Role of USG guided FNAC in intra-abdominal masses-A study at tertiary care hospital Bhopal

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Abstract

Introduction: Ultrasound Guided Fine Needle Aspiration is a safe, and reliable procedure for the accurate diagnosis of intra-abdominal mass lesions.

Materials and Methods: This study was based in a tertiary care centre and was a prospective type of study including all the patients with abdominal mass. Mass lesions were subjected for FNAC under ultrasound guidance from June 2016 to December 2017.164 cases were included in which FNAC was done for intra abdominal mass lesions under ultrasound guidance. Wet smears were prepared for Leishmann, PAP stain and air dried smears were prepared for May Grunwald Giemsa stain. The lesions were further studied and divided into Inflammatory, Benign, Malignant, Hemorrhagic and Unsatisfactory for interpretation categories.

Results: A total of 164 cases were included in the present study which FNA was done for intra-abdominal mass lesions under ultrasound guidance. In the present study, predominance was observed with a male to female ratio of 1.05:1. Majority of cases were present in the age group ranging from 30-60 years.158 cases were studied out of which Liver lesions constituted 87(55.06%) cases. There were total 118 malignant (71.93%) cases, 37 (22.56%) inflammatory cases, 3(1.89%) benign cases and 6(3.65%) cases were unsatisfactory and were excluded from the study.

Conclusion: It was observed that the incidence of malignant lesions in liver were more common than the benign lesions. Among benign, the most common lesion noted was reactive changes. Adenocarcinoma was the most common metastatic tumor in our study. While among the primary tumors, HCC was the most common. US guided FNAC was less time consuming, safe, useful, and accurate technique for making diagnoses of hepatic lesions.

Keywords: Ultrasound, Intra-abdominal, mass, Lesions, FNA.

Introduction

Intra-abdominal masses are a common problem inthe day-to-day surgical practice. A documentary evidence of the nature of the pathology before the institution of therapy and also for prognosis is mandatory in majority of the cases. The diagnosis which is obtained by FNAhelps in being the substitute for surgical procedures for laparotomy.[1, 2] Most of the intra-abdominal masses are not palpable and even if they are palpable, their exact extent is not discernable.

FNAC under image guidance has brought about revolution in the field of cytological diagnosis. Because of high degree of accuracy and minimum discomfort to the patient through this technique permits the accurate localization of non-palpable and deep seated lesions in the body. Image guided FNAC is routinely done when single or multiple lesions are located in inaccessible sites. It is very important to confirm the tissue diagnosis which is essential for both treatment as well as staging of cancer.[3] Image guided FNA has an important role in diagnosing inflammatory benign, malignant lesions of the-abdomen.[4]

The evaluation of deep, non-palpable masses or focal lesions involving abdominal sites is often difficult. Distinction between malignant and non-malignant lesions and particularly inflammatory lesions is vital for patient management. A distinction between malignant and non-malignant lesions can often besuspected by imaging, and the increasing use and sensitivity of radiological techniques has led to the identification of relatively small lesions. With the use of radiologic guidance for needle placement this technique is an effective way to obtain diagnostic material for rapid and accurate diagnosis.[5] 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.

Aspiration cytology helps in differentiating betweenthe cystic and solid lesions, and also benign versus the malignant neoplasms, or an abscess versus a neoplasm. Presence of a pathologist during the procedure provides a combined and better consultation between the pathologist and the radiologist leading not only to a better clinical correlation, but it can also to a suggestion of additional aspiration sites and samplings for special procedures such as culture or gram staining in abscesses or PAP staining in malignancies or by any other means of confirmation.[6-8]

Aims and Objectives

The present study was undertaken to analyze the usefulness of ultrasound guided FNAC in the diagnosis of intra-abdominal and pelvic masses and to evaluate the accuracy of aspiration cytology. To study cytomorphological features, age and sex distribution of intra abdominal lesions and to categorize them organ wise and as inflammatory, benign or malignant lesions. To classify malignant lesions according to their cell type and evaluate the diagnostic accuracy.

Materials and methods

This study was carried out in the department of Pathology of a tertiary care centre of Bhopal for a period of 18 months from 1 June– 2016 to 31 Dec 2017 and included 164 cases with clinically or ultrasonographically diagnosed abdomino-pelvic masses further referred for FNAC. Intra-abdominal organs included liver, spleen, pancreas, stomach, gallbladder, small and large intestines, omentum, mesentery, retroperitoneum, kidney, adrenals, lymph nodes and, soft tissues. Parietal swellings arising from the skin and the abdominal wall, the uterus, the cervix, the prostate and the bone were excluded from the study. Before posting the patients for the procedure, the absolute indications and contraindications for FNAC of the abdominal masses were kept in mind, the absolute indications being right hypochondrial masses without definite clinical diagnoses, suspected focal hepatic lesions and specific liver conditions like primary and secondary liver malignancies, hepatic abscesses and deep seated hepatic vascular and cystic tumours. The contraindications which were considered were patients with haemorrhagic tendencies and prolonged PT, suspected extra-hepatic obstructive jaundice, hepatic surface hemangioma and echinococcosis and unco-operative patients. After a thorough clinical examination, consent was obtained from the patients after explaining the procedure to them.

The aspirations were done by the radiologist in conjunction with a pathologist. The patients underwent an ultrasonographic evaluation to assess the origin of the mass and its relationship with the adjacent organs. A percutaneous FNAC of the mass was done under USG guidance, taking complete absolute aseptic precautionsand was done by the shortest route to the site, in suggestion with the sonologist. A 10 ml disposable plastic syringe and a 23 gauge needle were used. For deep-seated lesions, a 20-22 gauge spinal needle of 9cm length was taken in use. Each aspirate was smeared on a slide. The air dried and 95% alcohol fixed smears were prepared for Giemsa, Papanicolaou and Leishman stains, respectively. Special stains were used wherever required. FNAfindings were correlated with the clinical and radiological information. The smears were classified as benign, inflammatory, malignant, and inconclusive. Diseases like tuberculosis, reactive pathology and abscess were included in the inflammatory category.

Inclusion Criteria 1: Intra-abdominal organs included liver, spleen, pancreas, stomach, gallbladder, small and large intestines, omentum, mesentery, retroperitoneum, kidney, adrenals, lymph nodes and, soft tissues.

2-Right hypochondrial masses without definite clinical diagnoses, suspected focal hepatic lesions and specific liver conditions like primary and secondary liver malignancies, hepatic abscesses and deep seated hepatic vascular and cystic tumours.

Exclusion Criteria: Parietal swellings arising from the skin, abdominal wall, uterus, cervix, prostate and the bone.

2- Patients with haemorrhagic tendencies and prolonged PT, suspected extra-hepatic obstructive jaundice, hepatic surface hemangioma and echinococcosis and unco-operative patients.

3-Aspirates with inadequate material (e.g. scanty cellular material or presence of normal cellular material and hemorrhagic or those with atypical cells or where the possibility of malignancy could not be ruled out.

Results

A total of 164 cases were included in the present study. A detailed clinical information and laboratory, investigations were obtained. Altogether 164 patients were there between the age of 1yr to 93 yrs, with 84 males and 80 females having a M:F ratio 1.05:1. of the total cases where a definite cytological interpretation was possible, cyto-diagnosis revealed non-malignant lesions in 40 (24.39%) and 118 (71.95%) malignant lesions.

Right hypochondrium was the most frequent site of aspiration which comprised of133 cases (84.17%, followed by left hypochondrium (6.53%), umbilicus 8(5.06%), epigastrium 5(3.16%) and lumbar 2(1.26%) (Table 1). The various organs involved are depicted in Table 2. Table 3 reveals that out of 164 aspirates,158 aspirates were reported,out of which 118(71.95%) were categorized as Malignant, 37(22.56%) as Inflammatory, 3(1.89%) as Benign and 6(3.65%) 6 cases (%) were unsatisfactory since the aspirations were hemorrhagic or inadequate due to scanty cellularity and were excluded from the study.

A maximum number of benign lesions were found in 41-50 years of age groups with 14 cases (35%). While the maximum numbers of malignant lesions were found to be 39 cases (33.05%) in the age group of 51-60 years of age, followed by 22cases(18.64%) in the age group of 61-70 years.Inflammatory lesions were more common in males (29.7%) than females (15%), whereas malignancy was detected more in females (77.5%) than males (66.6%).

Table 4 reveals incidence of various types of inflammatory and benign lesions, Most of the lesions were inflammatory 18(45%), followed by reactive lymphadenitis 10 (25%)cases, Tuberculosis 6(15%) cases, Abscess 3(7.5%) cases, Benign lesions are Focal nodular hyperplasia 2 (5%)cases, and Hepatic Adenoma 1(2.5%) case.Out of 158 smears, 118 smears were found to be Malignant and most common malignancy was Adenocarcinoma Gall-Bladder 69(58.47%) followed by Hepatocellular carcinoma 39(33.05%).

Table 1: Region wise distribution of cases.

Region	No of cases	Percentage
Right Hypochondrium	133	84.17%
Left Hypochodrium	10	6.53%
Epigastrium	5	3.16%
Lumbar	2	1.26%
Umbilicus	8	5.06%
Total	**158**	**100**

Table 2: Organs Involved.

Organ	No of cases	Total%
Liver	87	55.06%
Gall bladder	51	32.27%
Abdominal Lymph Node	9	5.69%
Pancreas	7	4.43%
Renal	2	1.26%
Omentum	1	0.63%
Umbilical nodule	1	0.63%
Total	**158**	**100**

Table 3: Sex-Wise categorization of aspirate.

Lesion type	Male	Total%	Female	Total %
Inflammatory	25	29.7	12	15
Benign	0	0	3	3.7
Malignant	56	66.6	62	77.5
Unsatisfactory	3	3.5	3	3.7
Total	**84**	**100**	**80**	**100**

Table 4: Distribution of inflammatory and benign lesions.

Lesion Type	No of Cases	Total %
Inflammatory	18	45%
Tuberculosis	6	15%
Reactive lymphadenitis	10	25%
Abscess	3	7.5%
Focal Nodular Hyperplasia	2	5%
Hepatic Adenoma	1	2.5%
Total	**40**	**100**

Table 5: Distribution of malignant lesions.

Type of Lesion	No of cases	%
Adenocarcinoma(Gall bladder)	69	58.47%
Hepatocellular carcinoma	39	33.05%
Metastasis	6	5.08%
Lymphoma	2	1.69%
Renal cell carcinoma	2	1.69%
Total	**118**	**100**

Table 6: Comparison of nature of lesions with other studies.

Type of lesion	Inflammatory	Malignant	Unsatisfactory
Shamshad *et al* 2004	30.5%	57.5%	6.5%
Aftab A Khan *et al* 1995	6%	57.5%	6.5%
Sidhalingreddy *et al* 2011	10.2%	60.3%	6.5%
Present study 2018	**22.56%**	**71.93%**	**3.65%**

Table 7: Comparing most common malignant cell type with other studies.

Ref no.	Study	Adenocarcinoma (No of cases)	Total (%)	Hepatocellular Carcinoma (No of cases)	Total (%)
1	Shamshad *et al* (2006)	12	60	8	40
2	Sidhalingreddy *et al*(2011)	39	26.3	34	23
3	AS Tuladhar *et al* (2012)	5	45.5	3	27.2
4	Kothari *et al*(2016)	37	64.91	10	14.93
5	Present study (2018)	69	58.47	34	33.05

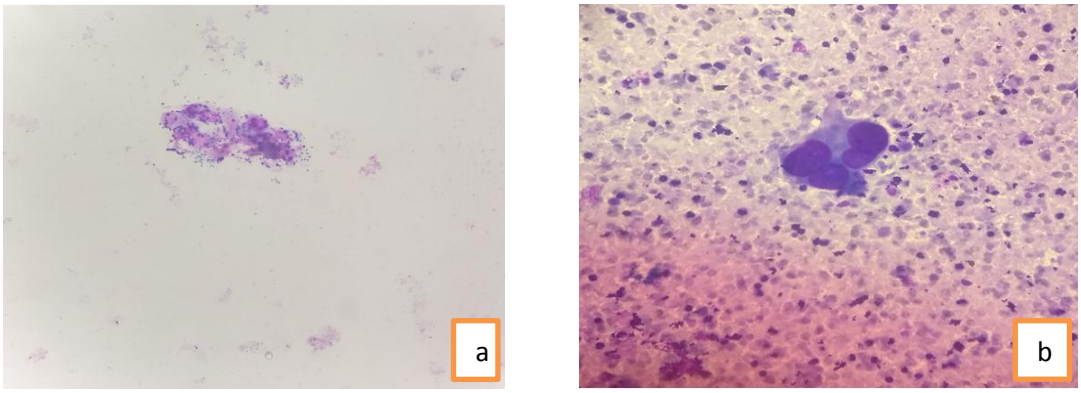

Fig. 1: a: FNAC smears of Metastatic Adenocarcinoma of Liver (Leishman stain, 10X), b: The neoplastic cells are pleomorphic having Fine granular chromatin and occasionally small or prominent nucleoli. Rare single benign hepatocytes are present in the background (Giemsa stain, 40X).

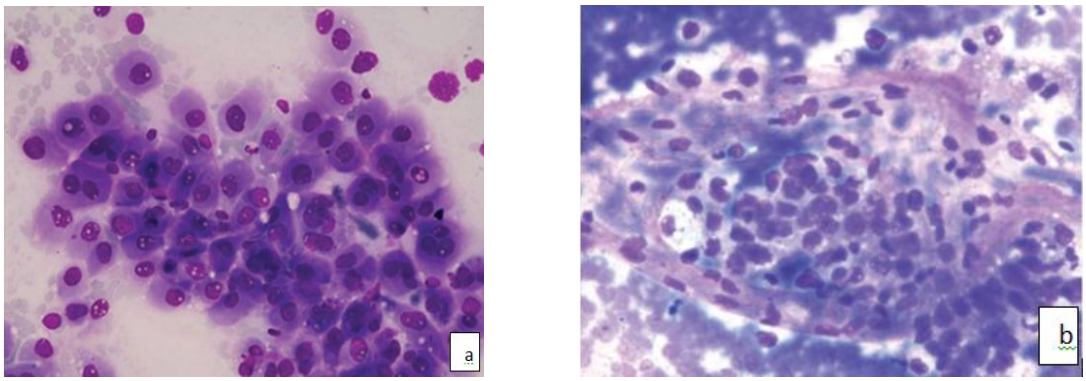

Fig. 2: Hepatocellular carcinoma showing sheets of pleomorphic hepatocytes peripherally traversed by endothelial cells (a,b-Giemsa, 40X).

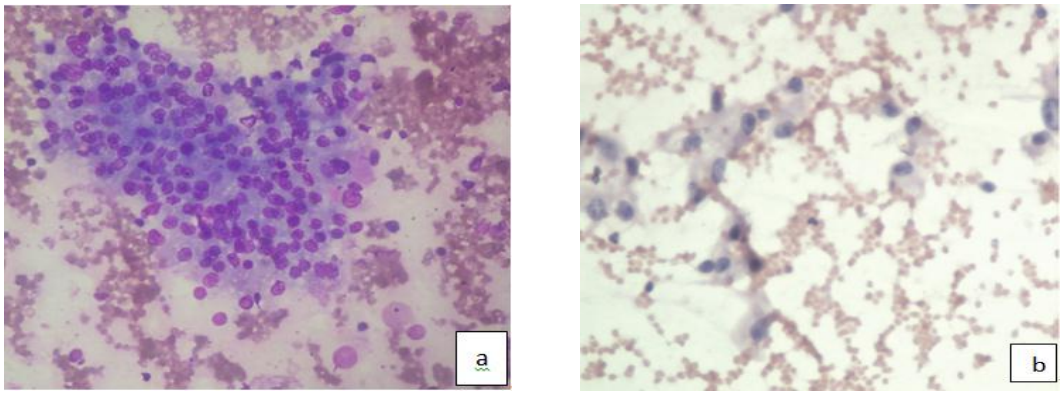

Fig. 3: Renal Cell Carcinoma displaying tumor cells with prominent nucleoli with clear to eosinophilic cytoplasm (a)Leishman stain,40x b)Pap, 40x).

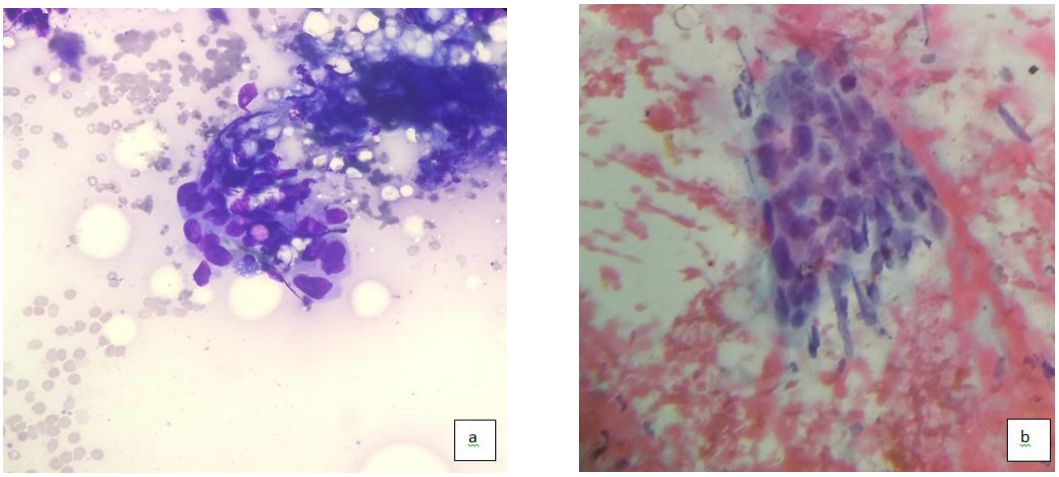

Fig. 4: Adenocarcinoma poorly differentiated. Pleomorphic cells with fragile cytoplasm. (a-Leishman, b- PAP,x40)

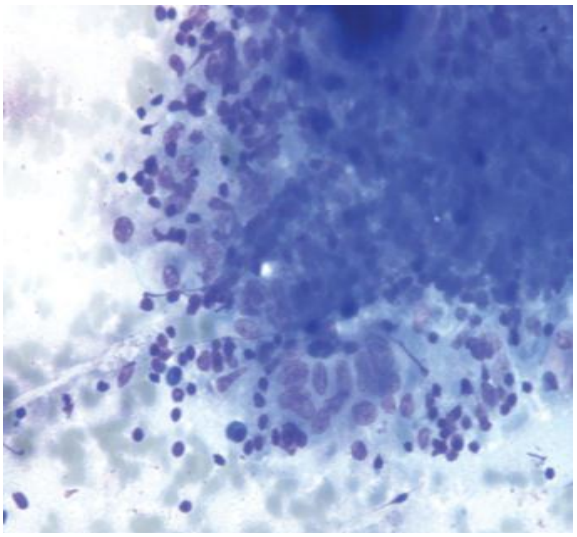

Fig. 5: Granulomatous lesion showing epithelioid cell granulomas and giant cells (Giemsa, 40x)

Discussion

Abdominal masses being a clinical enigma always pose a dilemma for the surgeons. A differentiation between non-malignant and malignant lesions is vital, especially in advanced unresectable malignant cases in order to avoid an exploratory laparotomy. FNA is considered to be more accurate than needle core biopsy. The role of USG guidance for placement of needle allows aspiration of representative material for precise cytological diagnosis.

The initial target of FNAC were palpable masses, particularly enlarged lymph nodes and breast lump, but now FNAC of intra-abdominal masses has become increasingly common.[9-11] Any intra-abdominal or retroperitoneal mass can be aspirated with a USG guided FNAC. However Khanna et al[54] performed FNAC without guidance in case of palpable masses.[11]

The present study included 164cases from various abdominal organs. Out of 164 cases, 158 were adequate to reach upto cytological diagnosis. Overall success rate of the study is 96.34% which is comparable to success rate of other studies Tsuiet al[12] 96%, Talukdhar et al[13] 93.5%, Khanna et al[11] 94.90%,Shamshad et al[14] 95.70% and Sidhalingreddy et al[15] 96.50%. These are due to the careful and proper selection of the cases for direct aspiration and as most of the lesions are superficial and easily palpable.

In our study, out of 164 cases, 84 cases are males and 80 are females with Male to Female ratio of 1.05:1 which is comparable with RC Adhikari[16], Sidhalingreddy,[15] Kothari[17] and, Suva.[18] Malignant and benign lesions both are more common in males. The age range of the patients and male predominance are comparable with Franca et al[19], Nasit VJ et al,[20] and Tailor et al.[17]

Benign lesions were seen more commonly in patients below 40 years of age, while malignant lesions were more common in patients above 40 years of age. The incidence of malignancy increased after the age of 40 years in males and after the age of 30 years in females with a peak incidence between the ages of 40-60 years, which is comparable to the results which are obtained by Zawar MP et al[21] and Shamshad et a1.[14] In our study the most common nature of lesion wasmalignant. Other studies like Shamshadetal.[14]

Aftab A Khan.[1] Sidhalingreddy et al[15] proved that malignancywas the most common nature of lesions.

Abdominal tuberculosis continues to be a diagnostic challenge for the clinicians, surgeons. In patients with abdominal tuberculosis whose presentations are always insidious, an abdominal mass is cited the most common finding in this group. It is in this group of patients that fine needle aspiration can be performed as an ambulatory procedure, to obtain a tissue diagnosis, thereby preventing the patient from undergoing surgery. In the present study, 6 cases of abdominal tuberculosis, with AFB (Acid Fast Bacilli) positivity, were diagnosed on cytology alone. There were 10 cases (25%) of reactive lymphadenitis. This was in accordance with the study done by Shamshad et al.[14] In the present study the most common type of lesion observed was Malignancy. Previous studies by Stewart et al,[8] Shamshad et al[14]; Sidhalingreddy et al[15] proved that malignant lesion was the most common nature of lesions.

Liver was the most common site for FNAC in this study as shown in Table 2 which is comparable to the studies done by Sheikh et al[9] and Adhikari RC et al.[16] This is also the most common site of aspiration performed in the abdomen in a study done by J Nobrega et al[22], Aftab A. Khan et al,[1] Stewart et al,[8] Zawar MP et al[21] Nyman et al[23], Joao Nobrega et al[22] and Nautiyal et al[2]. In the present study the second most common site of aspiration was Gall Bladder which is in accordance with the study by Reyaz TA et al.[24] In an observation which was made by Shamshad et a1,[14] Adhikari et al,[16] Sidhalingreddy et al.[15] Suva et al[18] the second most common organ sites for the malignant lesions was gall bladder.

In this study Adenocarcinoma was the most common malignant cell type followed by Hepatocellular carcinoma, which is in accordance with the previous studies by Zawer et al.[21] Hepatocellular carcinoma and adenocarcinoma have a peak incidence in the age group between 40-60 years, which is seen in our study in accordance with the observations made by Shamshad et al,[14] and Zawar MP et al,[21] Kothari et al.[17]

In our study, Right Hypochondrium was the most common site which is comparable with other studies like Nobregn and Santos,[22] Stewart et al,[8] Sidhalingreddy et al,[15] Sheikh et al,[9] Zawar M.P. et al,[21] Suva et al.[18]

The chief complaints by the patients were mainly abdominal pain in right upper quadrant, loss of appetite, weight loss and abdominal mass, which is also similar to that found in the studies done by Ali et al.[25] and Rasania et al.[26] Out of 164 cases, In 3.6% cases it was inconclusive which is comparable with Lowest inadequacy rate of 1% reported by Guo et al[64] using 22 gauge chiba needle.

The acellular smears could be attributed to many factors and depends on the location, size, accessibility, vascularity, necrotic component, consistency, nature and histologic tumor type of the lesion. Consideration of these factors in selection of the case for FNAC, or selection of lesion among many lesions, or the site within the same lesion would significantly minimize the number of inconclusive and acellular/ blood only smear FNAC reports.In certain cases repeat procedure may yield conclusive reports.

Although few studies have reported complications like mild local pain, bleeding and tumor seeding of the needle tract, a vast amount of literature supports the safety of FNAC. Therefore an attempt was made by us to minimize interpretative error by developing good understanding with the radiologists and clinicians. Presence of pathologist during the procedure is an added advantage for both in terms of sharing history, image findings and differential diagnoses. In this present study no major discomfort was observed following FNAC procedure, except for minimal discomfort at the time of needle puncture.

Conclusion

In our study 74.6% of neoplastic lesions of the intra-abdominal were diagnosed by this simple outpatient procedure with the lowest cost to the patient. We found that incidence of malignant hepatic lesions was more than benign.

US guided FNAC is simple, inexpensive, less time consuming, safe, useful and highly accurate in making diagnosis with minimal complications even in deep seated abdominal lesions. This also offers advantage of rapid diagnosis with minimum surgical intervention. The accuracy of diagnosis can be improved and problems faced during classification of tumors can be minimized by the use of Immunohistochemical techniques, Tumor markers and Electron Microscopic examination of slides through FNAC.

The main advantage of FNAC is the possibility of multiple passes, which increases the chances of obtaining adequate viable cells. The contraindications of FNAC are hemorrhagic diathesis, prolonged prothrombin time, vascular structure in the path and suspected extrahepatic obstructive jaundice.

The techniques of image guided FNA not only permit precise anatomical imaging and targeting of lesions but also allow planning of a safe access route with constant visualization of needle tip during procedure, thereby reducing the risk of complications.

FNAC is a highly sensitive, highly specific, accurate and cost effective diagnostic procedure with a minimal complication rate.

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