



ROLE OF IMAGE-GUIDED BIOPSY IN DIAGNOSING SOFT TISSUE TUMORS

Anantha Krishnan

Assistant Professor, Department of Radiodiagnosis, Saraswathi Institute of Medical Sciences, NH - 24, Anwarpur, Pilkhuwa, Distt. Hapur (U.P.) – 245304

Corresponding author: Dr. Anantha Krishnan

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Abstract:

Soft tissue tumors encompass a wide spectrum of benign and malignant lesions that require proper diagnosis for the right type of treatment. Radiographically-guided biopsy has recently become established as the less invasive, more accurate and safer means of diagnosing these tumors. This review aims at assessing the prowess of guide biopsy, on issues to do with ease in diagnosis, safety and clinical relevance in assessment of soft tissue tumors. A review of records of 120 patient who had ultrasound or CT biopsy for carcinoma was done. Concerning diagnostic accuracy, there was 94% accuracy with a complication rate of 2%. These findings show that with the use of image guidance there was improved accuracy of sampling of deep seated tissues. Drawbacks were nonrepresentative samples in highly necrotic tumors and selection biases concerning the patients. Nonetheless, image guided biopsy is shown to be a valuable diagnostic intervention for early, accurate diagnosis and tailoring of effective therapeutic plans.

Keywords: Biopsy under image guidance, soft tissue masses, ultrasound directed biopsy, computed tomography-guided biopsy, diagnostic yield |

Introduction:

Soft tissue tumors are a heterogeneous group of neoplastic mesenchymal formations and consist of benign and malignant tumors individuals, including sarcomas. It is especially important for diagnosis since the methods of their treatment are vastly different depending on the malignancy of the tumor ranging from no intervention at all in case of predominantly benign lesion to chemoradiotherapy or complex surgery in case of highly malignant lesions (1).

Conventional open biopsies are diagnostic but more morbid procedures compared to the present study. On the other hand Image-guided biopsies are less invasive procedures with higher diagnostic yields and fewer complications compared to the other methods (2). Instruments like the ultrasound and computed tomography (CT) is useful in the positioning of biopsy needle, particularly for internal or non- palpable mass (3).

Through image-guided biopsy, studies the suspicious area and collects samples that increase the chances of a correct diagnosis. It is most valuable in differentiating between primary benign and malignant neoplasms, recognising histological types and determining the grade of the tumour (4). However, some difficulties are still present, for example, non-diagnostic samples can be taken, and the patient can get bleeding or an infection (5).

This work aims to assess image-guided biopsy as a diagnostic tool for soft tissue tumors by establishing its diagnostic yield, risks, and strengths and weaknesses of the procedure which should be useful in giving a clinical perspective.

Aim

To assess the impact of using image guide biopsy in the diagnosis of soft tissue tumors.

Objectives

1. To assess the diagnostic accuracy of ultrasound- and CT-guided biopsies in soft tissue tumors.
2. To evaluate the safety and complication rates associated with image-guided biopsy procedures.

Materials and Methods

A retrospective study was conducted on 120 patients with suspected soft tissue tumors who underwent image-guided biopsy at a tertiary care center over three years.

Inclusion Criteria:

- Patients with suspected soft tissue tumors based on imaging or clinical findings.
- Lesions accessible by ultrasound or CT guidance.

Exclusion Criteria:

- Patients with bleeding disorders contraindicating biopsy.
- Superficial lesions suitable for excisional biopsy.

All procedures were carried under local anaesthesia by ultrasound or CT guidance. Fine-needle aspirations were the initial and sole approach, and included histopathological analysis. The degree of diagnostic accuracy was evaluated with regard to biopsy attested by surgery or follow-up examination. Any complication arising from the procedure was also noted, such as bleeding, infection, and inability to obtain diagnostic samples.

Results

Table 1: Diagnostic Accuracy of Image-Guided Biopsy

Parameter	Value (%)
Diagnostic Accuracy	94
Sensitivity	92
Specificity	96
Non-Diagnostic Samples	4

Table 2: Complications of Image-Guided Biopsy

Complication Type	Frequency (n=120)	Percentage (%)
Minor Bleeding	3	2.5
Pain	5	4.2
Infection	1	0.8

Discussion

IGC spectroscopy enhances the diagnosis of soft tissue tumor disorders that used to have an open biopsy technique which is invasive, less accurate, and risky. In this, the diagnostic accuracy of 94% was noted which is in concordance with the aforementioned studies carried out for the ultrasound- or CT-guided biopsies (6).

Superfocal and real-time imaging are well-imaged using ultrasound-guided biopsy, while CT is useful for deep-seated or challenging anatomic structures (7). These techniques minimize chances of obtaining nondiagnostic samples or experiences some other complication due to improper positioning of the needles. The overall patient

outcome noted in this study signifies the low complication risks seen in literature about these procedures (8).

Some difficulties encountered include sampling errors where samples obtained may not be diagnostic especially in conditions with necrotic or poorly described lesions. These problems can, however, be averted through multiple passes and extra caution while determining the target users. Also, the character of the study that does not allow making a conclusive diagnosis in some situations requires additional excisional biopsy or surgery (9).

However, image-guided biopsy is useful in the diagnosis of soft tissue tumors Although

significant difficulties are inherent in its application. It permits the characterisation of lesions in the early phases and also helps in the planning of the treatment and also minimizes the use of invasive investigations (10). New refinements, including intraoperative MRI-guided biopsy, may improve diagnostic accuracy even more in the future.

Conclusion

Image-guided biopsy has become an ideal modality in characterizing soft tissue tumors given the high diagnostic yield, procedural minimisation and low complication rates. Guidance by both ultrasound and CT increases the accuracy of tissue sampling especially in lesions that are located far from the body surface. As long as, for instance, such issues as currently poorly diagnostic samples do exist, it is possible to choose the procedure most appropriate and most effective for a specific case with the help of the close cooperation between departments. The integration of IGB into clinical practice therefore guarantees proper diagnostic information hence patient management and outcome.

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