

Accuration of Fine Needle Aspiration Biopsy in Musculoskeletal Tumour

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ABSTRACT

Fine needle aspiration biopsy (FNAB) has been reported to be the preferable choice of biopsy for musculoskeletal tumour. While FNAB appears to have advantages to core biopsy in the aspect of simplicity and cost, the diagnostic accuracy should be the most critical parameter in determining the choice of biopsy. This research was designed to evaluate the diagnostic accuracy of fine needle aspiration in musculoskeletal tumour in Sardjito Hospital from 2010 until 2014. This was a descriptive study from medical record in Sardjito Hospital from 2010 until 2014. The inclusion criteria are musculoskeletal tumours in all age level that has been performed FNAB with subsequent operative treatment and confirmation of histopathology examination in Sardjito Hospital. There were 41 elligible subjects in this study. Concordance diagnosis of FNAB and histopathological examination in all musculoskeletal tumor cases was found to be 86%. In addition, the concordance in soft tissue tumor cases was 94% with the detail as follows: giant cell tumor was 86%, synovial sarcoma was 50% and liposarcoma was 50%. In bone tumours, the accuracy was found to be 60% with the detail as follows: distribute osteosarcoma was 60%, osteochondroma was 50% and chondrosarcoma was 50%. Our data showed that accuracy of FNAB for diagnosis of musculoskeletal tumours was 86% with soft tissue tumour 94%, bone tumour 60% and others 93%. Therefore, Fine needle aspiration biopsy is still important diagnosis tool in musculoskeletal tumours.

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1. INTRODUCTION

Oncology cases in orthopaedic department needs highly specialized resources where the gold standard for diagnosing musculoskeletal tumor is biopsy. After radiographic staging study is carried out, biopsy should be carefully planned and performed by the well-trained medical doctor. This flow can determine the correlation of radiographic and histologic findings [1]. In order to achieve proper management of those patients and prevent improper management that can lead in unnecessary amputations and mortality, long-standing recommendations suggest referring all patients that are suspected to have musculoskeletal lesions to a high-volume tertiary care centers that are capable to do biopsy and definitive treatment [2].

In the recent years, there is a paradigm shift where less invasive procedures are more preferable due to their advantages. Despite of surgical open biopsy in the diagnosis and staging phase, percutaneous biopsy using large gauge needles have gain attention in orthopaedic oncology fields. This procedures are less invasive and have lower morbidity rate compared with open biopsy. If sufficient material is successfully obtained, diagnosis can be made in 80to 98% of the cases, therefore it began to constitute the gold standard [3]. In addition, the accuracy of percutaneous biopsy to differentiate benign tumor versus sarcoma and

sarcoma versus other malignancies are relatively high. Domanski et al stated that the combination of clinical evaluation, radiologic data, and the result of fine needle aspiration biopsy (FNAB) are sufficient to decide next treatment procedures [4]. However, there are several factors that affect the decision to do percutaneous needle biopsy. Those factors are the experience of the operator and the patient's condition, including patients coagulation state, the characteristics of each lesion, the access route [5].

In the cases of musculoskeletal benign lesion, definite diagnosis often cannot be made. On the basis of the evaluation of FNAB alone, precise classification of the musculoskeletal tumor is difficult to make, therefore, confirmation and evaluation of the histopathological examination is essential. However, on the other side, FNAB of bone lesions has many advantages. The procedures are simple, less risky, inexpensive, and it only need a quick outpatient procedure. In the cases of inadequate material being aspirated or there are doubt in the examination result, the samples can be retaken on different [6].

This research was carried out to evaluate the diagnostic accuracy of fine needle aspiration in musculoskeletal tumour in Sardjito Hospital from 2010 until 2014.

2. RESEARCH METHOD

This was a descriptive study in Sardjito Hospital, Yogyakarta, Indonesia from 2010 until 2014. The data of the subjects was obtained from the medical records of the patients. The inclusion criteria were musculoskeletal tumours in all age level; fine needle aspiration biopsy has been performed with subsequent operative treatment followed by confirmation of histopathological examination in Sardjito General Hospital. The exclusion criteria were patients with musculoskeletal tumour without receiving surgery treatment or open surgery biopsy. During 2010-2014, fine needle aspiration biopsy has been performed in 129 patients suffer from musculoskeletal tumors. The diagnostic accuracy was compared in 41 patients underwent consecutive fine needle aspiration and histopathological examination of the musculoskeletal tumour. Sex and age of the patients were seen and the diagnosis was compared between open surgery biopsy and FNAB results.

3. RESULTS AND DISCUSSION

Based on the medical records data, there are 129 patients with musculoskeletal tumours treated in Sardjito General Hospital from 2010 to 2014. From the retrospective review, forty one patients were operated and performed histopathological examination. Concordance diagnosis of fine needle aspiration and histopathological examination was found in 86% cases.

Table 1. The characteristics of the subjects

	Characteristics	n (%)
Sex	Male	20 (48.88 %)
	Female	21 (51.22 %)
Age	<20	6 (14.63 %)
	20-40	12 (29.27 %)
	>40	23 (56.10 %)
Diagnosis	Osteosarcoma	5 (12.20 %)
	Giant Cell Tumor	7 (17.07 %)
	Osteochondroma	2 (4.88 %)
	Chondrosarcoma	2 (4.88 %)
	Fibrous dysplasia	1 (2.44 %)
	Malignant Giant Cell Tumor	1 (2.44 %)
	Melanoma Maligna	1 (2.44 %)
	Malignant soft tissue	1 (2.44 %)
	Rhabdomyosarcoma	1 (2.44 %)
	Benign soft tissue	1 (2.44 %)
	Synovial Sarcoma	1 (2.44 %)
	Mix Liposarcoma	1 (2.44 %)
	Primitive neurodermal	1 (2.44 %)
	MBD	16 (39.2 %)

There were 2 subjects out of 5 Osteosarcoma subjects that have different FNAB results. The results were fibroplastic osteosarcoma in one case and there were not found any malignant cells in another. For 2 patients of osteochondroma, and chondrosarcoma, both cases showed 50% accuracy of FNAB. Only one case was found to be different for 7 cases of Giant Cell Tumors. However, there were cases that have 100% accuracy of the result of the FNAB. There are Malignant Giant Cell Tumor, Malignant Melanoma, Malignant

soft tissue, Rhabdomyosarcoma, Benign Soft Tissue, Synovial Sarcoma, Mix liposarcoma, and Primitive neurodermal for 1 cases each, and 16 cases of metastatic bone disease.

3.1. Discussion

Compared with open surgical biopsy, FNAB have many advantages. The procedures can be done in outpatient setting, it is easy to perform and does not need complicated preparation, the procedures can be done the very day the patient is referred, and the risk for serious complications is quite low. Based on the FNAB examination, it is easy to take material samples from different parts of the musculoskeletal tumors, therefore, sometimes the heterogeneity of the tumor characteristics can be rule out [7].

In the United States, FNAB is commonly used at musculoskeletal oncologycenters for documentation of metastases and local recurrences, especially if prior samples are available for comparison. However, the role of FNAB in the evaluation of primary soft tissuesarcomas remains controversial andlimited [8]. Performed bedside, it provides results within 30 minutes and canfacilitate additional staging or treatment decisions duringthe initial clinic visit. Although FNAB reliably distinguishes mesenchymal from metastatic tumors, malignantfrom benign lesions, and high- from low-grade sarcomas,some study criticized for its inability to differentiate subtypesarcomas precisely [2].

Our data involving 129 patients with musculoskeletal tumours demonstrated that concordance of fine needle aspiration biopsy with final histopathology examination was 86%. Nineteen patient with soft tissue tumour performed consecutive fine needle aspiration and final histopathological examination was 94%, distribute with diagnosis accuracy of giant cell tumour 86%, synovial sarcoma 50% and liposarcoma 50%. Ten patients with bone tumours the diagnostic accuracy was 60%, distribute osteosarcoma 60%, osteochondroma 50% and chondrosarcoma 50%.

This result of this study was concordance with another study by Ng et al. Fine-needle aspiration is usually accepted for documentation of metastases and local recurrences, especially if prior samples are available for comparison. 16 cases of metastatic bone disease in this study were shown to have positive results in the FNAB.

However, FNAB is not without potential pitfalls that can lead to misdiagnosis. False negative result still occurs. The pitfalls also might be due to the limitation on the evaluation of tissue architecture, and the samples are inadequate for ancillary, cytogenic, molecular, or immunohistochemical studies [9]. Although the accuracy is relatively high, improvement is required to improve the accuracy of fine needle aspiration biopsy.Guidance using computed tomography during sampling and sample aspiration could improve the sensitivity of fine needle aspiration biopsy [5].

4. CONCLUSION

Our data showed that accuracy of fine needle aspiration biopsy for diagnosis of musculoskeletal tumours was 86% with soft tissue tumour 94%, bone tumour 60% and others 93%. Therefore, fine needle aspiration biopsy is still important diagnosis tool in musculoskeletal tumours.

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