-cut biopsy and FNAB were 92.5%, 59.4% and 45.9%, respectively.

The three different methods presented congruency in 12 (30%) of the cases. FNAB and excisional biopsy presented congruency in five (12.5%) cases.

Tru-cut biopsy and excisional biopsy revealed consistent results in nine (22.5%) cases.

In 11 (27.5%) of the remaining cases no consistency was present with either FNAB or Tru-cut biopsy. Three (7.5%) samples could not be diagnosed by any of the biopsy methods due to lack of sufficient material.

Twelve cases in which the Tru-cut biopsy method was used could not be successfully diagnosed histopathologically, and seven cases presented incongruency with the excisional biopsy results.

Eighteen FNAB method cases could not be successfully diagnosed and the results for five cases were incongruent with those of the excisional biopsy results.

Discussion

Successful pre-operative diagnosis of pathologic lesions is of great importance when considering the treatment and prognosis of the disease (8).

Schneitzer and Deely (9) and Kattapuzam et al. (10) suggested the use of the Tru-cut biopsy method in bone lesions and the use of the FNAB method in lytic lesions as well as in suppurative formations.

Our study's results were congruent with the aforementioned authors' results regarding the successful diagnosis of pathologic lesions by the Tru-cut biopsy method or FNAB.

Being a simple and complication-free method makes the Tru-cut biopsy technique preferable, especially in cases with a risk of hemorrhagia (11-13). We experienced these advantages of the Tru-cut biopsy method in our study.

Gazelle et al. (14) state that excisional biopsy is a hazardous technique in cases presenting a risk of hemorrhage.

The unfavorable results of incisions performed in the excisional biopsy method may cause a delay in radiotherapy and/or chemotherapy.

Sufficient material can be obtained by percutaneous biopsy, causing minimum damage to the neoplastic lesions. Somers et al. (13) started the therapy in 84% of their cases following needle biopsy without the need-for any excisional biopsy operation.

The major disadvantage of the Tru-cut biopsy method is the possibility of insufficient material being collected (15).

Obtaining sufficient biopsy material from cystic lesions (aneurismal bone cyst, solitary cyst, simple cyst) by needle aspiration is often very difficult. There are cases where no material can be obtained by this method. (1,16)

Our results reveal the high success rate of Tru-cut biopsy method, which is congruent with the literature.

Excisional bone marrow biopsy was found to be more effective in metastatic carcinoma cases of Hodgkin's and non-Hodgkin's lymphomas than bone marrow aspiration biopsy (17,18).

However, Vetzani et al. (19) suggested the FNAB method as the primary technique to be performed due to their having obtained similar results by both FNAB and Tru-cut biopsy.

El-Khouri et al. (20) stated that they did not prefer FNAB in round-cell tumors and primary bone tumors due to the difficulty in obtaining sufficient material from these lesions.

Kattapuram et al. (10) cited a success rate of 97% for Tru-cut biopsy and 80% for FNAB in a comparative study of theirs.

Bearden et al. (17) obtained 67 positive results for Tru-cut biopsy and 42 positive results for aspiration biopsy in a field of 205 cases.

Fraser-Hill et al. (21) cited a success rate of 82% for metastatic lesions, 90% for suspicious musculo-skeletal lesions and 83% for suspicious primary musculo-skeletal tumors according to their clinical study of percutaneous needle biopsy performed on 102 individuals.

Cramer et al. (22) emphasized the successful diagnosis rate of metastatic carcinoma by using the needle biopsy method. No metastatic carcinoma diagnosis was present in our study, and no comparison on this subject can therefore be made between the two studies. On the other hand, three primary malign lesions were diagnosed by the Tru-cut biopsy method in our study.

Stahl and Jacobs (23) concluded that the excisional biopsy method was more efficient and successful in the diagnosis of 85 bone lesions when compared with needle aspiration biopsy in their study. Stahl and Jacobs stated that the needle aspiration biopsy method would be a helpful diagnostic technique considering its low morbidity rate and simplicity.

In our study the Tru-cut biopsy method presented a 10% higher success rate than FNAB. None of the three fibrous dysplasia cases were able to be diagnosed by FNAB. However, these lesions were successfully diagnosed by the Tru-cut biopsy method. Materials obtained from the center of the tumor lesions only can easily be diagnosed due to the presence of necrotic tissue at the center and vital cells in the peripheral areas of the pathologic lesion.

In our study, necrotic tissues were encountered in some samples obtained, and a successful diagnosis of these samples was more difficult to achieve (16,20). Therefore, our clinical study results are congruent with Bernardio's (24) and Dollahite's (1) conclusions regarding the renewal of the biopsy when necessary in cases when it had been performed only from the central area of the lesion.

Cytological examination is advised with Tru-cut biopsy, even though it has a low rate of accuracy (17,18,25,26). Verification by an excisional biopsy is mandatory in cases where cytological, histopathological, radiological and clinical results are not consistent (15). Twenty-two cases were successfully diagnosed by the Tru-cut biopsy method in our study, and this number increased to 25 when aspiration biopsy and Tru-cut biopsy were performed together. Therefore, it is obvious that cytological examination is a helpful complementary application to needle biopsy methods. The combined use of aspiration biopsy and Tru-cut biopsy is especially vital in the diagnosis of Hodgkin's and non-Hodgkin's lymphomas. In our study, both biopsy methods were successful in diagnosing the lymphoma.

Different success rates (66 to 100%) for the diagnosis of musculo-skeletal lesions by needle biopsy are reported in the literature by various workers. A success rate of 59.4% was found in our study (3,21,27).

In our opinion, the Tru-cut biopsy method is the primary method to be applied in the histopathological diagnosis of maxillo-mandibular bone lesions due to its clinical advantages.

According to our results, if we can develop this technique and improve specific apparatus for the maxillo-facial region, this could become a viable alternative technique to open biopsy .

Conclusion

The Tru-cut biopsy method was evaluated as a very helpful method since it is practical to perform, causes minimum trauma to the tissue, decreases the metastasis risk of malign lesions during the procedure and permits

earlier radio and chemotherapy applications in neoplastic lesions. New studies on this method would improve the technique to higher success rates and promote the method as the primary choice in practice.

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