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Original article:

Ultrasound guided fine needle aspiration cytology of abdominal masses: a hospital based study

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Abstract:

Introduction: Most of the intra abdominal masses are non – palpable and even if they are palpable, the idea of their size and shape and the extent of the lesion is not possible. Introduction of modern diagnostic imaging techniques, mainly ultrasonography (USG), has enabled the detection and location of lesions which are not easily accessible to surgical biopsies. Apart from that it offers opportunities for fine needle aspiration of the deeper structures. Obtaining of samples from the deeper structures is the first step in the laboratory investigation; thereby it quickly satisfies the avidity of clinicians for a rapid diagnosis .

Methodology: The present study was under taken in the department of pathology, Burdwan Medical College and Hospital, Burdwan, during the period from February 2012 to January 2013. 106 patients with clinically or radiologically diagnosed abdominal masses were taken for the study. Patients who are cooperative with normal coagulation profile irrespective of age and sex with abdominal masses diagnosed by physical examinations and/or ultrasound imaging were included in this study.

Results & Conclusion: USG guided FNAC is a simple, safe, cheap, quick, reliable and easily available OPD based procedure for the dignosing of intra abdominal lesions.. Complication was significantly low except mild pain for short duration.The presence of a pathologist during the aspiration procedure provided a good rapport between the pathologist and radiologist and leads not only to better clinical and radiological correlation but also to minimize inadequate material and poor smear preparation and also to suggest for additional sampling for special procedure. If we use immunohistochemistry for some specific lesions it definitely increases diagnostic accuracy of the procedure. Ultrasonography of abdominal mass lesion is a very good and effective screening tool and when used with USG guided FNAC it definitely increases diagnostic yield and in differentiating between non-neoplastic, benign and malignant lesions.

INTRODUCTION:

Most of the intra abdominal masses are non – palpable and even if they are palpable, the idea of their size and shape and the extent of the lesion is not possible. Introduction of modern diagnostic imaging techniques, mainly ultrasonography (USG), has enabled the detection and location of lesions which are not easily accessible to surgical biopsies. Apart from that it offers opportunities for fine needle aspiration of the deeper structures. Obtaining of samples from the deeper structures is the first step in the laboratory investigation; thereby it quickly satisfies the avidity of clinicians for a rapid diagnosis [(1)]. The non –availability of CT, coupled with the higher incidence of advanced malignancy due to public awareness and overburdened surgical units with meagre resources require the USG – guided FNAC procedure for cancer management in developing countries like India[(2)]. The greatest

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advantage of USG is that it allows the real time visualization of the needle tip as it passes through tissue in to the target. This allows precise needle placement and avoidance of important intervening structures. Doppler imaging can prevent complication of needle placement by identifying the vascular nature of a mass and allowing the interventionist to avoid vascular structure lying within the needle path [3, 4].

FNAC appears to have a diagnostic accuracy in comparing benign and malignant neoplasm as open biopsies [5]. USG-guided FNAC is now widely accepted as a safe diagnostic procedure in various neoplastic and non-neoplastic disorders [6]. Compared to CT, USG guided procedures require less time to perform and can be more cost effective and have no radiation hazards [7 - 9]. USG guided FNAC has been shown to be more accurate than CT especially for abdominal masses, with a lower false-negative results [9, 10]. It is a safe procedure except few relative contraindications, which includes uncorrectable coagulopathy, lack of safe route, and an uncooperative patient [11-15]. In the present study we classified abdominal masses in non neoplastic, benign and malignant lesion and analyze the usefulness of ultrasound guided fine needle aspiration cytology in the diagnosis of abdominal masses.

MATERIALS AND METHODS

The present study was under taken in the department of pathology, Burdwan Medical College and Hospital, Burdwan, during the period from February 2012 to January 2013. 106 patients with clinically or radiologically diagnosed abdominal masses were taken for the study. Patients who are cooperative with normal coagulation profile irrespective of age and sex with abdominal masses diagnosed by physical examinations and/or ultrasound imaging were included in this study. Un-cooperative patients with bad general condition and with history of unexplained prolonged bleeding were excluded. The patient and the party had been explained about the procedure and consent was obtained. A detailed clinical history was obtained. Physical examination, radiological examination and routine blood investigations including coagulation profile was performed in all cases.

Ultrasonography was performed by an experienced radiologist and different features of the mass were assessed such as depth, echogenicity vascularity, extent, etc. The bleeding time, clotting time, platelet count and prothrombin time were checked to be within normal limits prior to the procedure.The skin was sterilized using alcohol and betadine preparation. The skin and peritoneum were infiltrated with 2 % xylocaine. The technique was performed under continuous ultrasound guidance using a 90 mm long 22 gauge spinal needle with an outer diameter of 0.7 mm. The position of the needle tip in the lesion was confirmed followed by aspiration. This was performed by attaching the hub of the needle to a 20 ml plastic syringe already fitted to a metallic syringe holder. The needle was moved back and forth a few millimeters during maximal aspiration while visualizing the echo of its tip in the target. The procedure was terminated as soon as any material aspirated in the hub of the needle. Close monitoring of the patient was done for a period of 2 hours following the procedure for the stability of his/ her vitals and the development of any complications. The material thus procure was forcibly ejected onto clean glass slides. An average of three to four smears was prepared by rubbing two glass slides against each other. After that 2-3 slides were immediately fixed in 95 % ethyl alcohol to be stained with Papanicolaou & H&E and the rest half were kept air dried to be stained with May Grunwald Giemsa and Ziehl Neelsen Stain (In case of purulent material) In case of cystic aspirate, it was centrifuged @ 2000 rpm for 15 minutes and smears prepared from the sediment.

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RESULTS

Guided FNAC was carried out in 106 cases. Among them aspiration material was satisfactory in 102 (96.22 %) cases and unsatisfactory in 4 (3.77%) cases, so statistical analysis was done in 102 cases.

TABLE 1:-DISTRIBUTION OF CASES ACCORDING TO AGE GROUP

AGE GROUP (IN YEARS)	NO. OF CASES	PERCENTAGES (%)	NON NEOPLASTIC LESION	BENIGN NEOPLASM	MALIGNANT NEOPLASM
0-10	3	2.9	0	0	3
11-20	3	2.9	2	0	1
21-30	9	8.9	4	1	4
31-40	12	11.7	3	1	8
41-50	24	23.6	7	2	15
51-60	28	27.5	3	4	21
61-70	20	19.6	4	2	14
>70	3	2.9	0	0	3
Total	102	100	**23**	10	69

In our study the age of the patient ranged from three to 80 years with the mean age of 48.4 ±15.7years and most of the patients were in age group of 4th to 6th decades (70.6%). Most of malignant and benign neoplasm in the 6th decade and most of the non neoplastic lesions in the 5th decade.

TABLE 2:-SEX DISTRIBUTION OF DIFFERENT TYPE OF LESIONS

TYPE OF LESION	MALE	FEMALE
Non neoplastic lesion	13(12.7%)	10(9.8%)
Benign neoplasm	2(1.9%)	8(7.8%)
Malignant neoplasm	30(29.4%)	39(38.4%)
Total	45(44.1%)	57(55.9%)

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TABLE 3:- DISTRIBUTION OF CASES ACCORDING TO THEIR CLINICAL PRESENTATION (MULTIPLE RESPONSES)

CLINICAL PRESENTATION	NO. OF CASES	PERCENTAGE
Abdominal pain	65	63.7
Weight loss	21	20.6
Fever	9	8.8
Hepatomegaly	11	10.7
Anorexia	14	13.7
Jaundice	7	6.8
Hematuria	2	1.9
Constipation	5	4.9
Diarrhea	3	2.9
Abdominal mass	41	40.2
Ascites	6	5.8

Among these most common clinical presentation was abdominal pain (63.72%) and abdominal mass (40.19%).

TABLE 4:- DISTRIBUTION OF NON NEOPLASTIC LESION ON CYTOLOGY

TYPE OF LESION	NUMBER	PERCENTAGE %
Liver abscess	8	34.78
Hydatid cyst	2	8.69
Hepatic cyst	3	13.04
Fatty liver	1	4.34
Inflammatory lesion of GB	2	8.69
Inflammatory pancreatic cyst	1	4.34
Tubercular lymphadenitis	2	8.69
Reactive lymph node	3	13.04
Renal cyst	1	4.34

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TABLE 5:-DISTRIBUTION OF BENIGN NEOPLASMS ON CYTOLOGY

TYPE OF LESION	NO OF CASES	PERCENTAGE (%)
Hepatic adenoma	1	10
Pheochromocytoma	1	10
Renal oncocytoma	1	10
Benign ovarian cyst	7	70
Total	10	100

TABLE 6:- DISTRIBUTION OF MALIGNANT NEOPLASMS ON CYTOLOGY

TYPES OF LESIONS	NO OF CASES	PERCENTAGE (%)
Metastatic deposit in liver	16	23.2
Hepatocellular carcinoma	5	7.2
Adenocarcinoma of GB	12	17.4
Pancreatic adenocarcinoma	2	2.9
Adenoocarcinoma of stomach	5	7.2
GIST	2	2.9
Adenocarcinoma of large gut	5	7.2
Lymphoproliferative disorder of large gut	1	1.4
Renal cell carcinoma	4	5.8
Wilms tumor	1	1.4
Neuroblastoma	2	2.9
Serous cystadenocarcinoma of ovary	5	7.2
Mucinous cystadenocarcinoma of ovary	2	2.9
Dysgerminoma	1	1.4
Retroperitoneal sarcoma	2	2.9

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Lymphoproliferaticve disorder of lymph node	2	2.9
Metastatic deposit in lymph node	2	2.9
Total	69	100

TABLE 7:- ORGAN DISTRIBUTION OF DIFFERENT LESIONS

ORGAN	Non-neoplastic lesion	Benign neoplasm	Malignant neoplasm	TOTAL	PERCENTAGE (%)
Liver	14	1	21	35	34.3
GB	2	-	12	14	13.7
Stomach	-	-	7	7	6.8
Large gut	-	-	7	7	6.8
Pancreas	1	-	2	3	2.9
Lymph node	5	-	4	9	8.8
Adrenal	-	1	2	3	2.9
Kidney	1	1	5	7	6.8
ovary	-	7	8	15	14.7
Retroperitoneum	-	-	2	2	1.9
Total	23	10	69	102	100

In our study we found most common organ was liver 34.3% followed by ovary 14.7%.gall bladder involved in 13.7% cases. Stomach and large gut and kidney all are involved in 6.8% cases. Adrenal and pancreas both involved in 2.9 % cases.

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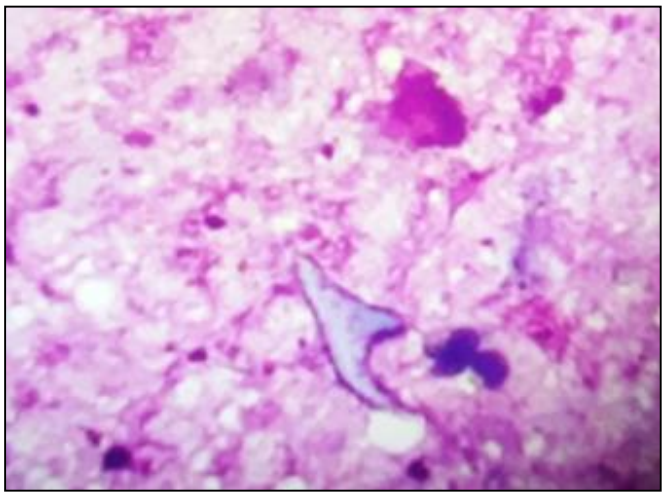

Figure-1A. Smear showing hooklet in aspirated fluid from hydatid cyst. (H/E 40X)

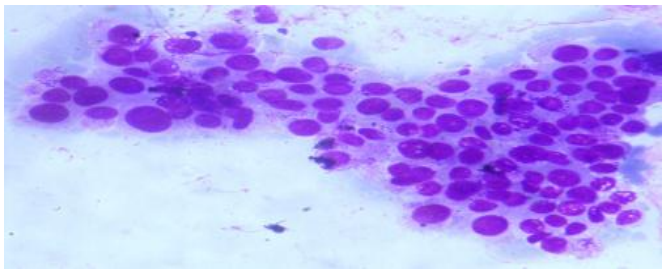

Figure-2. fnac smear showing metastatic deposit of adenocarcinoma in liver (MGG Stain stain, 40x)

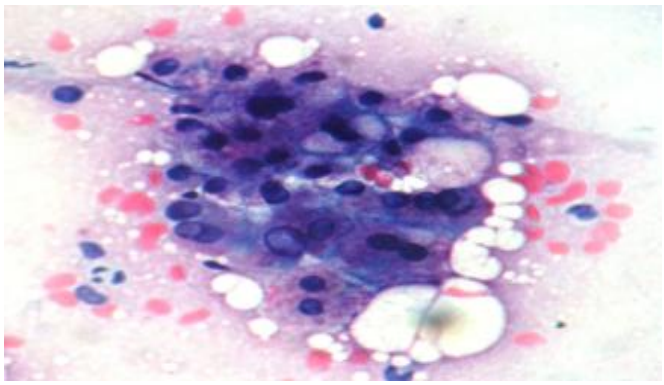

Figure-3 FNAC smear showing intracytoplasmic inclusion (arrow) in case of hepatocellular carcinoma. (H/E stain, 40x)

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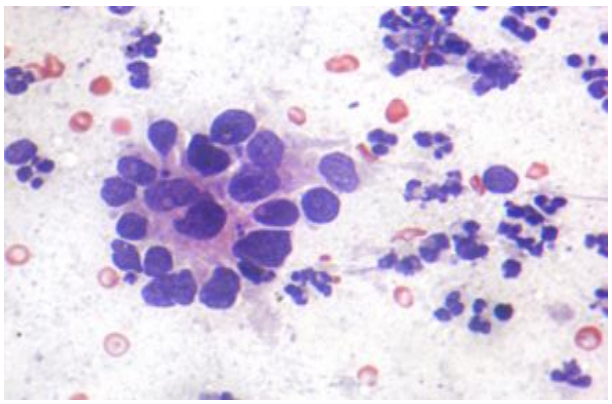

Figure-4. FNAC smear showing acinar pattern of tumor cell in Inflammatory background in adenocarcinoma of Gall bladder. (H/E stain, 40X)

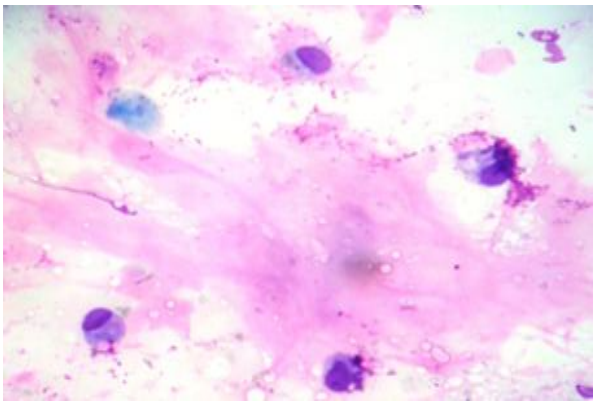

Figure-5.FNAC smear showing signet ring with pool of mucin in case of signet ring adenocarcinoma of stomach. (H/E stain 40X)

DISCUSSION

Various imaging modalities like USG, CT scan have been widely used in the diagnosis of abdominal masses in the last 20 years, but the final definitive diagnosis of abdominal masses cannot be made only by imaging methods because of the several limitation, though it acts as a very important diagnostic tool for screening of the lesions and localization of the lesion. To solve this problem USG has been used in combination with FNAC in the diagnosis of abdominal masses .Since 1970s, this technique has become popular in the diagnosis of abdominal masses in various parts of the world. In our study, diagnostic yield of USG guided FNAC was 96.22%. Andola SK et al in 2011 found diagnostic yield of 92.7% with USG guided FNAC [(20)]. Nautiyal S., et al in 2004 and Nyman et al in 1995 found yield of 93.06% and 64% respectively [(21,22)]. In present study we found more diagnostic yield in comparison to previous study. It could be due to careful and proper selection of cases.The present study showed age ranged from 3 year to 80 year. Most of the patient between 4^{th} to 6^{th} decade (70.6%) and mean age of the patient was 48.4± 15.7.

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In two similar studies done by Andola SK et al in 2011 and Islam T et al in 2013 with 245 & 78 cases respectively and they found the mean age was 45.16±18.48 years and 45.22± 17.59 years respectively[20,23].

In our study most of the patients with benign and malignant neoplastic lesion were in the 6th decade. Zawar et al also found similar age range for malignant lesion but shmashd et al found most of the malignant lesion in 5th decade [18,17]. In our study most of the patients with non neoplastic lesion were in 5th decade. In the present study, the male: female ratio was 1:1.25 . Shamshad et al and SK Andola et al found male: female ratio of 1:1.78 and 1:1.3 respectively; so both study showed female preponderance as present study [17,20]. But the Zawar MP et al showed a male preponderance [18]. This could be due to the inclusion of the ovary in this study as done by SK andola et al and Shamshad et al [20,17]. In our present study, abdominal pain was the most common (63.4%) presentation followed by abdominal lump (40.19%), Islam T et al in 2013 found abdominal pain in 43.6% cases and abdominal lump in 70.5% cases [23].

In the present study, it was observed that a majority were malignant lesions which comprised 67.6% lesions and the remaining 32.4% were benign and non-neoplastic lesions which is similar to the study of Smith et al. in which 66% were malignant lesions and 34% were benign and non-neoplastic lesion [24]and of hemlatha et al (64.5%), Zawar et al (78.23%), and Azizi et al (69.82%) with preponderance of malignant lesion [25,18,26].

Among the non neoplastic lesion majority of cases were liver abscess (34.7%) hemlatha et al found only 11.2% cases of liver abscess[25]. In present study secondary adenocarcinoma of liver was the most common mass lesions sharing 15.6 % which was similar with Khanna et al.(44.13%) and Hemlatha et al (39.14%) and they also observed that secondary adenocarcinoma of liver was most common mass lesion[16,26]. Regarding benign hepatic lesions we found 2.94% cases of hepatic cyst which was similar to the study of Khanna et al 2% cases [16]. In present study we got 4.90% of adenocarcinoma of stomach however Shamshad et al found 18.60% cases in their study [17]

In present study we got 5.88 % cases of adenocarcinoma of large gut which was similar to Zawar et al 5.00% and Khanna et al 2.50 %[18,16]. However higher percentage of cases were found in study of Shamshad et al [16].Adenocarcinoma of pancreas comprised of 1.96% cases which was similar to Zawar et al 2.50% cases [18].

In the present study liver was the most common site of distribution of abdominal mass lesions accounting for 34.3% .Similar features were observed in other studies of Zawar et al (45 %), Biradar et al (38%) and Andola SK et al (36%) [18,19,20] .Next common site of involvement was Gall Bladder (13.7%) in our study but Zawar et al and Biradar et al showed lower incidence of Gall Bladder involvement 2.5% and 2.73% respectively[18,19]. Lymph node involvement in present study was 8.8 % which was similar with the findings of Andola SK et al and Biradar et al but Zawar et al showed slightly lower incidence (2.5%)[18,19,20]. Involvement of stomach was seen in 6.8 % cases in present study which was similar with other studies of Z awar et al and Biradar et al but only 0.90% cases were found in study of Andola SK et al[18,19,20].

CONCLUSION

USG guided FNAC is a simple, safe, cheap, quick, reliable and easily available OPD based procedure for the dignosing of intra abdominal lesions.. Complication was significantly low except mild pain for short duration.The presence of a pathologist during the aspiration procedure provided a good rapport between the pathologist and radiologist and leads not only to better clinical and radiological correlation but also to minimize inadequate material

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and poor smear preparation and also to suggest for additional sampling for special procedure. If we use immunohistochemistry for some specific lesions it definitely increases diagnostic accuracy of the procedure. Ultrasonography of abdominal mass lesion is a very good and effective screening tool and when used with USG guided FNAC it definitely increases diagnostic yield and in differentiating between non-neoplastic, benign and malignant lesions.

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