

Diagnostic Accuracy of Fine Needle Aspiration Cytology in Evaluation of Intra-Abdominal Mass Lesions

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Abstract

Introduction: Diagnostic evaluation of Intra-abdominal masses has always remained an enigma in surgical practice. Fine needle aspiration cytology (FNAC) is an alternative for exploratory laprotomy to provide documentary evidence of the nature of pathology before institution of therapy and also prognosis. The objective of the study was to assess the diagnostic accuracy of FNAC in evaluation of Intra-abdominal mass lesions. *Methods:* Study included 128 intra-abdominal mass lesions detected clinically and radiologically which was further classified into palpable and non palpable masses. Image guided FNAC was performed in non palpable lesions. Smears were made with routine stains and special stains were done wherever required. Histopathological correlation was done wherever possible. *Results:* The mean age was 45.17 years, with Male: Female ratio of 1:1.3. The diagnostic yield was 95.2% under direct aspiration and 91.8% under Ultrasonography (USG) guidance. There were 74(57.8%) malignant, 30(23.4%) benign, 14(10.9%) inflammatory, 1(0.78%) suspicious lesions and 9(7.03%) unsatisfactory smears. The liver and the ovary were the most common sites. Adenocarcinoma and hepatocellular carcinoma were the most common malignant lesions. This study showed 97.3% sensitivity, 100% specificity, 100% positive predictive value, 93.3% negative predictive value and 98.07% diagnostic accuracy. *Conclusion:* FNAC is a highly sensitive, reliable, accurate method for rapid provisional pre-operative evaluation of intra-abdominal mass lesions. This has a major impact on the management of patients, avert diagnostic surgical procedures and accelerate the planning for therapy.

Keywords: Guided FNAC; Abdomen; Histopathology; Diagnostic Accuracy.

Introduction

Fine needle aspiration cytology (FNAC) of Intra-abdominal mass lesions is a valuable investigatory tool which establishes a preliminary pre-operative diagnosis of neoplastic and non neoplastic lesions [1]. The use of imaging techniques combined with FNAC has revolutionized the approach in diagnosis of space occupying lesions of the abdomen [2]. It may avert the need for diagnostic laprotomy [3].

Various studies have shown inconsistent data in literature regarding the accuracy and effectiveness of FNAC to an extent that some authors have suggested

that core biopsy alone should be used [4], hence this study was conducted to assess the diagnostic accuracy of FNAC in management of Intra-Abdominal mass lesions by histopathological correlation wherever possible.

Materials and Methods

One year hospital based study was carried out in the department of cytopathology from October 2014 to September 2015. Patients with intra-abdominal lesions were detected clinically or under radiological guidance. Swellings from the skin and abdominal wall were excluded from the study. Intra-abdominal organs included the liver, stomach, pancreas, spleen, gall bladder, intestines, retroperitoneum, kidneys, adrenal glands, lymph nodes, soft tissues and ovary.

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After obtaining an informed consent from the patient, a thorough clinical examination was done. In palpable intra-abdominal swellings, FNAC was directly performed and in non palpable or deep seated lesions USG guided FNAC was performed. Aspiration was done in each case using 20-22G needle attached to a 10ml syringe for superficial masses and 20-22G spinal needle for deep seated mass lesions. The sample was expelled onto slides, air dried and stained with Giemsa or fixed in 90% alcohol and stained with Haematoxylin and Eosin stain along with Papanicolaou stain. Special stains were used wherever required. The data was entered into a spread sheet and analysed using Epi Info Software Package developed by USA for disease Control. Finally the accuracy of cytological diagnosis was evaluated by comparing them with Histopathological diagnosis wherever possible.

Results

During the study period, 1748 fine needle aspirations were performed of which 128 cases presented with intra-abdominal mass lesions accounting to 7.3% of the total cases. There were 84 palpable and 44 non palpable lesions. Histopathological correlation and confirmation was available in 18 cases.

Out of the 128 cases, there were 55 males and 73 females with a male to female ratio of 1:1.3. The youngest patient in the study was 1 year old and oldest was 85 years old. A majority of the patients i.e 91(71.09%) were in the age group of 30-60 years out of 128 mass lesions in male patients.

Among 55 lesions in male patients, a majority were malignant, accounting for 40(72.7%) and 6(10.9%) lesions were inflammatory lesions 5(9.09%) lesions were benign and one (1.81%) was suspicious for malignancy. In 3(5.45%) cases the smears were unsatisfactory for evaluation. Of 73 lesions in female patients, 37(50.6%) were malignant, 24(32.8%) were benign and 7(9.5%) were inflammatory. In 5(6.8%) cases, the smears were unsatisfactory for evaluation.

Out of 128 lesions, 74(57.8%) were malignant, 30(23.4%) were benign, 14(10.9%) were inflammatory and 1(0.78%) was a suspicious lesion. There were about 8(6.25%) unsatisfactory smears. The malignant lesions were more common in males than in females whereas the benign lesions had a female preponderance. The incidence of the lesions increased in both the sexes after 30 years as depicted in Table I.

Out of 128 lesions, 86 were aspirated under USG

guidance. In 42 cases, aspiration was done directly without guidance. The diagnostic yield of USG was 91.8% i.e out of 86 USG guided procedures adequate material was obtained in 79 cases. It was 95.2% in the direct unguided procedure, which was higher than that of USG guided procedure. Overall the diagnostic yield was 92.9% in the 128 lesions as shown in Table 2.

Majority of the lesions were located in the liver and most of them were malignant lesions. The most common malignant lesion in the liver was Hepatocellular carcinoma (HCC) 18 cases, followed by metastatic carcinoma in 13 cases. In 4 cases, we could not differentiate between primary HCC and the metastatic lesions were labelled as poorly differentiated carcinoma. One case was diagnosed as cholangiocarcinoma in 52 years male. Ovary was the next common site (24), wherein most of the lesions were benign (17). Other common organs involved were the lymph nodes (9), kidney (6), soft tissue (4) and gall bladder (3).

Among the inflammatory lesions, abscess constituted the most common inflammatory lesions. Out of 4 abscesses, two were located in liver and two in lymph nodes. There were 3 reactive lymphadenitis and 2 granulomatous lymphadenitis cases.

In most of the benign lesions i.e 17 lesions were located in the ovary of which majority i.e 12 cases were diagnosed as serous cystadenomas as depicted in Figure 1.

Among malignant lesions, Adenocarcinoma was the most common malignant lesions followed by HCC both seen in age group of 21-60 years. There were one each case of Malignant granulosa tumour, Dysgerminoma, Cholangiocarcinoma, Non Hodgkin lymphoma, Hodgkin lymphoma and Round cell tumour as shown in Figure 2.

Histopathological correlation and confirmation was available in 18 cases. Out of the 8 benign cases, 4 cases were confirmed by histopathology. Two cases each of the Mucinous cystadenoma and Serouscystadenoma diagnosed on cytology were confirmed on histopathology. However two serous cystadenoma cases turned out to be serous cystadenocarcinoma on histopathology. And two cases reported as benign spindle cell tumour on cytology, turned out to be benign Brenner tumour and Ovarian fibroma respectively.

Out of 10 malignant cases, 7 cases were confirmed on histopathology. One case of clear cell carcinoma of kidney turned out to be Adrenocortical carcinoma on histopathology. Two cases diagnosed as poorly differentiated carcinoma on cytology turned out to be

mixed germ cell tumour on histopathological examination.

The cytopathology diagnosis was compared with the histopathology diagnosis. Among the 30 benign cases on FNAC, 28 cases were proven to be benign (True negative) and 2 cases were diagnosed as malignant on Histopathological examination (False negative). 74 cases diagnosed malignant on cytology were proven to be also malignant (True positive) on

histopathology and hence no false positive cases were obtained.

Accordingly the overall diagnostic sensitivity, specificity, positive predictive value and negative predictive value of FNAC of intra-abdominal mass lesions were 97.3%, 100%, 100% and 93.3% respectively. The overall diagnostic accuracy was 98.07% while the overall discordance rate was 1.92%.

Table 1: Age and Sex distribution of Intra-Abdominal lesions

Age (in yrs)	Inflammatory		Benign		Malignant		SFM		Unsatisfactory		Total	%
	M	F	M	F	M	F	M	F	M	F		
1-30	3	2	2	3	8	6	0	0	0	0	24	18.75
31-60	3	5	3	18	25	30	0	0	3	4	91	71.09
61-90	0	0	0	3	7	1	1	0	0	1	13	10.15
Total	6	7	5	24	40	37	1	-	3	5	128	
%	10.9	8.2	7.27	32.8	12.7	50.6	1.8	0	7.27	12.32		100
Total (%)	13(10.1%)		29(22.6%)		77(60.1%)		1(0.78%)		8(6.25%)		128(100%)	

M: Males F: Females SFM: Suspicious For Malignancy

Table 2: Type of Radiological guidance and diagnostic yield

Method	No of cases	Diagnostic yield	
		No of cases	%
USG	86	79	91.8
Unguided	42	40	95.2
Total	128	119	92.9

USG: Ultrasonography

Table 3: Statistical Results - Comparative Analysis

Study	No of FNAC's (%)	Sensitivity (%)	Specificity (%)	Diagnostic Accuracy (%)
Shamshad SA et al	200	94.1	100	95.7
Siddlingreddy et al	245	94.1	100	96.5
Shoba Rani SG et al	100	90	100	92
Present study	128	97.3	100	98.07

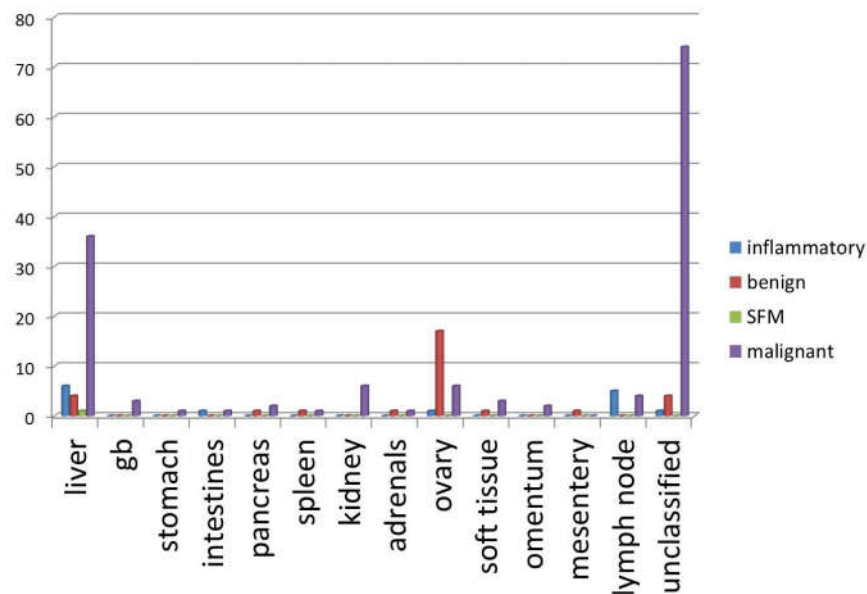


Fig. 1: Organ distribution of lesions

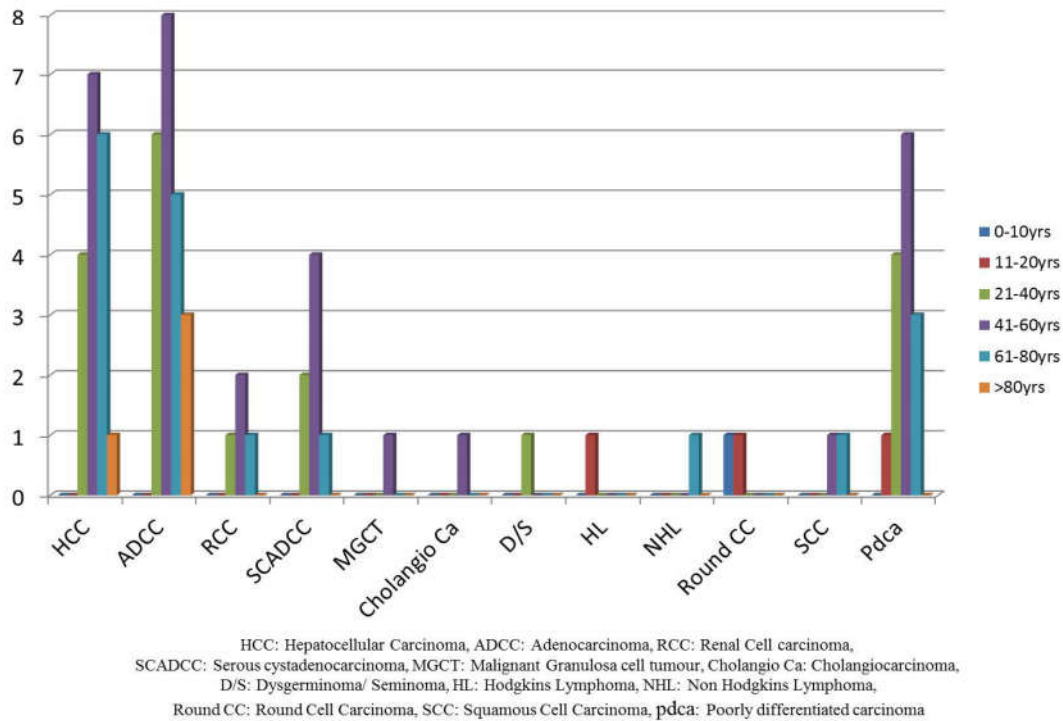


Fig. 2: Age Distribution of Malignant lesions according to cell type

Discussion

In recent years, FNAC has emerged as an established technique for the diagnostic evaluation of intra-abdominal mass lesions. Diagnostic yield in our study under Ultrasound guidance was 91.8% and direct aspiration was 95.2% with an overall diagnostic yield of 92.9%. However in a study by Nautiyal S et al, the diagnostic yield was 64.81% on direct aspiration and 93.06% under USG [3]. The diagnostic yield in our study was higher in direct aspiration than under USG due to proper selection of cases and superficial location of mass lesions.

Majority of the cases were in the age group of 31-60 years (50.2%). The age incidence in the present study ranged from 1 year to 85 years. The peak incidence of malignancy was between the ages of 31-60 years which was comparable to the results which were obtained by Ahmed SS et al [5].

The male to female ratio of 1:1.3 was in accordance with the observations made by Siddlingreddy et al and Ahmed SS et al [6,5]. However studies by Bolde SA et al showed a male preponderance [1]. This could be due to the inclusion of the ovary in this study.

In this study, most of the intra-abdominal masses were arising from liver (39.4%). Similar observation was made by Bhargava R et al, Shoba Rani G et al, Bolde SA and Siddlingreddy et al [7,2,16].

Majority of the lesions were malignant (62.2%) which was a similar observation made by Ahmed SS et al and Siddlingreddy et al [5,6].

In the present study there was no age or sex predilection for inflammatory lesions. Female preponderance was seen in benign mass lesions as cystic lesions of ovary were most common benign mass lesions.

Our study revealed, Adenocarcinoma was the most common malignancy (29.7%) followed by HCC (24.3%) and serous cystadenocarcinoma of ovary (9.4%). Poorly differentiated carcinoma constituted 20.2% which was in accordance with the observation made by Siddlingreddy et al and Khan AA et al, who reported as 19.6% and 34% respectively [6,8]. However studies by Shoba Rani G et al, Bhargava R et al reported the most common malignant lesion was HCC followed by metastatic carcinoma [2,7].

The overall diagnostic accuracy in our study was 98.07%, with sensitivity of 97.3% and specificity of 100%, which was compared to that of most of the studies as shown in Table 3.

Conclusion

FNAC is a highly reliable, safe economical, pre-operative diagnostic tool for evaluation of intra-

abdominal mass lesions. It not only helps in differentiation of mass lesions as inflammatory, benign and malignant lesions but also in categorization of different malignant lesions as it is sensitive, specific method with high diagnostic accuracy [9].

However with the application of advanced imaging techniques and immunocytochemistry, the diagnostic accuracy can be considerably increased [10].

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