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Original Research Article

Ultrasound-Guided Fine Needle Aspiration Cytology Study of Intra-Abdominal Masses in a Tertiary Center

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Abstract

Background: USG-guided FNAC has become an indispensable component of the diagnosis of abdominal masses. The objective of this study was to adopt USG-guided FNAC in the diagnosis of abdominal masses, assess its efficacy, and describe the cytological features of abdominal masses.

Methods: 50 patients with clinically or sonographically diagnosed abdominal masses were taken up for the study. The FNAC has performed under real-time USG guidance. The aspirate was smeared onto a minimum of 3 slides and they were routinely stained with H & E, MGG, and Papanicolaou stains.

Observation: In our study, we were able to diagnose 88% (44) of cases as either benign or malignant (Benign-40% and malignant- 48%) and 12% of cases were inconclusive. The percentage of inconclusive cases was quite high. Proper discussion and input from both radiologists and pathologists can reduce this. In the case of malignant cases samples taken from primary organ/visceral organ were more diagnostic.

Conclusion: USG-guided FNAC is a rapid, economical, less-invasive, highly accurate, and safe diagnostic procedure.

Keywords: Abdominal masses, FNAC, Ultrasonography.

Introduction

Ultrasonography (USG) has enabled the detection and localization of lesions in sites that are not easily accessible to surgical biopsies. It offers easy access to needle for cytological aspirations. Sample can be obtained from deeper and small areas by USG-guided FNAC, with better precision and the least exposure to ionizing radiations. This is a readily accepted, rapidly growing, and important diagnostic technique that is more accurate, safe, simple, and rapid. USG offers several advantages, as it is readily available, relatively inexpensive, it uses non-ionizing radiation and it can provide guidance in multiple planes; that is transverse, longitudinal, and oblique.

The most important advantage of USG-guided FNAC is that it allows real-time visualization of the needle tip as it passes through the tissue planes into the target area.

Under USG guidance, the needle can access smaller lesions in critical anatomical areas like retroperitoneal lymph nodes and para-aortic lymph nodes in cases like Non-Hodgkin's lymphoma and Hodgkin's lymphoma. Liver primaries and secondaries are easily accessed by this technique; few cases presented clinically with vague constitutional symptoms but are diagnosed by USG-guided FNAC as malignant tumors. There were cases of the gallbladder which were clinically and radiologically thought to be benign, but are diagnosed as malignant neoplasm on USG-guided FNAC. Occasionally the FNAC may not yield information sufficient for making a precise diagnosis.

There are a few complications of USG-guided FNAC:

1. Infection
2. Hemorrhage
3. Seeding of Malignant cells
4. Bile peritonitis
5. Intra - hepatic hematoma [1,2]

Material and Methods

The study involved 50 cases with clinically or ultrasonography-diagnosed abdominal masses that came in the Pathology department of Patna Medical College (PMCH) from July 2017 to July 2019.

In two years, a majority of patients presented clinically with a mass per abdomen, and a few with pain, fever, and vomiting. Most of the cases were females in the age group of 20 to 70 yrs. A detailed workup of patients was carried out including complete patient history, review of records, and clinical examination. The patients were subjected to an ultrasonographical evaluation to assess the origin of the mass and its relationship with adjacent organs. A percutaneous FNAC of the mass was done under USG guidance, in the department of Radiology, while taking absolute aseptic precautions, by the shortest route to the site, as was suggested by the sonologist. A 10 ml disposable plastic syringe and a 22 gauge needle were used for deep-seated lesions a 20-22 gauze spinal needle of 9 cm length was used. A trans-abdominal approach by using the most direct route was made and the standard FNAC procedure was followed. Each aspirate was smeared on an average of four to five slides. Then they were routinely stained by MGG and Papanicolaou stains.

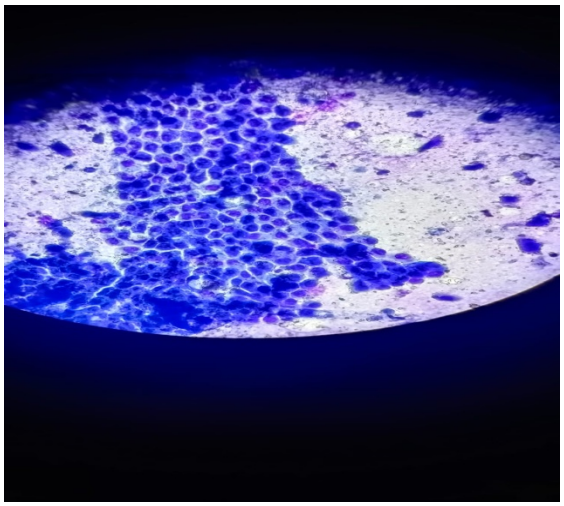

Figure 1: Pancreatic adenocarcinoma

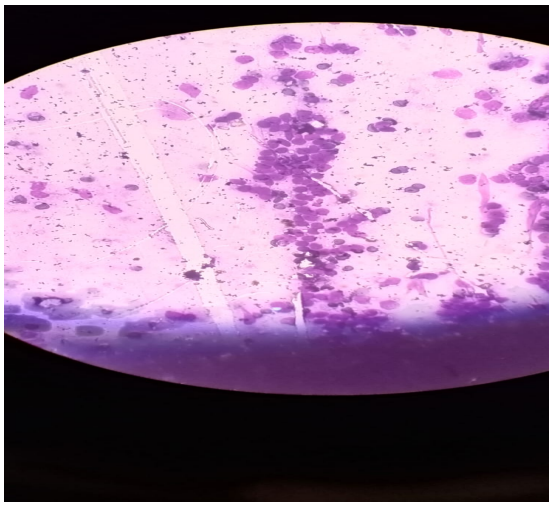

Figure 2: Hepatocellular carcinom

Results

The applicability of USG-guided FNAC for the diagnosis of intra-abdominal masses in 60 patients was assessed. A total of 50 cases were taken into my study, among them 27 were female and 23 were male patients. The youngest person who underwent the procedure was of 4 years and the oldest was of 75 years of age. Among the various sites aspirated the most common site was lymph nodes; a total of 18 cases of lymph nodes were aspirated among a total of 50 cases.

Table 1: Organ Distribution of Different of Intra-Abdominal Masses

S. No.	Organ	Total	Inconclusive	Benign	Malignant
1	Liver	6	0	2	4
2	Retroperitoneal L.N.	11	4	6	1
3	Abdominal L.N.	7	0	4	3
4	Gall Bladder	11	1	1	9
5	Ovary	6	1	3	2
6	Omentum	1	0	0	1
7	Pancreas	2	0	0	2
8	Others	5	0	4	2

Out of the total 50 cases under study 20 cases (40%) were found to be benign cases. About 24 cases (48%) were malignant and 6 cases (12%) were inconclusive.

Retroperitoneal Lymph nodes and gallbladder were the most common site aspirated. There were 11 cases (22%) from each site. Out of 11 cases of the gallbladder, 1 case (2%) was inconclusive, 1 case (2%) was benign and 9 cases (18%) were malignant.

Out of the total of 11 cases of retroperitoneal lymph nodes aspiration 6 (12%) cases were benign, 4 cases (8%) were inconclusive and 1 case was (2%) malignant. We compared the diagnostic value of FNAC in the case of abdominal mass to differentiate abdominal mass in lymphnodes and visceral organ mass. We found 44 cases were diagnostic of which 14 cases of lymphnode and 30 cases of the visceral organ were diagnosed either as malignant or benign as shown in the chart. The P value for diagnostic to inconclusive cases was 0.09 showing no significance.

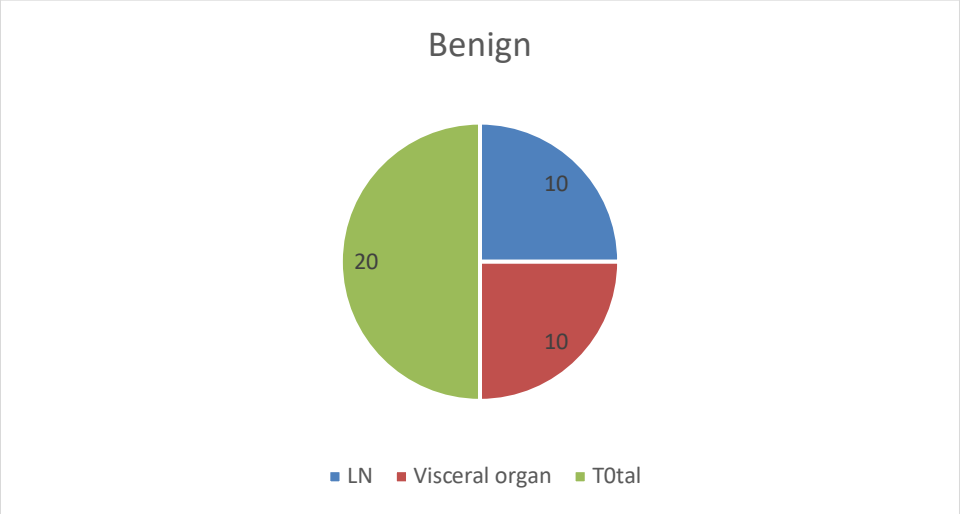

Figure 1: Diagnostic value of USG -guided FNAC according to LN and Visceral organ

Out of 18 cases of lymphnode (Abdominal and retroperitoneal) 14 cases were diagnostic whereas 4(22.22%) cases were inconclusive. The p-value was 0.07 which is not statically significant.

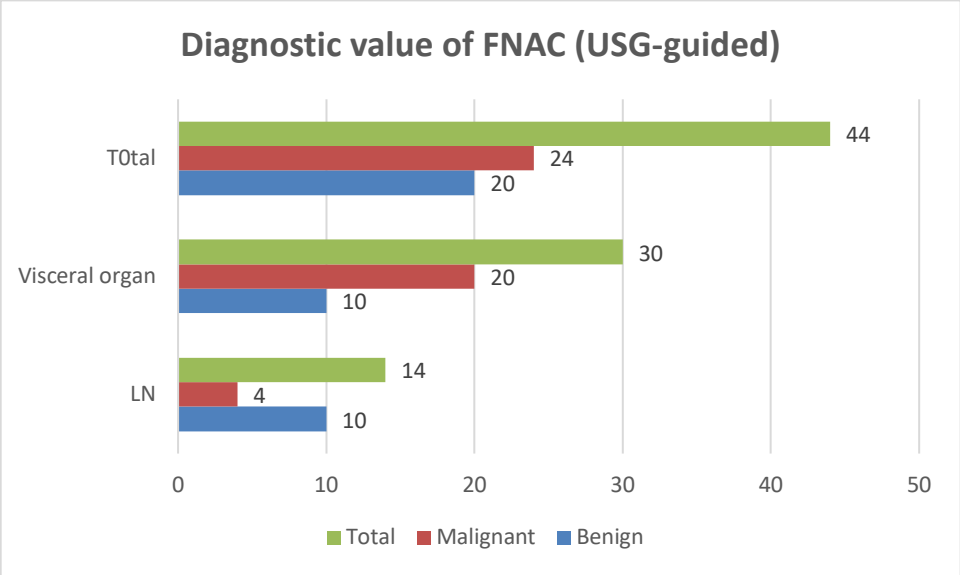

Figure 2: Graph showing the diagnostic value of FNAC (USG-guided) in the case of lymphnode

Similarly comparing the diagnostic role of USG-guided FNAC in case of benign and malignant lesions among lymphnodes and visceral organs we found that overall, 20 cases were diagnosed as benign and 24(54%) cases as malignant. 22.72% of the total diagnosed cases were benign lymphnode cases whereas 9% were malignant. However, 45% of cases were malignant for samples from the visceral organs. The P value for this is 0.01 which is statically significant.

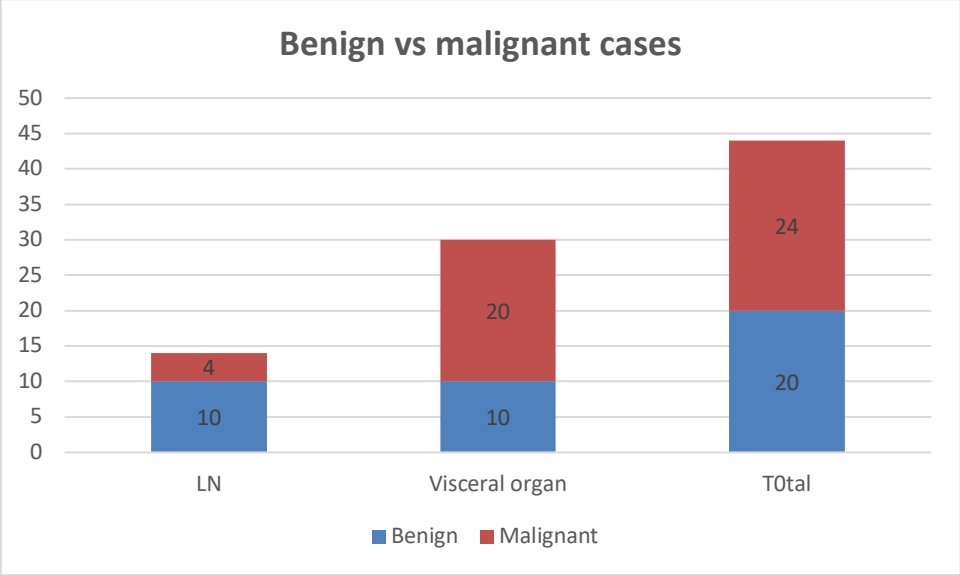

Figure 3: Graph showing Benign vs malignant cases

Table 2: Distribution of Malignant and Benign Lesions according to age.

S. No.	Age	Total No.	Income	Malignant	% M	Benign	V.B.
1	0-10	2	1	0	0%	1	2%
2	11-20	5	2	2	4%	1	2%
3	21-30	12	1	1	2%	10	20%
4	31-40	10	1	4	8%	5	10%
5	41-50	2	0	1	2%	1	2%
6	51-60	14	0	12	24%	2	4%
7	61-70	2	0	2	4%	0	0
8	71-80	3	1	2	4%	0	0

Table 3: Distribution of Malignant Lesion According to gender.

S. No.	Type of Malignant	Total	Male	M %	Female	F %
1	Adeno Carcinoma Gall Bladder	9	2	4%	7	14%
2	HEC (Hepatocellular Liver carcinoma)	2	2	4%	0	0%
3	Metastatic Adenole in liver	2	1	2%	1	2%
4	Non-Hodgkin's Lymphoma of L.N.	3	2	4%	1	2%
5	Hodgkin's Lymphoma of Abd. L.N.	1	1	2%	0	0%
6	Ovarian Adenocarcinoma	2	0	0%	2	4%
7	Malignant Mesenchymal Tumors	2	1	2%	1	2%
8		2	1	2%	1	2%
9		1	0	0%	1	2%
	Total	24	10	20%	14	24%

Table 4: Distribution of Benign Cases According to Gender.

S. No.	Types of Benign Lesions	Total	Male	Female
1	Non-Specific Reactive Lymphadenopathy of Mesenteric L.N.	5	3	2
2	Non-SpecificReactive Lymphadenopathy of Abdominal L.N.	3	3	0
3	Chronic cholecystitis of Gall Bladder	1	0	1
4	Tubercular lymphadenitis	2	1	1
5	Benign cystic lesions of the ovary	3	0	3
6	LiAbscesscess	2	1	1
7	Anterior abdominal gall lipoma	1	0	1
8	EpidermalKeratinn cyst	1	0	1
9	Benign cystic lesion of the Abdomen	1	1	0
10	Hematoma of Rectus Abdominis	1	1	0

Table 5: Showing Cytological yield on aspiration

S. No.	Material on aspiration / cytologicyieldild	No. of cases	% age
1	Sufficient material for smear	34	68%
2	Blood-mixed fluid or pus-line material	9	18%
3	Scanty material	4	8%
4	Unsatisfactory	3	6%

Discussion

Abdominal masses are a clinical enigma and always pose a dilemma for the surgeon. Differentiation between non-malignant and malignant lesions is vital, especially in advanced unresectable malignant cases to avoid an exploratory laparotomy. FNAC is considered to be more sensitive and accurate than needle core biopsy. The use of USG guided needles allows the aspiration of representative material for precise cytological diagnosis. The residual material in the needle hub after preparation of routine smear contains diagnostic material. The maximum number of patients in the present study belong to the age group of 51-60 years (14 (28%) out of the total 50 cases). A similar age range was observed by Zawar *et al* [3], and Reddy S *et al* [4],

A female predominance was observed, with an incidence of 54%. These results did not tally with those of Zawar *et al* [3], Ennis and Mac Erlean [5], and Suman BS and Muniyappa B [7] who observed male predominance.

Among the organs sites in the present study, the maximum number of aspirates were of gallbladder 2 and retroperitoneal lymph node 22%. These results did not tally with the study done in the year 1980 by Ennis and Mae Erlean [5] where 47.of 37% of cases were from the liver.

In the present study of the 50 diagnostic aspirates, 48 were malignant and 45.45% were benign. Studies conducted in the past by Ennis and Mac Erlean [5], Suman BS, and Muniyappa B [7] revealed the predominance of malignant lesions among the total intra-abdominal masses aspirated.

Among the malignant lesions, the maximum number of cases was of adenocarcinoma gallbladder 18% cases with female predominance. Next being Non-Hodgkin's lymphoma 6casesse with male predominance. Lymphoma also formed the majority in the study conducted by Khanna *et al*. [8].

The most common age group for benign lesions was 21-30 years, with an incidence of 24%. The most common benign lesion was Non-specific reactive lymphadenopathy having an incidence of 10% with male predominance.

Among the malignant hepatic lesions, the incidence of primaries was equal to the incidence of secondaries. In the present study, the incidence was 4% for each.

Among the diagnostic pancreatic aspirate, 1,00% were malignant adenocarcinoma. It was also found in the study by Jorda *et al* [12] incidence was 90% and, in the study conducted by Goldstein *et al*. in which there were 8 of the 14 caseshad a correct presumptive diagnosis of pancreatic carcinoma. In the present study, the aspirate from the ovary has 60% benign and 40% malignant cases. Among the malignant lesions, primary adenocarcinoma of the ovary had the highest incidence (100%). Similar findings were concurred upon by Bandyopadhyay A *et al*. [13].

Table 6: Categories of final cytological diagnosis comparative analysis

Sl. No.	Study	Pelvic mass included	Guidance technique	Benign	Malignant	Suspicious of malignancy	Inconclusive	Total No. of Cases
1	Present Study	12%	USG guided	40%	48%	0%	12%	50
2	Stewart *et al*. [19]	6.4%	Image-guided	7.80%	78.2%	0%	13.5%	141
3	Sidhaling Reddy & Anodola [18]	21%	USG and CT guided	32.6%	60%	0.6%	6.5%	245
4	Islam *et al*. [21]	0	USG guided	37.2%	52.6%	0%	10.3%	78
5	Hemlatha *et al* [9]	32.8%	USG	35.5%	64.5%	0%	0%	90
6	Bolde SA *et al* [32]	0%	USG direct	22%	48%	18%	12%	50

Conclusion

USG-guided FNAC procedure involves the presence of both pathologist and radiologist thereby facilitating clinical correlation and appropriate handling and allocation of aspiration material for routine and ancillary tests.

Real-time USG is a simple, cost-effective imaging modality, that has an advantage over CT in guiding non-axial needle trajectories and allowing procedures to be accomplished more quickly than USG-guided FNAC is a safe and reliable method not only for cytodiagnosis but also for differentiating neoplastic from non-neoplastic intra-abdominal lesions.

However, the negative FNAC result in a patient with suspected malignancy may need further evaluation.

In this study, 48% of malignant lesions of the intra-abdominal masses were diagnosed by this simple outpatient procedure with the lowest cost to the patient as compared to higher cost, morbidity, and lengthy hospital stay in surgical biopsies.

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