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Analysis of 100 Cases of USG guided Fine Needle Aspiration Cytology of Intra-abdominal Masses in Bihar: A Study at Tertiary Care Hospital

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Abstract: *USG guided FNAC is emerging, widely accepted, less invasive and cost effective safe diagnostic procedure with high sensitivity and specificity. Intraabdominal mass or focal lesion involving abdominal sites is often difficult for evaluation and remain an enigma for clinician. This study was done to evaluate the utility of USG guided FNAC to differentiate between malignant and nonmalignant lesion in various palpable and non palpable intraabdominal lesion.*
Aim: *The aims of our study is to assess the usefulness of USG guided FNAC as a pre-operative diagnostic procedure in management of intra-abdominal lesions.*
Objective: *The objective of our study is to assess the cytomorphological feature, age and sex distribution of the patients with various condition of intra-abdominal lesions, to classify the malignant according to their cell type and to evaluate the sensitivity, specificity and the diagnostic accuracy in different lesion wherever possible.*
Material and method: *The study was done in Department of Pathology with collaboration of Radiology department, Patna Medical College and Hospital,Patna over a period of two year. The study was done on 100 patient of clinically and radiologically suspected intraabdominal masses.*
Result: *Total 100 patient with intraabdominal mass were included in the study. Cases were reported in the age group of 13 month to 84 year. Of these 46 cases (46%) were male and 54 cases (54%) were female. The diagnostic yield of USG guided FNAC was 96%. Out of total aspirate; 79% were neoplastic and 17% were non neoplastic and 4% were categorized as inadequate.The study showed 92.3% sensitivity and 100% specificity with a diagnostic accuracy of 92.8%.*
Conclusion: *USG guided FNAC is a simple, safe, rapid and highly accurate diagnostic procedure in differentiating benign from malignant lesion. It can be utilized as a pre operative procedure for the management of intra abdominal lesion.*

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I. Introduction

Intra abdominal masses always remain as an enigma in surgical practice. Most of the intra abdominal masses are non palpable and even if they are palpable, the idea of their size, shape and extent is not possible. The lesion can be benign, malignant or inflammatory and the distinction between them is vital for patient management. Various imaging modalities like CT and USG are used as a guide for fine needle aspiration. It is well established diagnostic technique and is increasing in popularity as a means of diagnosing masses in intraabdominal organs[1].

Ultrasonography offers several advantages as a biopsy guidance system. It is readily available, relatively inexpensive and portable. It uses no ionizing radiation[2] and it can provide guidance in multiple planes[3].The greatest advantage however, is that, it allows real time visualization of the needle tip as it passes through the tissue planes into the target area[4]. It has been demonstrated that ultrasound can precisely guide needle biopsies in lesions which are as small as 1cm, in critical anatomical areas. This precision is necessary for a successful procedure and it often makes sonography the first choice in guiding interventional procedures. Fine needle aspiration of abdominal masses has gained tremendous popularity, since it can have a major impact on the management of the patients and in many cases, it may obviate the diagnostic surgical procedures or expedite the planning for the therapy[5]. Ultrasound guided fine needle aspiration can be utilized for practically any mass in the abdomen. It is highly sensitive, highly specific, accurate and cost-effective diagnostic procedure with negligible complication rate[6] as well and usually performed on out-patient basis. The FNA cytology was shown to be 100% specific for diagnosis of malignancy[7]

However, it should be also stressed that aspiration cytology is not a substitute for conventional surgical histopathology. A definitive specific diagnosis is not always possible by cytology, but categorization of disease and a possible differential diagnosis can be provided in a majority of cases to suggest the most efficient further management.

II. Material And Method

The present study is a prospective study and carried out in PMCH, Patna from September 2011 toSeptember 2013.The purpose of cytological diagnosis & its evaluation was to determine the nature and origin of lesion as far as possible. A total no. of 100 patients of intra-abdominal masses who came from various clinical departments were selected in which direct FNAC was not possible. With consent of the patient a thorough clinical examination and all the relevant investigations findings noted before undergoing the procedure.Materials used were 10cc air tight disposable syringe with 22G needle of 3.5 inches length. LP needle of 22G was also used depending upon the depth of the lesion. Cotton swab soaked with spirit used for sterilization of skin puncture site. At least two dry and two wet fixed smear prepared. Dry smear stained with MGG stain and wet smear with Papanicolaou stain and examined under the light microscope. Histopathological interpretation were done in available 28 cases.

III. Observation

The present studyconsist of observation done on FNAC of sonographically demonstrable intra-abdominal masses in 100 patients. A subsequent histopathological examinations were done in available 28cases. Thedetail related to observation in respect to age, site of origin, type of lump and complication related with the procedure are all mentioned in table below.

Table-1: Table showing the number of cases aspirated from different organs of abdomen

SI No.	Name of organs Aspirated	No. of cases
1.	Liver	32
2.	Gall-Bladder	22
3.	Kidney	5
4.	Lymph Node	11
5.	Stomach	5
6.	Bowel	4
7.	Pancreas	3
8.	Ovary	10
9.	Omentum	1
10.	Unclassified	7
	Total	100

In present study maximum number of aspiration was done from liver (32), followed by Gall-bladder (22), lymph nodes (11), ovary (10), Kidney (6), stomach (5), large bowel (4), Pancreas (3) and omentum (1).

Table-2: Table Showing the Age and Sex distribution in different age groups:

Age (year)	Male		Female		Total No. of cases
	No. of cases	Percentage	No. of cases	Percentage	
0-10	3	3%	2	2%	5
11-20	3	3%	0	0%	3
21-30	5	5%	5	5%	10
31-40	6	6%	10	10%	16
41-50	6	6%	13	13%	19
51-60	10	10%	10	10%	20
>60	13	13%	14	14%	27
Total	46	46%	54	54%	100

The above table shows that maximum 54% of cases in this study were female and rest 46% were male. Only in the age group 0-20 years the percentage of male patients are more compared to female by 4% while in rest age group female patients are more.

Table -3: Table showing the cytological yield on aspiration

Sl. No.	Material on aspiration/Cytological yield	No. of cases	Percentage
1	Sufficient material for smear	76	76%
2	Blood mixed fluid or Pus like material	18	18%
3	Scanty material	2	2%
4	Unsatisfactory	4	4%
	Total	100	100%

Table -3 shows that material with satisfactory cells was obtained in 96% cases and overall unsatisfactory rate was 4%.

Table4: **Table showing organs-wise abdominal lump pathology**

Sl. No.	Organs Aspirated	Malignant	Benign	Infective/ Inflammatory	Not Diagnosed	Total
1.	Liver	30	0	2	0	32
2.	Gall-Bladder	17	0	5	0	22
3.	Kidney	4	1	0	0	5
4.	Lymph Node	5	0	4	2	11
5.	Stomach	4	0	0	1	5
6.	Large Bowel	3	0	0	1	4
7.	Pancreas	3	0	0	0	3
8.	Ovary	7	2	1	0	10
9.	Omentum	1	0	0	0	1
10	Unclassified	5	2	0	0	7
	Total	79	5	12	4	100

So, the table clearly showing that out of 100 cases, most (79 cases) are malignant, only few cases 17 (5+12) are non malignant and 4 cases remain undiagnosed as the type of cell could not be categorized in any of the category.

Table – 5: Table showing percentage of malignant abdominal lump as by aspiration cytology

Sl. No.	Site of Abdominal lump	No. of lump aspiration	No. of Malignant Cases	Percentage of Malignant lump
1.	Liver	32	30	93.7
2.	Gall-Bladder	22	17	77.2
3.	Lymph Node	11	5	45.4
4.	Kidney	5	4	80
5.	Stomach	5	4	80
6.	Large Bowel	4	3	75
7.	Pancreas	3	3	100
8.	Ovary	10	7	70
9.	Omentum	1	1	100
10.	Unclassified	7	5	71.4
	Total	100	79	

This table shows that maximum number of malignant cases originated from liver followed by Gall bladder

Table – 6:Table showing about Complications occurredafter FNAC

Sl. No.	Complications	No. of cases	Percentage
1.	Pain and discomfort	09	09%
2.	Post aspiration bleeding	03	03%
3.	Sepsis	0	00%
4.	Peritonitis	0	00%
5.	Needle track implantation	0	00%
6	Injury to other structures	0	00%
		12	12%

During and after aspiration no major complication was reported or encountered. Out of 100 only 9 patients (9%) show mild discomfort and pain and 3 patients (3%) with post aspiration bleeding. That bleeding was minor and was stopped by manual pressure.
In follow up cases there was no sepsis, peritonitis, needle tract implantation, and any anaphylaxis.

IV. Discussion

Aspiration cytology is not a substitute for histopathology, but is one of the weapons to be used to hit the diagnostic target.Now a daysit's in routine use as a preoperative diagnostic tool for intra abdominal lump.In the present study the F.N.A.C. was done in almost all age group. There are some variations in disease related with age group.The youngest patient in the study was of 13 month and oldest of 84 years age.In our present series the maximum no. of cases 27% are above 60 yrs. of age group, followed by 19% cases in between 41-50 years age group, 21% cases are in between 51-60 years age group and 9% cases above the 60 years age group. There are 3% cases in between 0-10 year's age group out of which one case is of 3 years old.Out of 100 patients with sonographically demonstrable intra-abdominal lump, male patients were 46% and female patients were 54%.

In the present series the aspirate obtained by aspiration cytology for cytological study was sufficient in 76% cases, and blood mixed with pus or fluid in 18% cases. Out of 100 cases onlyin 2% cases there was scanty material yield.In 4% cases though the aspirate could be obtained, but unsatisfactory due to presence of insufficient cells or the sample was too contaminated or the cells are degenerated for evaluation. In 18 %cases the blood mixed with pus or fluid is obtained, which show the sufficient no. of cell when the fluid is centrifuged and smear is made.

Thus the incidence of satisfactory cellular aspiration obtained in this study was96%, a total of 96 cases (76+18+2). Our study is comparable with Islam et al.,who obtained 87.7% diagnostic yield, Sidhalingreddy and Andola[8] 92.7% and Nautiyal[9] S et al in 2004,who found a diagnostic yield of 93.06%.

In the present series out of 100 cases 79% malignant,12% inflammatory and 5% benign tumour were identified. This was higher in comparisonto the study done by Smith et al.[10],in which 66% were malignant lesion and 34% were benign/non neoplastic lesion. Similarly, malignant lesion outnumbering benign ones were also reported by Sheikh et al[11] (2000) Sidhaling Reddy et al[12] (2011) and Sumana BS et al[13] (2015).

Out of 100, the maximum no. of aspiration done from liver (32), followed by Gall-bladder (22), lymph nodes (11), ovary (10), Kidney (6), stomach (5), large bowel (4), Pancreas (3) and omentum (1).Remaining 6 cases were in unclassified group, whose origin could not be ascertained with certainty by sonologist. Out of which 3 were of soft tissue origin, one was Embryonal Rhabdomyosarcoma; second,Mesenchymal neoplasm and third, malignant fibroushistiocytoma. Rest 3 were Lymphangioma, Liposarcoma and Adenocarcinoma.

Liver was the common sites (32%) for FNAC in this study as shown in table 1, 4&5 which is comparable to the studies done by Sheikh et al and Adhikari RC et al[14],Zawar M.P. et al[15].Liver was the common sites for FNAC in this study similar to those of Tuladhar AS et al[16](2012),Adhikari RC et al[17] (2010) ,and J Nobrega et al[18] (1994).

In liver out of 32 cases, 30 were diagnosed as malignant (93.7%) and 2(6.3%) as benign, out of malignant lump primary hepatic malignancy (Hepatocellular carcinoma) were seen in 18 cases, secondary metastatic adenocarcinoma seen in 10 cases, 1 was poorly differentiated carcinoma and 1of liver cirrhosis. In the present study, Hepatocellular carcinoma were the most common malignant lesion. The observations of the present study were similar to those of Indian studies,where hepatocellular carcinoma constituted the most common hepatic malignancy[19] and are comparable to the two studies done earlier in the Kashmir valley[20].

Second most common site of aspiration was gall bladder as found by Reyaz TA et al.[21] (2016) which is comparable to our present study.In Gall-bladder lump, 22 cases were aspirated out of which 17 were malignant, 5 benign or inflammatory lesion.

5 cases were related to Kidney and Adrenal,out of which two were diagnosed as Renal cell carcinoma and other as Wilm's tumor, Sarcomatoid carcinoma and Angiomyolipoma.In retroperitoneal masses Renal cell carcinoma was most common malignant lesion of kidney. In a study by Adhikari RC et al[17] (2010) similar results were reported.

Out of 11 cases of lymph nodes, 5 were malignant, 4 inflammatory and, 2 cases were undiagnosed due to unsatisfactory smear probably due to small size of lymph node. Out of 5 malignant cases one was Non-Hodgkin's lymphoma, and the rest showed metastatic adenocarcinoma deposits from nearby GIT and all 4 inflammatory lesion were diagnosed as granulomatous inflammation.

Although few studies have reported complications like mild local pain, bleeding and tumour seeding of the needle

tract, a vast amount of literature supports the safety of FNAC. In present study we did not find any complication

except mild pain at the time of needle puncture.Potential complications of FNAC of abdominal lesions are described in the literature varying between 0% and 12% depending on the organ sampled in the procedure. But majority of the studies[22]including ours support the safety of the procedure.

4% cases were reported to be inconclusive. Data was comparable to those of Sumana BS et al[13] (2015), SidhalingReddy et al[12] (2011)and Tuladhar AS et al[16] (2012).

Histopathological correlation of 28 out of 100 FNAC cases were done, in which 23 were from hepatobiliary mass,3 from kidney and 2 from lymph node.Sensitivity and specificity for malignant lesions is found to be 92.3% and 100% respectively. Out of 23 cases of hepatobiliary masses, 21 cases were found to be true positive for malignancy, one true negative and one was false negative (a case of adenocarcinoma with necrosis where the aspirate showed inflammatory cells and necrosis only, so a false –ve diagnosis of empyema).

Histopathological examination done in 3 cases of renal & adjacent structures showed similar malignant pathology as in FNA, out of which one was Wilm's tumor and other two were Renal cell carcinoma.

Of total 11 cases of abdominal lymph node, histopathological examination were done in 2 case. One was found to be Non-Hodgkin's lymphoma which on cytological examination was found to be a case of reactive lymphoid hyperplasia. Other was of granulomatous inflammation as seen in FNAC. So here one case was false –ve and other was true –ve.

Table -6: sensitivity and specificity

	Histopathology	
FNAC	Positive	Negative
Positive	24	0
Negative	2	2

So in the present series total number of true +ve case for malignancy were 24, true –ve case for non-malignant lesion were 2, false –ve were 2 and no any case of false +ve seen.

So this study reveals an overall sensitivity of 92.3% (calculated as % of true +ve /(true +ve + false –ve), overall specificity of 100% (calculated as true –ve/true –ve + false +ve) and diagnosis accuracy of 92.8% (calculated as sum total of true +ve and true –ve/ total number of cases).

In the present series the diagnostic accuracy is 92.8% as calculated after Cyto-histopathological correlation with Sensitivity of 92.3% and Specificity of 100%.

V. Conclusion

Usg guided FNAC is a simple, safe, rapid, highly sensitive and accurate diagnostic procedure in differentiating benign from malignant lesions. It can be utilized as preoperative procedure for further management of intra abdominal lesions.

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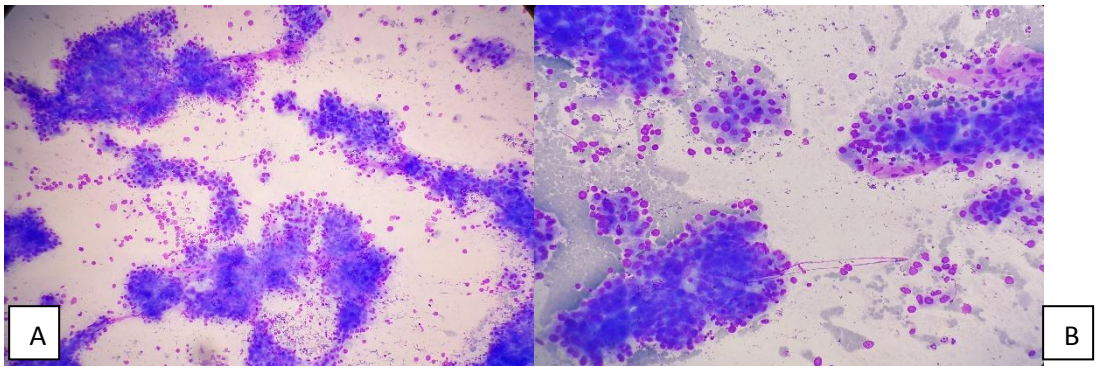

Fig.1: Hepatocellular carcinoma showing moderately differentiated pleomorphic tumour cell with severe anisokaryosis, prominent intranuclear inclusion and transgressing blood vessel, A: MGG(10X),B:MGG (40x).

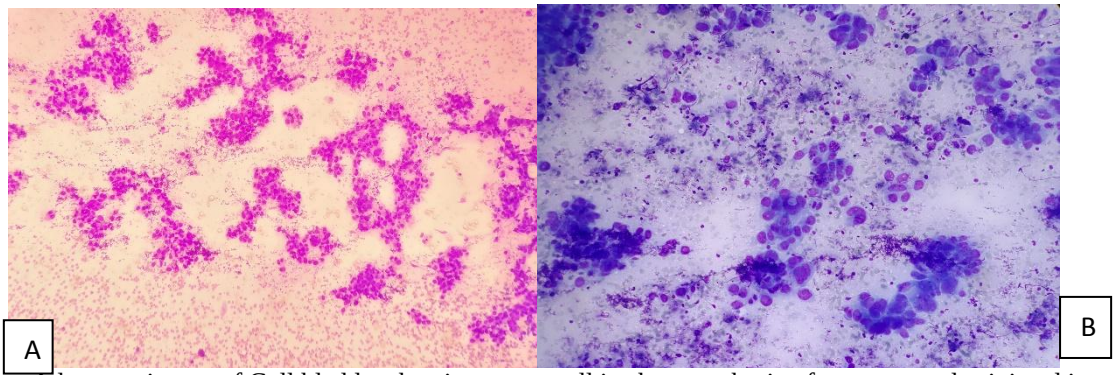

Fig.: Adenocarcinoma of Gall bladder showing tumor cell in sheets, cohesive fragments and acini and in papillary pattern, A: MGG(10X), B:MGG (40x).

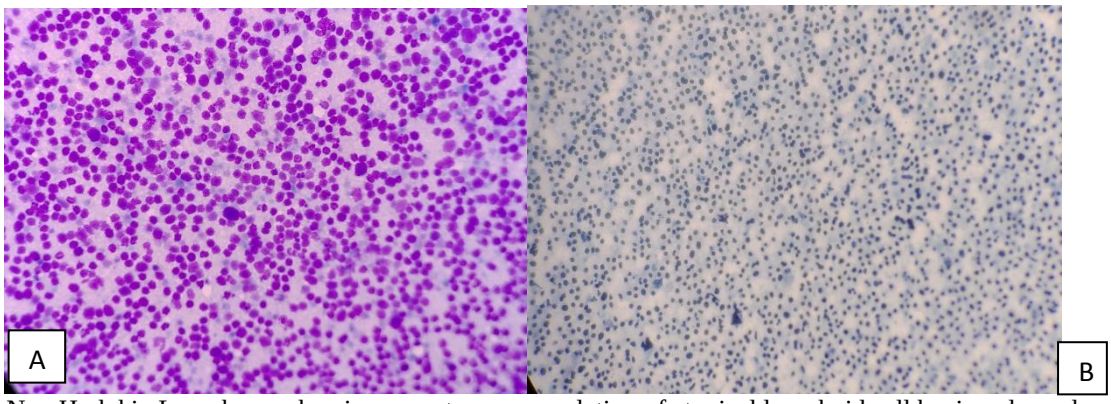

Fig.3: Non Hodgkin Lymphoma showing monotonous population of atypical lymphoid cell having cleaved and non cleaved tumour cell with peppered chromatin A: MGG(40X), B: Pap (40x)..

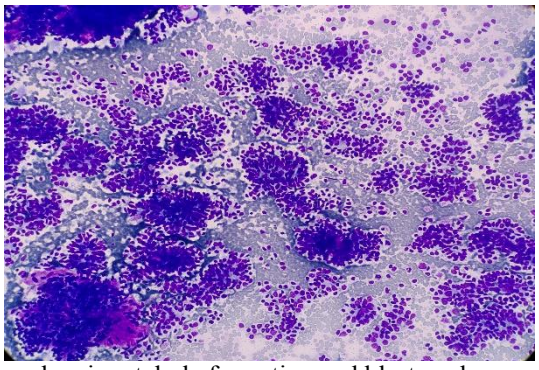

Fig.4: Wilm's Tumor showing tubule formation and blastemal component, MGG,(40X)

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