

Original Research Article**Study of Ultrasound Guided Fine Needle Aspiration Cytology of Abdominal and Pelvic Masses****Chandan Rajesh H.¹, Ganesh B.D.², Giriyan Sujata S.³**

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Abstract

Background and Aims: Fine Needle Aspiration (FNA) which is used for making a cytological diagnosis has become an indispensable component of the work-up of many abnormalities. Intra-abdominal masses always remain an enigma in surgical practice. A documentary evidence of nature of pathology before institution of therapy is mandatory. The objectives of this study were to adopt Ultrasonography (USG) guided fine needle aspiration in the diagnosis of abdomino-pelvic masses, to assess its efficacy and to study the cytological features of these masses.

Materials and Methods: Two hundred patients with clinically or sonologically diagnosed abdomino-pelvic masses were taken up for the study. FNAC was performed under real time USG guidance. Two to four smears were prepared for each case. Air-dried smears were stained with Wright's stain and wet fixed smears were stained with H&E and Pap.

Results: The intra-abdominal and pelvic masses were divided according to the organ involved. The commonest organ to be involved was liver with 120 (59.79%) cases followed by gastrointestinal masses with 21 (11.34%) cases and miscellaneous soft tissue and retroperitoneal masses with 21 (11.34%) cases. Ovary was involved in 12 (6.18%) cases. Intra-abdominal lymph nodes were involved in 16 (7.21%) of cases. Pancreas 5 (2.57%), kidney 2 (1.03%) cases, spleen 2 (1.03%) cases and gall bladder 1 (0.55%).

Conclusion: USG guided FNAC is a relatively simple, economical, quick and safe, non-invasive procedure, highly accurate and a safe diagnostic procedure which can pre-empt a lengthy and expensive workup in various abdomino-pelvic masses.

Keywords: Abdomino-Pelvic Masses; FNAC; Ultrasonography.

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Introduction

Intra-abdominal masses always remain an enigma in surgical practice. A documentary evidence of nature of pathology before institution of therapy is mandatory. Since time immemorial, surgical exploration has been a traditional well established gold standard procedure used in the diagnosis. Fine needle aspiration is a proven technique for diagnostic evaluation of patients with intra-abdominal masses [1].

Most intra-abdominal masses are non-palpable and even if palpable, the idea of size, shape and extent of lesion is not possible, therefore Ultrasound guided fine needle aspiration can be utilized for practically any mass in the abdomen and pelvis. It is a simple, safe and inexpensive way to obtain diagnosis in most anatomic areas [2].

This study was undertaken to emphasize its usefulness in the diagnosis of intra abdominal and pelvic masses. Most studies have shown it as a highly sensitive, highly

specific, accurate and a cost effective diagnostic procedure with a negligible complication rate [1-5].

USG is readily available, relatively inexpensive and portable. It uses no ionizing radiation and it can provide guidance in multiple planes such as transverse, longitudinal and oblique. The greatest advantage however, is that, it allows the real time visualization of the needle tip as it passes through the tissue planes into the target area [1-2].

This study was performed to know the age and sex distribution as well as the incidence of intra-abdominal and pelvic masses diagnosed on ultrasound guided fine needle aspiration cytology and to categorize them organ wise into inflammatory, benign and malignant lesions.

Materials and Methods

This was a prospective study conducted in department of Pathology, KIMS, Hubballi from August 2013 to May 2015. Two hundred patients who presented with abdominal or pelvic mass confirmed by radiological examination were included in the study. USG guided FNAC was performed in those cases. Two to four smears were prepared for each case. Air-dried smears were stained with Wright's stain and wet fixed smears were stained with H&E and Pap wherever needed and examined under microscope. The cytological diagnoses were analyzed and results tabulated.

Results

Among 200 cases, 102 (51%) were females and 98 (49%) were males. The commonest age group involved was between 41-50years with 47cases (23.19%). The least common age group to be involved was >70years (7.24%).

The intra-abdominal and pelvic masses were divided according to the organ involved. The various organs to be involved were liver, ovary, kidney, pancreas, spleen, gall bladder, gastrointestinal masses, intra-abdominal lymph nodes and miscellaneous soft tissue and retroperitoneal masses.

The commonest organ to be involved was liver with 120 (59.79%) cases followed by gastrointestinal masses with 21 (11.34%) cases and miscellaneous soft tissue and retroperitoneal masses with 21 (11.34%) cases. Ovary was involved in 12 (6.18%) cases. Intra-abdominal lymph nodes were involved in 16 (7.21%) of cases, Pancreas 5 (2.57%), kidney 2 (1.03%) cases, spleen 2 (1.03%) cases and gall bladder 1(0.55%) case as shown in table 1.

Further the lesions of each system were classified as neoplastic and non-neoplastic. Of 120 cases involving the liver, 90 (75%) cases were neoplastic, 20 (16.66%) cases were non- neoplastic, among 8 (6.66%) cases the aspirate was in conclusive while 2 (1.66%) cases specimen was inadequate.

Table 1: Showing Organ Wise Distribution of Cases

Organ	No of cases	Percentage
Liver	120	59.79%
GIT	21	11.34%
Miscellaneous	21	11.34%
Ovary	12	6.18%
Lymph nodes	16	7.21%
Pancreas	5	2.57%
Kidney	2	1.03%
Spleen	2	1.03%
Gall bladder	1	0.51%
Total	200	100%

Table 2: Showing the Organ- Wise Distribution of cases in the GIT

Organ	No cases	Percentage
Stomach	6	28.57%
Caecum	6	28.57%
Colon	7	33.34%
Rectum	1	4.76%
Appendix	1	4.76%
Total	21	100%

Out of the 20 non-neoplastic lesions 14 were diffuse parenchymal disease, 4 were granulomatous lesions and 2 were suppurative lesions. Among 90 neoplastic lesions, majority of the lesions were metastatic adenocarcinomas (figure 1) with 42 cases followed by hepatocellular carcinoma with 32 cases (figure 2,3), 5 cases of cholangiocarcinoma, 2 cases of metastatic squamous cell carcinoma deposits, 1 case of hepatoblastoma and 4 cases were just diagnosed to be positive for malignancy. Also there were 3 cases of focal nodular hyperplasia and 1 case of hemangioma.

Of 21 cases of Gastro-intestinal masses, stomach was involved in 6 (28.57%) cases, caecum in 6 (28.57%) cases, colon in 7 (32.01%) cases (Figure 4), rectum in 1 (4.76%) cases and appendix in 1 (4.76%) case. The table 2 given below represents the organs involved in the gastrointestinal tract and the number of cases.

Of these 21 cases, 9 (42.85%) were neoplastic, 8 (38.09%) were non neoplastic and 4 (19.06%) were inconclusive. Among the non-neoplastic lesions 7 were inflammatory lesions and 1 case of tuberculosis of caecum. Out of the 8 malignant cases all were

adenocarcinomas arising from the stomach, colon and rectum. 1 case of gastrointestinal stromal tumour (GIST) was made. USG guided FNAC was done in 16 cases of lymph node masses. Among these there were 6 cases of reactive lymphadenitis, with 5 cases of adenocarcinoma deposits and 2 cases of poorly differentiated carcinoma deposits, 1 case of germ cell tumour deposits and 1 case of Non- Hodgkin' s lymphoma. In 1 case no opinion was possible. Thus, 6 cases were non-neoplastic, 9 were neoplastic, and 1 was inconclusive.

FNAC could be done on 12 ovarian masses. Among the 12 cases, 10 (83.33) cases showed neoplastic lesion while in 2 (16.67%) cases the diagnosis was inconclusive. 8 (83.34%) were found to be malignant and 2 (16.66%) were benign.

All the malignant lesions were malignant surface epithelial tumours which were either mucinous or serous cystadenocarcinomas. 1 case of mucinous cystadenoma and a case of teratoma was diagnosed among benign lesions.

There were 21 cases involving the soft tissue and retroperitoneal masses (Figure 5). Two cases were arising

Table 3: Showing other lesions encountered in the study

Site	Lesion	No. of cases
Kidney	Renal cell carcinoma	2
Pancreas	Adenocacinoma (figure 6)	2
	Suspicious of malignancy	1
	Non-neoplastic	2
Gall bladder	Adenocarcinoma	1
Spleen	Inconclusive	2

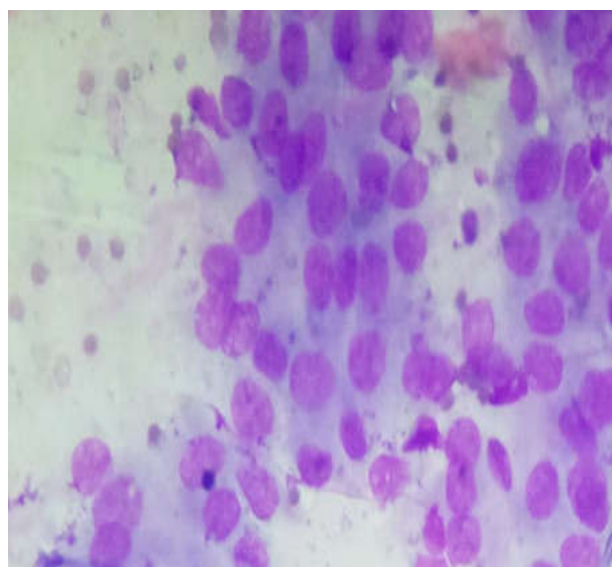


Fig. 1: Metastatic adenocarcinoma deposits in liver showing acinar pattern with mild nuclear pleomorphism, Wright,s, 40X

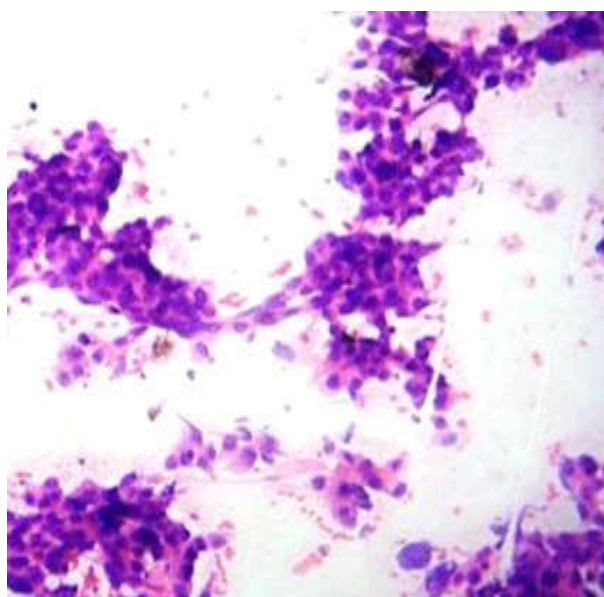


Fig. 2: Hepatocellular carcinoma- showing endothelial rimming, H &E, 10X

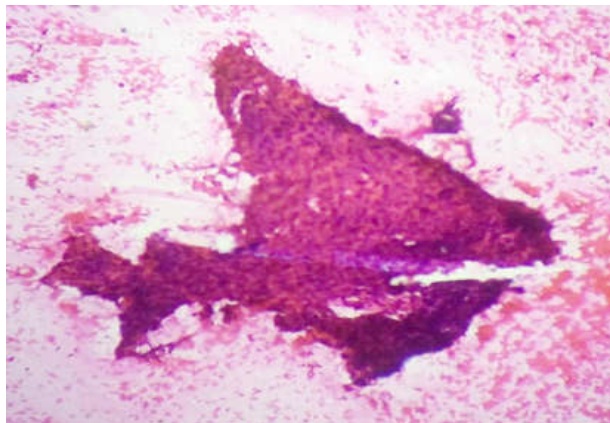


Fig. 3: Showing traversing blood vessels and rimming of endothelial cells in hepatocellular carcinoma, H &E, 40X

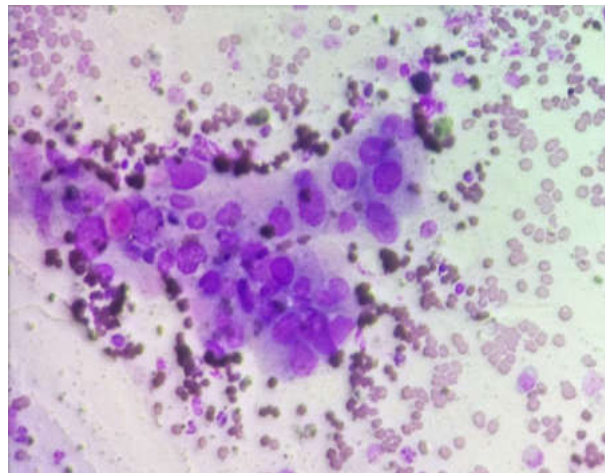


Fig. 6: Pancreatic adenocarcinoma- cells arranged in acinar pattern with nuclear pleomorphism and high N: C ratio, Wright's, 40X

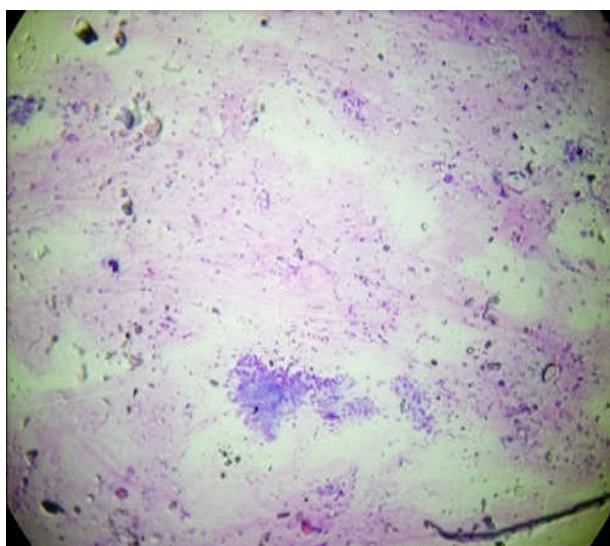


Fig. 4: Cellular smears showing round cells in clusters and singles against mucoid background – mucin secreting adenocarcinoma-colon Wright's, 10 X

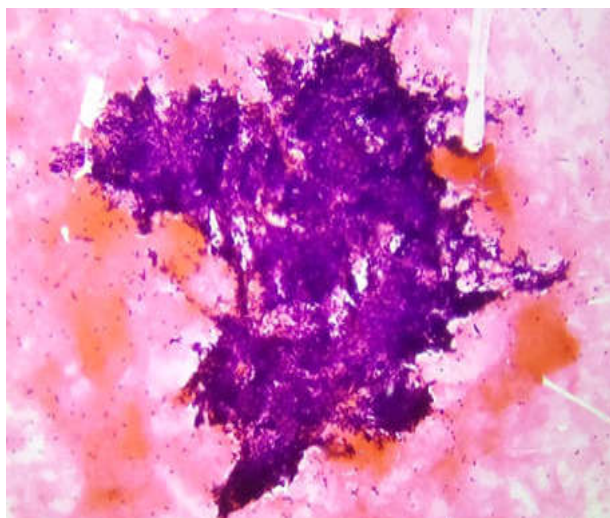


Fig. 5: Cellular smears showing oval to spindle cells in sheets – soft tissue sarcoma, H & E, 10X

from the mesentery, 1 case from the omentum, 2 cases from the hypochondriac region, 2 from the epigastric region, 7 cases from the iliac region and 7 cases from the retroperitoneal region. Among them there were 12 neoplastic lesions, 5 were inconclusive and in 4 cases the aspirate was inadequate.

Other lesions which were encountered in the study have been mentioned in Table 3.

Discussion

In recent years, FNA has emerged as a useful diagnostic technique. Nature of disease, experience and understanding of certain limitations determine its diagnostic utility. In this study, percutaneous aspiration biopsy cytology of intra-abdominal and pelvic masses, were done and analyzed for their diagnostic utility. This study deals with FNA of intra-abdominal and pelvic masses performed on 200 patients.

In the present study, Liver was the commonest organ with lesions to be involved with 59.79% followed by gastrointestinal tract masses (11.34%) and miscellaneous soft tissue and retroperitoneal masses accounting for 11.34% (Table 1). This was followed by intra-abdominal lymph node masses, ovarian masses, pancreatic masses, kidney masses, splenic masses and gall bladder mass in the order of frequency. Literature on intra-abdominal FNACs showed similar higher incidence of hepatic masses when compared to masses arising from other intra-abdominal organs [1-3].

Majority of the liver lesions were neoplastic with 75%, followed by non-neoplastic lesions accounting for 16.66%. The other studies done by Khurana et. al., Pupulim et. al., and Ramdas et. al., were comparable with the present study [6-8].

Among the non-neoplastic liver lesions, diffuse parenchymal disease accounted for 70%, followed by granulomatous lesion (20%) and suppurative lesion (10%). Swamy et. al. [9] reported non-neoplastic lesions as pyogenic abscess, amoebic liver abscess, cirrhosis, fatty liver and granulomatous hepatitis.

Among the neoplastic lesions majority were malignant lesions. In the present study metastatic adenocarcinoma deposits accounted for 48.84% (Figure 1), followed by hepatocellular carcinoma (39.02%) (Figure 2,3). This was in comparison with other studies done by Balani et. al. [10], Khurana et. al. [6], and Rasanian et. al [11]. In one study done by Ceyhan et. al. [12], the number of hepatocellular carcinoma and metastatic adenocarcinoma deposits were equal. Of the 21 cases of GI masses in our study, neoplastic lesions were more with 9 (42.85%) cases and non-neoplastic lesions accounted for 8 (38.09%) cases. The study done by Ahmad SS et. al. [13], showed 42 (48.8%) neoplastic lesions and 36 (41.8%) non-neoplastic lesions. Among the neoplastic lesions, in the present study there was 1 benign lesion and 8 were malignant lesions. Ahmad SS et. al. [13], reported 4 benign lesions and 36 malignant lesions.

In present study out of the 8 malignant cases all were adenocarcinomas arising from the stomach, colon (figure 4) and rectum (Table 2). Study done by Akhtar SS et. al. [14], showed that the majority of the malignant lesions were adenocarcinoma of the stomach, followed by adenocarcinoma of the intestine [3,6]. This study is comparable with present study. Among the non-neoplastic lesions they found majority of tuberculosis cases whereas, in our study only one case of tuberculosis was seen and rest all were Non-specific inflammatory lesions.

Ultrasound guided FNAC of ovarian lesion could be done in 12 cases in the present study. In a study done by Agarwal N et. al. [15], 15.5% of the cases were non-neoplastic, 45.55% were benign and 39% were malignant. Among the malignant tumours, serous cystadenocarcinoma accounted for 25% cases, mucinous cystadenocarcinoma accounted for 23.25%. Ray S et. al. [16], in their study have described that majority of the cases were surface epithelial tumours of serous and mucinous variety.

Study done by Shamshad et. al. [17], out of 200 cases with abdominal masses, 17 cases had enlargement of abdominal lymph nodes. Of those 10 cases (58.9%) were reactive lymphadenitis and 7 were (41.1%) of neoplastic etiology, lymphoma comprised 4 cases (23.5%) and metastatic adenocarcinoma 3 cases (17.6%) [3]. The findings of their study was concordant with present study.

In the present study there were 21 cases involving the soft tissue and retroperitoneal masses. Among them there were 4 benign lesions, 8 malignant lesions, 5 were

inconclusive and in 4 cases the aspirate was inadequate. In the present study malignant lesions were more with 8 cases and 4 were benign lesions. The neoplastic lesions were soft tissue sarcoma (3 cases) (Figure 5), two were adenocarcinoma deposits, one was malignant mesothelioma, squamous cell carcinoma, Non-Hodgkin's lymphoma, and Lipoma respectively.

This was in concordance with the study done by Chakrabarti I et. al. [5], in which the malignant lesions were more common with 49.29% than the benign lesions accounting for 18.3%. According to their study majority of the malignant lesions were of lymph node origin (48.75%), 14.29% of soft tissue, 11.43% of renal and gonadal origin, 8.57% of pancreas and 2 cases of adrenal origin [17].

Mangal N et. al. [16], also showed similar results with malignant lesions more than the non-malignant lesions. Of 85 cases of retroperitoneal masses 47 were malignant and 38 were benign lesions. Of 24 soft tissue tumours 7 were malignant and 17 benign. Chakrabarti et. al. [5], showed that among the benign tumours, soft tissue tumours predominated with lipomas making the single largest subgroup, followed by fibromatosis and benign spindle cell lesions.

Singla D et. al. and Rathod G [18], have reported a case of renal cell carcinoma diagnosed on the basis of FNAC of Kidney. They have mentioned that FNAC under radiologic guidance for diagnosis of renal cell carcinoma is well established and is increasingly utilized. In the present study, FNAC of pancreas was done in 5 cases. Among them 2 cases were of pancreatic adenocarcinoma (Figure 6). 2 lesions were of inflammatory origin, one was suspicious of malignancy (Table 3).

Guided FNAC aids to differentiate intra-abdominal lesions thus helping in categorizing them into neoplastic and non-neoplastic as well as on basis of type and site.

Conclusion

Ultrasound imaging can precisely visualize intra-abdominal mass lesions and sonography aided fine needle aspiration cytology can be regarded as the investigation of choice for early confirmation and exclusion of neoplastic diseases in cases presenting with intra-abdominal and pelvic masses. Intra-abdominal FNAC is a relatively simple, economical, quick and safe procedure for such lesions. It not only helps in differentiating between inflammatory, benign and malignant lesions, but also in categorizing different malignant lesions. Intra-abdominal FNAC is a reliable, sensitive and specific method with a high diagnostic accuracy. It can be utilized as a pre-operative procedure for the management of all intra-abdominal and pelvic lesions.

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