DIAGNOSTIC YIELD OF IMAGE GUIDED CORE BIOPSY AND FINE NEEDLE ASPIRATION CYTOLOGY IN THE EVALUATION OF VARIOUS MASSES

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ABSTRACT

Objective: The purpose of this study is to evaluate diagnostic yield of ultrasound / computed tomography (CT) – guided core biopsies and fine needle aspiration cytology (FNAC) of various masses.

Study Design: An observational study.

Place and duration of study: This study was carried out in radiology department of Combined Military Hospital Rawalpindi from Aug 2006 to May 2007.

***Patients* and Methods:** A total of 91 patients with wide range of masses involving different organs of body underwent image guided core biopsies and FNAC. Sixty seven patients were males and 24 were females. Age of patient ranged from were performed under ultrasound guidance. Out of the 91 cases, 48 were core biopsies and 43 FNAC. Biopsies were performed with 18G Monopty gun and FNAC were done with 20 – 22G lumbar puncture (LP) needle in all cases except FNAC of thyroid gland, cervical lymph nodes and calf muscle (in which FNAC was done with 5cc disposable syringe).

Results: Out of 48 core biopsies, 40 (83.3%) had adequate diagnostic yield and histopathologist was able to give a definite diagnosis. However in 8 (16.7%) biopsies, diagnostic yield was inadequate and it was labelled non-diagnostic by histopathologist. Similarly out of 43 FNAC, 33 (76.7%) had adequate diagnostic yield and 10 FNAC (23.3%) were declared non-diagnostic. Over all success rate was found to be 80.22%.

Conclusion: Image guided core biopsies and FNAC, both are very helpful in histophatological diagnosis of various masses and success rate is quite high when appropriate technique is employed.

Key words: Diagnostic yield, core biopsy, fine needle aspiration cytology.

INTRODUCTION

The management of patients with suspected neoplastic disease is dependent on obtaining tissue diagnoses, usually via a percutaneous sampling1. The increasing use and sensitivity of radiological techniques has also led to the identification of relatively small lesions, which require the use of image guidance for reliable targeting. At present, there are two widely used and accepted methods for obtaining diagnostic material, namely fine needle aspiration cytology (FNAC) and core biopsy (CB). Although both techniques are very safe, FNAC is often preferred in sampling deeply placed lesions, sites adjacent to major vessels, or in situations in which needles are to be passed through the bowel wall [1,2]. Cytological samples can be rapidly stained and examined, providing immediate assessment of adequacy [2-8].

A study has been carried out in our hospital in which the diagnostic yield of image guided techniques was evaluated. In some other local and international studies the role of FNAC / CB has been evaluated in specific disease states [9] and focal lesions [10]. But our study encompasses lesions irrespective of site anywhere in the body. We have evaluated the yield of FNAC and CB in 43 and 48 patients respectively. The aim of this study is to highlight the importance of FNAC and CB in histopathological diagnosis of various lesions and to evaluate diagnostic yield and accuracy of these procedures.

PATIENTS AND METHODS

This was an observational study carried out from Aug 2006 to May 2007 in radiology department of Combined Military Hospital Rawalpindi which is a tertiary health care hospital receiving referred cases from all

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peripheral hospitals of Armed Forces of Pakistan. Radiology department is equipped with latest diagnostic facilities including state of the art Toshiba ultrasound machine (Aplio) and Toshiba multislice CT scanner.

Inclusion Criteria: All those cases were included in the study who were referred to our department for image guided FNAC or CB.

Exclusion Criteria: Patients with deranged haemodynamics, abnormal coagulation profile or masses lying close to or adhering to a major blood vessel were excluded from study.

PATIENTS AND METHOD

When a patient was referred to radiology department for FNAC / CB, the initial assessment regarding the size and location of the mass, general condition of patient and choice of imaging modality (USG or CT) was done. Coagulation profile was advised and appointment for biopsy was given. On the day of biopsy, whole procedure with its advantages and risks was explained to the patient and written consent was taken. Mass to be biopsied was localized and marked by ultrasound or CT. Proper aseptic measures were taken. Local anesthesia was used prior to biopsy. Most of the CB were done with 10cm long, 18G Monopty gun and FNAC were performed with 20 – 22G LP needle in all cases except FNAC of thyroid gland, cervical lymph nodes and calf muscle (in which FNAC was done with 5cc disposable syringe).

Core biopsy tissue was put in formaline jar. FNAC tissue was spread on slides and then placed in alcohol. After about 30 minutes, slides were taken out of alcohol and dried. Finally these FNAC slides and CB samples were sent to Armed Forces Institute of Pathology for cytology and histopathology. After the procedure, patient was kept for observation in radiology department for about one hour.

Data Analysis

Data had been analyzed using SPSS version 11. Frequency and percentages were used to describe the data.

RESULTS

A total of 91 image guided FNAC and core biopsies of various masses were performed. Sixty seven (74%) patients were male and 24 (26%) female. Age of the patients ranged from 4 to 95years. Four (4.4%) cases were CT guided while 87 (95.6%) were ultrasound guided. Out of 91 cases 48 (53%) were core biopsies and 43 (47%) FNAC.

CORE BIOPSIES

In our study 48 core biopsies were performed (Table-1). The most common organ for CB was liver (39.6%) and commonest mass was found to be hepatocellular carcinoma (14.6%). Rest of the biopsies were done for abdominal masses (16.7%), lung (12.5%) kidney (10.4%) pleura (4.2%), mediastinum (4.2%) and testis, right iliac fossa, gallbladder, retro peritoneum, sacrum and psoas muscle (2.1%). Out of 48 cases, 40 (83.3%) had adequate diagnostic yield and definite diagnosis was given by histopathologist. In 8 cases (16.7%), diagnostic yield was inadequate and tissue was labelled as non diagnostic.

FNACS

FNACs were performed in 43 cases (Table-2). The commonest organ for FNAC just like CB, was liver (30.23%) and the most common mass was hepatocellular carcinoma (11.6%). Other lesions where FNAC was done included abdominal masses (18.6%), breast (16.3%), thyroid gland (9.3%), cervical lymph nodes (9.3%), lung (7%), right iliac fossa, spleen, psoas muscle and calf (2.3%). Out of 43 FNAC, 33 (76.7%) had adequate diagnostic yield. However 10 (23.3%) cases were

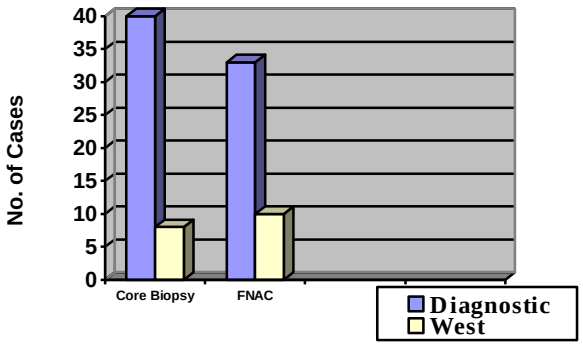

Figure: Diagnostic Yield of core biopsy and FNAC

Table-1: Showing number of diagnostic and non diagnostic cases on core Biopsies (n=48)

S/No.	Organ/Site of lesion	Total cases (%)	Diagnostic cases	Non-diagnostic cases
1	Liver	19 (39.6%)	17	2
2	Abdominal mass (Not related with any organ)	8 (16.7%)	5	3
3	Lung	6 (12.5%)	5	1
4	Kidneys	5 (10.4%)	3	2
5	Pleura	2 (4.2%)	2	-
6	Mediastinum	2 (4.2%)	2	-
7	Testis	1 (2.1%)	1	-
8	Right Iliac Fossa	1 (2.1%)	1	-
9	Gall Bladder	1 (2.1%)	1	-
10	Retroperitoneum	1 (2.1%)	1	-
11	Sacrum	1 (2.1%)	1	-
12	Psoas Muscle	1 (2.1%)	1	-
	Total	**48**	**40**	**8**

Table-2: Showing number of diagnostic and non diagnostic cases on FNAC (n=43)

S/No	Organ/Site of lesion	Total cases (%)	Diagnostic cases	Non-diagnostic cases
1	Liver	13 (30.2)	12	1
2	Abdominal Mass (Not related with any organ)	8 (18.6)	6	2
3	Breast	7 (18.6)	5	2
4	Thyroid Gland	4 (9.3%)	3	1
5	Lymph Node (Neck)	4 (9.3%)	3	1
6	Lung	3 (7.0%)	2	1
7	Right Iliac Fossa	1 (2.3%)	1	-
8	Spleen	1 (2.3%)	1	-
9	Psoas Muscle	1 (2.3%)	-	1
10	Calf	1 (2.3%)	-	1
	Total	43	33	10

declared non diagnostic.

Adequate diagnostic yield was found in 83.3% of core biopsies and 76.7% of FNAC (Figure). Overall success rate was 80.22% (73 out of 91).

DISCUSSION

Once a mass lesion is found anywhere in the body, the most important task is to characterize the mass and know the nature of the lesion so that appropriate treatment can be given to the patient [11]. FNAC and CB are two sampling techniques which are used to establish tissue diagnosis. The decision to use FNAC or CB depends upon size and site of lesion, the suspected likely diagnosis and the risk of complications.

The tissue obtained by FNAC / CB is vital for histopathologist to make an accurate diagnosis. If the sample contains inadequate amount of tissue, the histopathologist may not be able to establish the diagnosis and re-biopsy will be advised. So getting adequate tissue material from mass lesion by FNAC / CB using image guidance is of utmost importance keeping in mind the invasiveness of the procedure and risk of complications.

It is generally accepted that CB samples provide more accurate diagnosis than FNAC samples due to increased amount of tissue and retained architectural pattern in histological specimen. However in some studies FNAC has been found to be more sensitive than CB when cytological and

histopathological specimens were compared [12].

In our study we found that CB provided more diagnostic yield than FNAC success rate was 83.3% for CB and 76.7% FNAC. However the difference in two sampling techniques is not much and both can be declared effective in terms of diagnostic yield and accuracy. The overall success rate of CB and FNAC in our study was 80.22%. This result is quite comparable with international studies where FNAC was found to successful in 86% of cases and CB around 80% of cases [13].

It is important to remember that diagnostic yield not only depends upon sampling technique, size and site of lesion and quality of guidance equipment but experience of radiologist is also a crucial factor.

CONCLUSION

Image guided FNAC and CB both are excellent interventional procedures with very high success rate when proper radiological approach is used. In expert hands, these procedures are safe and reliable with low insufficient sampling rate, allowing correct histopathological identification of various masses.

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