International Journal of Clinical and Diagnostic Pathology

ISSN (P): 2617-7226
ISSN (E): 2617-7234
www.patholjournal.com
2019; 2(1): 247-253
Received: 17-03-2019
Accepted: 19-04-2019

B Ranjitha
Postgraduate, Department of Pathology, ESIC Medical College & Postgraduate Institute of Medical Sciences and Research, Karnataka, India

J Hemalatha
Assistant Professor, Dept of Pathology, Adichunchanagiri Institute of Medical sciences, B G Nagara, Karnataka, India

V Srinivasa Murthy
Professor and Head, Department of Pathology, ESIC Medical College & Postgraduate Institute of Medical Sciences and Research, Rajajinagar, Bangalore, Karnataka, India

Correspondence
J Hemalatha
Assistant Professor, Dept of Pathology, Adichunchanagiri Institute of Medical sciences, B G Nagara, Karnataka, India

Role of radiological-guided FNAC in intra-abdominal lesions

B Ranjitha, J Hemalatha and V Srinivasa Murthy

DOI: https://doi.org/10.33545/pathol.2019.v2.i1d.36

Abstract
Introduction: Diagnosis of intra-abdominal lesions is mysterious many a times, especially deep-seated lesions. Confirmed diagnosis is essential for proper management. FNAC with radiological assistance helps to approach the lesion and obtain diagnostic material.
Aims and Objective:
1. To study the utility of radiological-guided FNAC in intra-abdominal lesions.
2. To distribute the lesions according to anatomical site and categorization of these lesions as non-neoplastic/inflammatory, benign and malignant based on cytomorphological features.
Material and Methods: A total of 82 intra-abdominal and pelvic lesions detected clinically or radiologically from January 2015 to December 2017 were included in the study. CT or USG guided FNAC was performed. H&E and Leishman stained slides were retrieved from archives of pathology department. Histopathological follow up was done, wherever available.
Results: The mean age was 52.5years, with male to female ratio being 2.03:1. The diagnostic yield in CT-guided FNAC was 96.8% and USG guided FNAC was 94.2%. Out of 82 cases, 4 were unsatisfactory, 12 were non-neoplastic, 8 were benign, and 57 were malignant lesions. Liver was the most common organ followed by retroperitoneum and kidney. Hepatocellular carcinoma was the most common malignant lesion.
Conclusion: Radiological-guided FNAC is simple, relatively quick and safe method in diagnosing intra-abdominal lesions and can be used as a preliminary procedure in management of intra-abdominal lesions.

Keywords: Guided FNAC, liver, intra-abdominal lesions

Introduction

The diagnosis of abdomino-pelvic masses is often difficult and mysterious many a times, especially non-palpable deep-seated lesions [1]. With the introduction of modern imaging techniques, like computed tomography (CT) and Ultrasonography (USG) the detection and location of these lesions is possible, besides providing opportunities for fine needle aspiration cytology (FNAC) of these deep-seated lesions [2]. Before institution of therapy and for prognosis, a documentary evidence of the nature of the pathology is important [3]. As FNAC offers a rapid diagnosis, appropriate medical and surgical therapy can be instituted at the earliest avoiding unnecessary invasive and expensive diagnostic procedures and needless surgery [4].

Majority of the abdomino- pelvic masses present as non-palpable lesions, the idea about their size, shape and extent of lesion is not possible without the help of imaging modalities like CT and USG, which are used as a guide for FNAC [5]. These lesions can be benign, malignant or inflammatory. However, imaging techniques do not always distinguish between benign and malignant lesions [6]. Differentiation between non-malignant and malignant lesions is vital, especially in advanced unresectable malignant cases to avoid an exploratory laparotomy [5].

FNAC is a highly sensitive, specific, accurate and cost-effective diagnostic procedure with negligible complication rate and has shown to be 100% specific for the diagnosis of malignancy [5]. FNAC provides benefit to the patient as well as the entire health system by reducing or eliminating surgical morbidity and mortality as well as hospitalization of the patient [4]. Thus radiological guided FNAC is a simple, safe and efficient procedure, which helps to approach the lesion, obtain diagnostic material and to reach the doorstep of accurate diagnosis.

Aims and Objectives

1. To study the utility of radiological-guided FNAC in the diagnosis of intra- abdominal lesions.
2. To distribute the lesions according to anatomical site and categorization of these lesions as non-neoplastic/inflammatory, benign and malignant based on cytomorphological features.

Material and Methods

The present cross sectional study was conducted in the Ddepartment of Pathology, ESIC Medical College and PGIMSR, Rajajinagar, Bangalore. Both retrospective and prospective cases were selected for the study. A total of 82 intra-abdominal lesions detected clinically or radiologically were studied for a period of 3 years from January 2015 to December 2017. For retrospective cases, clinical and radiological data were retrieved from archived files of department of Pathology. In prospective cases detailed clinical findings including history, physical examination and reports of relevant investigations, were recorded.

Intra- abdominal and pelvic organs including the liver, spleen, pancreas, stomach, gall bladder, small and large intestine, omentum, mesentry, the retroperitoneum, kidney, adrenals, lymph nodes, soft tissues and ovary were included in the study. The coagulation profile was routinely done in all the patients with intra-abdominal masses. Only those patients with normal coagulation profiles were selected for the study. CT or USG guided FNAC was performed after taking consent from the patient. For superficial masses, 20–22 gauge needle attached to 10 ml syringe and for deep-seated lesions, 20–22 gauge spinal needle was used. The aspirate smears were air dried and fixed with 95% alcohol for leishman, papanicolaou and H & E stains respectively. These smears were categorized into inflammatory/ non-neoplastic, benign and malignant lesions based on cytological features. Cyto-Histopathological correlation was done wherever available, to know the diagnostic accuracy of radiological guided FNAC.

Results

In our study there were 82 cases of intra- abdominal and pelvic lesions. Among them 50 cases were USG guided FNAC and 32 cases were from CT guided FNAC. The diagnostic yield of USG guided FNAC was 94% (3 cases were unsatisfactory) and that of CT guided FNAC was 96.8% (1 case was unsatisfactory). Overall diagnostic yield of radiological guided FNAC was 95.12%. In relation to sex distribution, 55 cases (67%) were males and 27 cases (32.9 %) were females. Male to female ratio was 2.03:1. The youngest patient was 7 years old and the oldest was 86 years old. 63 cases (76.8%) were above 50 years of age and 19 cases (23.7%) were below 50 years of age. Maximum number of cases was seen in 51-60 years of age.

Out of 82 cases, majority of cases were from liver comprising of 44 cases (53.6%) followed by retroperitoneum 9 cases (10.9%), kidney 8 cases (9.7%), spleen 5 cases (6%), pancreas 4 cases (4.9%), omentum 4 cases (4.9%), pelvic region 3 cases (3.6%), 2 each cases (2.4%) from stomach and adrenal gland and 1 case (1.2%) from peritoneum (Table 1).

Table 1: Organ wise distribution of cases

Organ	Number of cases
Liver	44 (53.6%)
Retroperitoneum	9 (10.9%)
Kidney	8 (9.7%)
Spleen	5 (6%)
Pancreas	4 (4.8%)
Omentum	4 (4.8%)
Pelvic organ	3 (3.6%)
Stomach	2 (2.4%)
Adrenal gland	2 (2.4%)
Peritoneum	1 (1.2%)

Among 82 cases, majority were categorized as malignant lesions comprising of 57 cases (69.5%), followed by 15 cases (18.29%) of inflammatory/ non-neoplastic lesions, 6 cases (7.3%) of benign and 4 cases (4.8%) of unsatisfactory smears as they were either acellular or contained only blood elements (Table 2).

Table 2: Distribution of cases according to various categories

Categories	Total No of cases (82)
Unsatisfactory	04 (4.8%)
Inflammatory/ non-neoplastic	15 (18.29%)
Benign	06 (7.3%)
Malignant	57 (69.5%)

Out of 57 cases (69.5%) of malignant lesions, majority were from liver, which included 35 cases (61.4%) comprising of 17 cases of Hepatocellular carcinoma (HCC) (Fig 1), 16 cases of metastatic adenocarcinoma deposits (Fig 2) and 2 cases of intrahepatic cholangiocarcinoma. The next most common site was retroperitoneal region comprising of 3 cases of Non-Hodgkins Lymphoma (Fig 8), 2 cases of metastatic adenocarcinoma deposits (Fig 4b), 1 case of metastatic germ cell tumour (Fig 6) and 1 case of malignant fibrous histiocytoma followed by kidney comprising of 6 cases of Renal cell carcinoma (Fig 3) and pancreas comprising of 4 cases of adenocarcinoma.

Out of 15 cases of inflammatory/non neoplastic lesions, majority of lesions were from liver comprising of 2 cases of cirrhosis, 3 cases of acute suppurative lesion and 1 case of granulomatous lesion. The next common site was spleen, which had 4 cases, consisting of 1 each case of Gauchers disease (Fig 5), extramedullary haematopoiesis, leishmaniasis and reactive hyperplasia.

Among 6 cases of benign lesions, 2 cases were from liver comprising of 1 each case of focal nodular hyperplasia and hepatic adenoma followed by 2 cases from ovary consisting of 2 cases of benign serous cystadenoma, 1 case of benign spindle cell tumor (GIST) (Fig 7a) from stomach and 1 case of angiomyolipoma of kidney. 4 cases were unsatisfactory as the smears were either acellular or contained only blood elements. Among them 2 cases were from omentum and 1 each case from spleen and liver (Table 3).

Table 3: Organ wise distribution of cases into various categories

Organ (No. of cases)	Unsatis factory	Inflammatory / Non-Neoplastic (No. of cases)	Benign (No. of cases)	Malignant (No. of cases)
Liver (44)	1	Cirrhosis (2) Acute suppurative lesion (3) Granulomatous lesion (1)	Focal Nodular Hyperplasia (1) Hepatic Adenoma (1)	Hepatocellular carcinoma (17) Intra-hepatic cholangiocarcinoma (2) Metastatic adenocarcinoma deposits (16)
Kidney (8)	-	Renal Abscess (1)	Benign lesion possibly angiomyolipoma (1)	Renal Cell Carcinoma (5) RCC- Papillary variant (1)
Pancreas (4)	-	-	-	Adenocarcinoma Pancreas (4)
Spleen (5)	1	Gauchers Disease (1) Extramedullary haematopoiesis (1) Leishmaniasis (1) Reactive hyperplasia (1)	-	-
Omentum (4)	2	Abdominal Tuberculosis (1)	-	Positive for malignancy –possibly metastatic epithelial malignancy (1)
Retro-peritoneal Lymph node (4)	-	-	-	Non Hodgkins Lymphoma (3) Metastatic adenocarcinoma deposit (1)
Retroperitoneal Mass (05)	-	Acute Suppurative lesion (2)	-	Positive for malignancy-possibly metastatic deposit (1) Metastatic deposits of Germ cell tumor-Seminoma (?) (1) Malignant Fibrous Histiocytoma (1)
Stomach (2)	-	-	Benign Spindle Cell tumor (GIST) (1)	Adenocarcinoma Stomach (1)
Adrenal (2)	-	Inflammatory lesion	-	Suspicious of malignancy- possibly metastatic deposit (1)
Peritoneum (1)	-	-	-	Malignancy-possibly metastatic deposit
Pelvic Organ - Ovary (2) Uterus (1)	-	-	Benign serou cystadenoma (2)	Malignant Spindle cell lesion (1)

Our study had 82 intra- abdominal and pelvic lesions. Among them histopathological correlation was available in 28 cases. Out of 57 cases of malignant lesions, histopathological correlation was available in 21 cases. Among them 10 cases of hepatocellular carcinoma, 4 cases of metastatic adenocarcinoma deposits of liver, 5 cases of renal cell carcinoma, 1 case of Non – Hodgkins Lymphoma and 1 case of metastatic deposit of peritoneum which were diagnosed cytologically were confirmed on histopathology.

Among 6 cases of benign lesions, histopathological correlation was available in 4 cases. 1 each case of benign spindle cell lesion (GIST), benign lesion possibly angiomyolipoma and hepatic adenoma which were diagnosed cytologically were confirmed on histopathology except 1 case of benign serous cystadenoma which was diagnosed as serous cystadenocarcinoma. Out of 15 cases of inflammatory/non neoplastic lesions, in only one case histopathological correlation was available, where 1 case of cirrhosis of liver was diagnosed on histopathology as Hepatocellular carcinoma. Among 4 cases of unsatisfactory smears, one lesion from omentum was diagnosed as Metastatic adenocarcinoma deposit and lesion from liver as hepatocellular carcinoma (Table 4).

The present study revealed a sensitivity of 84%, specificity of 100%, positive predictive value of 100% and diagnostic accuracy of 85.7% in 28 out of 82 cases where cyto-histopathological correlation was available.

Table 4: Cytohistopathological correlation of cases

FNAC Diagnosis (No. of cases: 28 cases)	Histopathology Diagnosis (No. of cases)
Malignant lesions	
Hepatocellular carcinoma (10)	Hepatocellular carcinoma (10)
Metastatic adenocarcinoma deposit liver (4)	Metastatic adenocarcinoma deposit liver (4)
Renal cell carcinoma (5)	Renal cell carcinoma (5)
Metastatic Deposit- peritoneum (1)	Metastatic deposit of ovarian malignancy
Non-Hodgkins lymphoma - retroperitoneum (1)	Non-Hodgkins lymphoma – retroperitoneum (1)
Benign lesions	
Hepatic Adenoma (1)	Hepatic Adenoma (1)
Benign serous cystadenoma (1)	Serous cystadenocarcinoma (1)
Benign Spindle cell lesion (GIST) (1)	GIST
Benign Lesion possibly Angiomyolipoma - kidney (1)	Angiomyolipoma
Inflammatory/Neoplastic	
Cirrhosis Liver (1)	HCC liver
Unsatisfactory Smears	
Omental mass	Metastatic adenocarcinoma deposit
US- Liver	HCC Liver

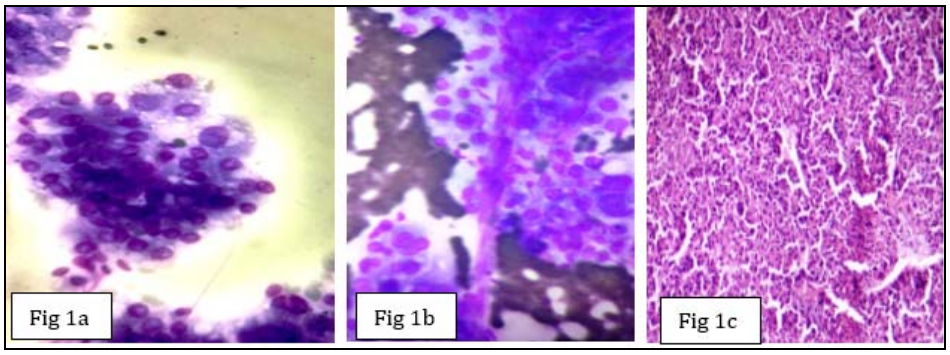

Fig 1a, 1b, 1c: FNAC of Hepatocellular carcinoma showing sheets of neoplastic cells having high N:C ratio and granular vacuolated cytoplasm (40X Leishman stain). Corresponding histopathological picture showing tumor cells arranged in solid sheets and trabecular pattern (10X H&E stain)

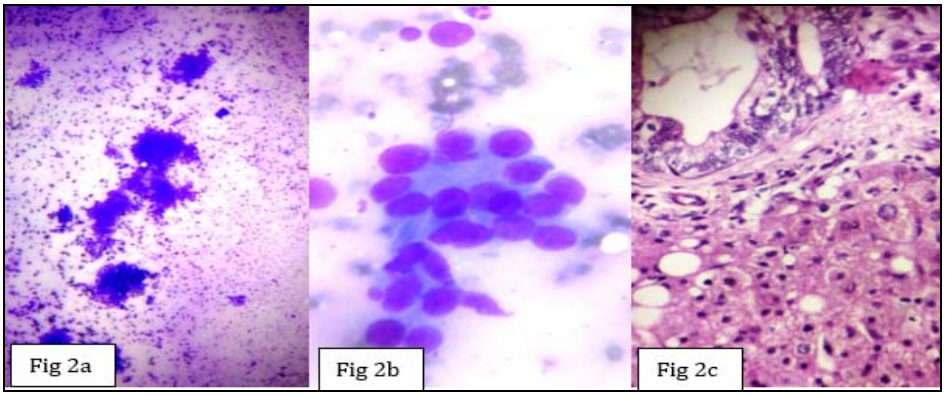

Fig 2a, 2b, 2c: FNAC of Metastatic adenocarcinoma deposits in liver showing tumor cells arranged in sheets and acinar pattern (10X & 40X Leishman stain). Corresponding histopathological picture showing neoplastic glands in liver (40X H&E).

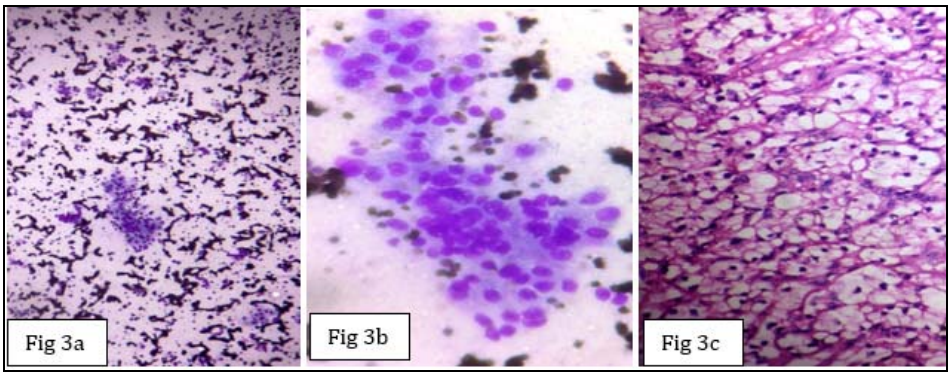

Fig 3a, 3b, 3c: FNAC of Renal Cell Carcinoma showing poorly cohesive tumor cells, abundant fragile cytoplasm, moderate nuclear enlargement and anisokaryosis (10X & 40X Leishman stain). Corresponding histopathological picture showing solid nests of tumor cells having round to polygonal cells with clear or granular cytoplasm (40X H&E).

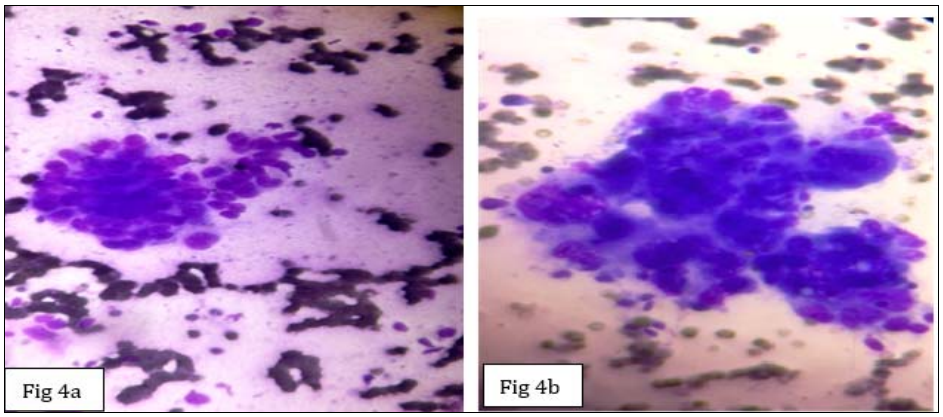

Fig 4: 4a & 4b: FNAC of Metastatic adenocarcinoma deposits in lymph node and retroperitoneum respectively presenting microglandular pattern of atypical epithelial cells having nuclear atypia, irregularity and moderate amount of cytoplasm (40X Leishman stain)

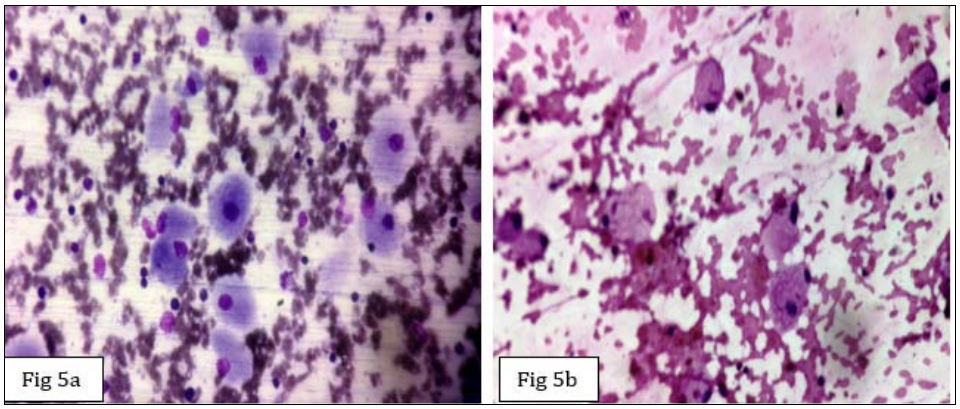

Fig 5a, 5b: Gauchers Disease- Splenic FNAC showing large histiocytes with abundant granular or fibrillary, blue gray cytoplasm with "crumpled tissue paper" appearance (40X Leishman stain).

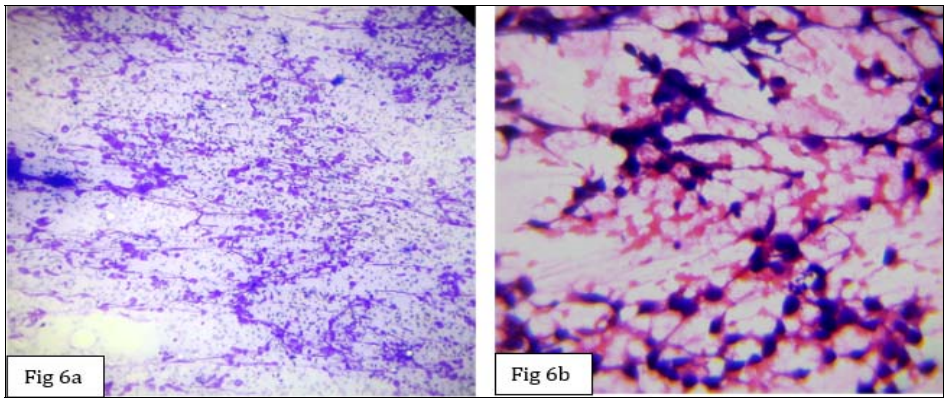

Fig 6a, 6b: FNAC of metastatic germ cell tumour (seminoma) deposit in retroperitoneum showing dispersed atypical cells having highly fragile cytoplasm and nuclei with many scattered lymphocytes (6a: 10X Leishman stain & 6b: 40X H&E Stain)

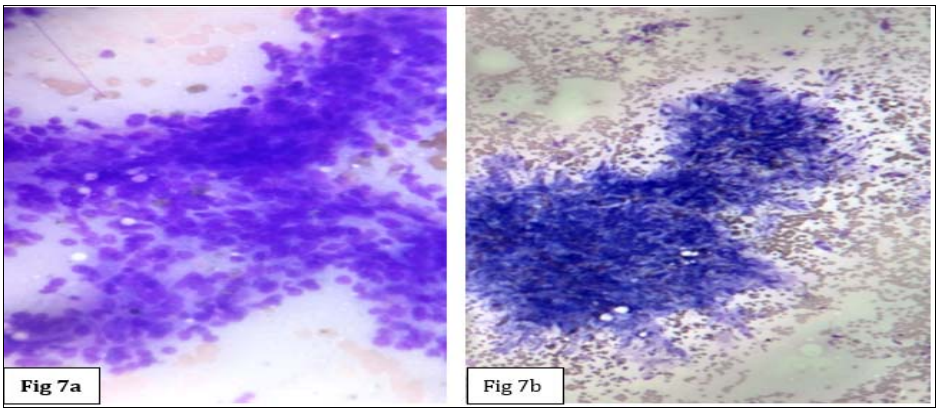

Fig 7a: Benign spindle cell lesion (GIST) showing fascicles of spindle cells arranged in sheets (40X Leishman stain). **7b:** Malignant spindle cell lesion showing fascicles of atypical spindle cells with elongated cigar shaped nuclei arranged in sheets (40X Leishman stain)

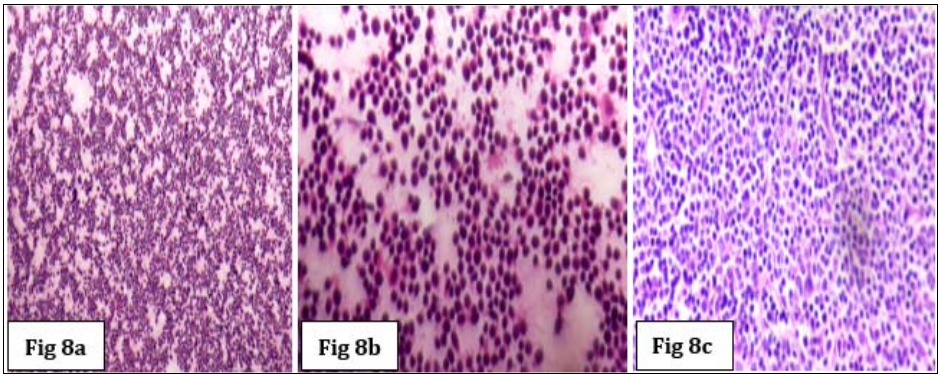

Fig 8: 8a & 8b: FNAC of Non- Hodgkins Lymphoma showing monomorphic population of atypical lymphocytes arranged in diffuse sheets (10X & 40X H&E). Fig **8c:** Corresponding histopathological picture showing similar features.

Discussion

Our study had 82 cases of intra- abdominal and pelvic lesions. Out of these 50 cases were USG guided and 32 cases were CT guided FNAC. Overall diagnostic accuracy was 95.12%. Our study was comparable with a study conducted by Dosi S *et al.* [7] where the authors found a diagnostic accuracy of 92.7 % in image-guided aspirates.

The age range of the patients in our study was 7 to 86 years with maximum number of cases in age group of 51-60 years. Our study was concordant with a study done by Dosi S *et al.* [7] who also found majority of cases in the age group of 51-60 years. In a study conducted by Ahmad Reyaz T *et al.* [5] the authors found an age range of 4 to 80 years, which is comparable with our study.

Out of 82 cases, 55 patients (67%) were males and 27 patients (32.9%) were females. Male to female ratio was 2.03:1. Male patients predominated over female patients in our study. A similar male preponderance was seen in other studies done by Islam T *et al.* [8] and Mishra BJ *et al.* [9].

Majority of the cases in our study were from liver, which was also seen in other studies conducted by Stewart CJR *et al.* [10] and Sidhalingreddy *et al.* [11]. In our study there were 57 cases (69.5%) of malignant lesions, which constituted the most common category, which is comparable with other studies conducted by Islam T *et al.* [8], Mishra BJ *et al.* [9], Stewart CJR *et al.* [10] and Sidhalingreddy *et al.* [11]. Hepatocellular Carcinoma (HCC) was the most common malignancy in our study followed by metastatic adenocarcinoma deposits in liver. Our study was comparable to other studies conducted by Sidhalingreddy *et al.* [11] and Bolde SA *et al.* [12] who reported a similar incidence of hepatocellular carcinoma in their studies. However majority of the hepatic malignancies studied by Stewart CJR *et al.* [10] were metastatic carcinomas in contrast to our study, which showed predominance of HCC.

The other categories in our study were 15 cases (18.2%) of inflammatory/non-neoplastic lesions, 6 cases (7.3%) of benign lesions and 4 cases (4.8%) of unsatisfactory smears. Studies conducted by various authors have shown different incidence of these lesions (Table 5).

Table 5: Categories of final cytologic diagnosis- comparative analysis by various authors

Categories	Sidhalingreddy *et al.* [11]	Stewart CJR *et al.* [10]	Hemalatha AL *et al.* [2]	Present Study
Unsatisfactory	6.5%	13.5%	0%	4.8%
Non-neoplastic/ Inflammatory	10.2%	7.8%	20%	18.2%
Benign	22.4%	0%	15.5%	7.3%
Malignant	60.3%	78.2%	64.5%	69.5%
Suspicious	0.6%	0%	0%	0%
Total no. of cases	245	141	90	82

Cyto-Histological correlation was available in 28 cases out of 82 intra- abdominal and pelvic lesions. Our study revealed a sensitivity of 84%, specificity of 100%, positive predictive value of 100% and diagnostic accuracy of 85.7%. Our study was comparable with a study conducted by Nobrega J *et al.* [14] who showed a sensitivity of 87 %, specificity of 100 % and diagnostic accuracy of 100 %, Sidhalingreddy *et al.* [11] who showed a sensitivity of 94.1%, specificity of 100 %, positive predictive value of 100% and diagnostic accuracy of 96.5% and Ahmad SS *et al.* [15] who showed a sensitivity of 94.1 %, specificity of 100 % and diagnostic accuracy of 95.7 %.

Conclusion

Radiological-guided FNAC is simple, cost effective, accurate, relatively quick and safe method in diagnosing intra-abdominal and pelvic lesions. Appropriate medical and surgical therapy can be instituted at the earliest avoiding unnecessary invasive and expensive diagnostic procedures and needless surgery. It can be used as a preliminary procedure in the management of deep seated palpable as well as non-palpable lesions and offers minimal/ no risks and complications from the procedure and also helps in choosing the appropriate management.

References

1. Aftab Khan A, Jan GM, Wani NA. Fine Needle Aspiration of Intraabdominal masses for cytodiagnosis. J. Indian Med Assoc. 1996; 94(5):167-69.
2. Hemalatha AL, Sumana SV, Sushma S, Suma JK, Varna I, Anubha A. Ultrasound Guided FNAC of Abdominal- Pelvic Masses-The Pathologist' Perspective. Journal of Clinical and Diagnostic Research. 2013; 7(2):273-77.
3. Nautiyal S, Mishra RK, Sharma SP. Routine and Ultrasound Guided FNAC of Intra-Abdominal Lumps-A Comparative Study. J Cytol. 2004; 21(3):129-32.
4. Ghodasara V, Goswami H, Desai H, Patel S. Ultrasound guided Fine Needle Aspiration Cytology (FNAC) Study of Intra-Abdominal Mass Lesions. BJKines-NJBAS 2015; 7(2): 32-37.
5. Ahmad Reyaz T, Summyia F, Isma N, Nazia B, Adil S *et al.* International Journal of Medical Research & Health Sciences. 2016; 5(4):169-175.
6. Dr. Zawar MP, Dr. Bolde S, Dr. Shete SS. Correlative study of fine needle aspiration cytology and histology in intra-abdominal lumps. SMJ, 2007, 4.
7. Dosi S, Gupta G, Raj Jain M. Role of radiological-assisted cytology in intra-abdominal lesions: A 3 years' experience in a tertiary care center. International Journal of Applied and Basic Medical Research. 2016; 6(2):101-105.
8. Islam T, Hossain F, Rumpa AP, Sikder NH, Bhuiyan MA, Karim E *et al.* Ultrasound guided fine needle aspiration cytology: a sensitive diagnostic tool for diagnosis of intra-abdominal lesions. Bangladesh Med Res Counc Bull. 2013; 39:14-17.
9. Mishra BJ, Mohapatra CKR, Bishi PR. Evaluation of abdominal mass with special reference to FNAC and Ultrasonography :a prospective study. Asian J Pharm Hea Sci. 2014; 4(3):1083-87.
10. Stewart CJR, Coldewey J, Stewart IS. Comparison of fine needle aspiration cytology and needle core biopsy in the diagnosis of radiologically detected abdominal lesions. J Clin Pathol. 2002; 55:93-97.
11. Sidhalingreddy, Andola SK. Fine Needle Aspiration

cytology of intra-abdominal lesions. Journal of Clinical and Diagnostic Research. 2011; 5(3):551-58.
12. Bolde SA, Pudale SS, Shette SS, Raut A, Kole N. Correlative study of fine needle aspiration cytology and histopathology in intraabdominal lumps. International Journal of Recent Trends in Science and Technology. 2014; 13(1):01-04.
13. Likhar KS, Sakhuja S, Sawke N, Likhar SK, Puja *et al*... Role of FNAC in diagnosis of intra-abdominal lump and its histological correlation. Biomedical & Pharmacology Journal. 2009; 2(2):455-458.
14. Nobrega J, Dos Santos G. Aspirative cytology with fine needle in the abdomen, retroperitoneum and pelvic cavity: a seven-year experience of the Portuguese Institute of Oncology, Center of Porto. Eur J Surg Oncol.1994; 20(1):37-42.
15. Ahmed SS, Akhtar K, Shakeel Akhtar S, Alia Nasir AA. Ultrasound guided fine needle aspiration biopsy of abdominal masses. JK Science. 2006; 8(4):200-204.