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Role of image guided fine needle aspiration cytology in diagnosis of hepatic lesions-study at a tertiary care centre of Kashmir valley

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ABSTRACT

Background and aim: Liver diseases are common causes of mortality and morbidity worldwide. Image guided fine needle aspiration cytology(FNAC) is a rapid and reliable method for diagnosis of hepatic mass lesions. It provides a predictive diagnosis of benign and malignant lesions and in most of them provides the tumor type. Ours is a prospective study of three years. **Material and methods**: A three year prospective study of image guided FNAC of lesions of liver was done from May 2014 to April 2017. The study included total 130 cases which were selected irrespective of age and sex. USG or CT guided FNAC was done using 18-22 gauge needle. Air dried and alcohol fixed smears were stained with May-Grünwald Giemsa(MGG)and hematoxylin and eosin(H&E)stain respectively. **Results:** The diagnostic yield was 92.8%. Out of the 130 cases 84.6% were malignant and 15.3% were benign. Metastatic malignany was the most common diagnosis seen in 80.2% of the patients adenocarcinoma(73.1%),neuroendocrine carcinoma(9.2%), squamous cell carcinoma(10.7%) and pleomorphic sarcoma (2.1%). Metastasis of malignant melanoma, medullary carcinoma thyroid and non hodgkins lymphoma was seen in one patient (.1.07%) each. Cytological diagnosis of hepatocellular carcinoma was made in 15 patients (13.6%). **Conclusion**: Image guided FNAC is a quick, minimally invasive and economically effective procedure which helps in accurately diagnosing liver lesions without major complications.

Key words : hepatic lesions, image guided, FNAC

Introduction

Most of the mass lesions of the liver discovered clinically or by imaging techniques are easily assessable to FNAC. It is important to establish primary or metastatic nature of the lesion and in case of the latter to comment upon the probable site of the primary tumor[1] Ultrasonography (USG) or computed tomography (CT)- guided fine needle aspiration cytology (FNAC) is an accurate method for a definite diagnosis in focal liver lesions[2].The advantages of this technique are its high diagnostic accuracy and low cost, thereby rendering the older technique of blind percutaneous biopsy using a coarse needle obsolete[3]

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The technique is minimally invasive, produces a speedy result and is inexpensive. A definitive specific diagnosis may not be possible by cytology in a proportion of cases, but a categorisation of disease and a differential diagnosis with an estimate of probability can usually be provided to suggest the most efficient further investigations, saving time and resources [4]. The main indication of FNAC of the liver is single or multiple nodular lesions, demonstrated by palpation, nuclear scan, computed tomography (CT), and ultrasonography (USG)[5]. The purpose of the study is to evaluate various neoplastic lesions whether primary, metastatic or non-neoplastic conditions of the liver and to correlate with histopathology wherever possible. . Complications include bleeding, peritonitis or needle tract tumor seeding [6].Large series indicate the sensitivity of FNAB in the evaluation of masses to range from 88-93%with specificity of 100% [7]

Material and methods

The study was a tertiary care hospital based prospective study and was carried out in the department of pathology ,Sher-i-kashmir Institute of medical sciences (SKIMS),Srinagar ,Kashmir from May 2014 to April 2017.130 Cases were studied ,the coagulation profile was routinely done in all the patients. After mild sedation, sterile preparation, and topical anesthetic, the needle was inserted under USG/CT guidance and a sensation of tactile tumor resistance was often felt. Aspiration was performed using 18-22G aspirating needles (Chiba/spinal) or aspirating cutting needles (Wescott/Franseen) of suitable length. The material was forcibly ejected on to a glass slide and stained with diff quick in order to check on spot adequacy of the material aspirated. The slides were then destained and restained with may graunwald-Giemsa or fixed in 95% ethanol and stained by papanicolaou's stains. Special stains like Gram stain/Zeihl Neelson were done wherever required.

Results

A total of 140 patients with hepatic lesions were aspirated under USG/CT guidance. Most of the patients presented with the abdominal lump or the dull aching pain in upper abdomen and weight loss. Out of a total of 140 patients, only 130 cases yielded adequate smears giving total diagnostic yield of 92.8%.7.2% of the smears were unsatisfactory for evaluation even after three to four aspirations.

Age and sex distribution: The age group of the patients with liver lesions sent for FNAC ranged from 1-90yrs.Majority of the patients belonged to age group of 51-60 yrs (33.3%).Among the 130 patients in whom the diagnosis was made 70(53.8%) were males and 60(46.2%) were females(Table 1)

Clinical features: Pain abdomen was the most common presenting complaint which was followed by hepatomegaly(Chart 1)

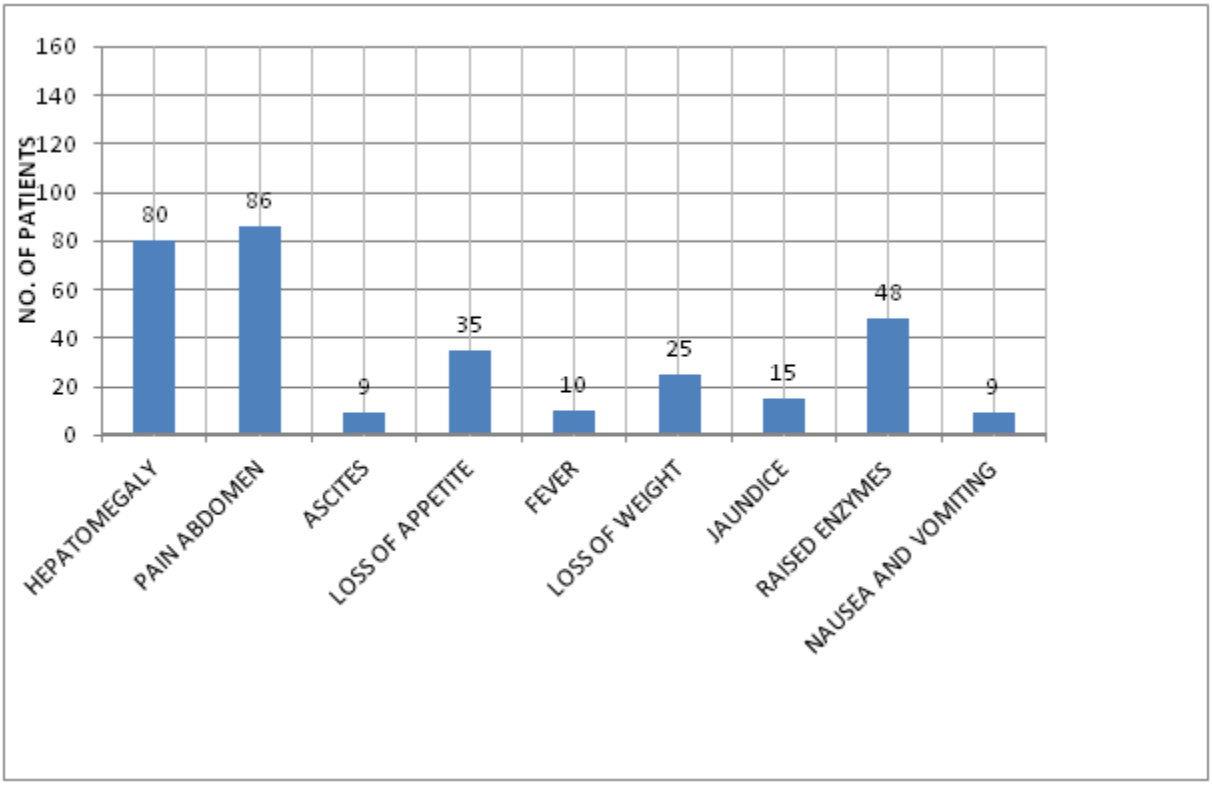

Chart 1: Clinical features

Cytological diagnosis: Cytological diagnosis was broadly classified as unsatisfactory, non neoplastic and neoplastic. Out of 140 cases 10 were unsatisfactory for evaluation after multiple aspirations (Table 2)

FNAC diagnosis of hepatic lesions: Aspirates from 10 cases were reported as cytologically unsatisfactory for evaluation. These cases revealed sheets of normal hepatocytes, sparse kupfer cells and occasional inflammatory cells only.

These cases yielded scanty material even after two to three repeated aspirations. The rest of the 130 cases were classified into neoplastic and non neoplastic lesions.

Non neoplastic lesions: Cytological diagnosis of abscess was made in 16 patients. The age of these patients ranged from 10 to 80 years. 9 were males and 7 were females. One male patient aged 45 yrs was diagnosed with cirrhosis. Two patients,a male and a female aged 48 yrs and 36 yrs respectively were diagnosed with chronic granulomatous disease.1 patient aged 32 yrs was diagnosed with hydatid cyst.

Neoplastic lesions: The most common diagnosis made was malignant lesions in the liver seen in 110 patients(80.7%).Their age ranged from 24 to 86 years.55 were males and 50 were females. Ultrasonography in all these patients with malignant lesions revealed single or multiple lesions in the liver. Age and sex distribution of malignant hepatic lesions in Table 3.Out of 110 patients with malignant lesions,93(84.5%) had metastatic deposits,15(13.6%) patients were diagnosed with hepatocellular carcinoma and 2(1.8%) patients were diagnosed as suspicious for malignancy.68 patients(73.1%) had metastatic deposits of adenocarcinoma among which colon was the most common primary site of malignancy.The other primary sites of malignancy are depicted in Table 4.This was followed by 11(11.8%) patients having metastatic deposits of neuroendocrine carcinoma, 9(9.6%) patients with squamous cell carcinoma metastasis and 2(2.1%) patients with metastasis of pleomorphic sarcoma. Metastasis of malignant melanoma,medullary carcinoma thyroid and non hogkins lymphoma was seen in one patient(1.07%) each.

Discussion

FNAC has proven to be a very useful procedure for the diagnosis of both malignant and benign focal liver lesions. The combination of image guidance with it has only increased its utility further. Image guided FNAC is an easy, quick, cost effective and minimally invasive procedure which offers accuracy without major complications. Guided FNAC is very sensitive for diagnosing hepatic lesions. The results of various studies on FNAC of hepatic lesions have shown that it is a very useful procedure to diagnose hepatic lesions [5,8-12]

We did a three year prospective study of 140 cases of image guided liver aspiration cytology among which 135 were ultrasound guided and 5 were CT guided. Out of the total 140 cases, 10 were considered unsatisfactory for evaluation giving the present study an adequacy rate of 92.8%.Similar results were earlier obtained in other studies in which the diagnostic yield was 93.5%(Talukdar et al [13] in 2004),93%(Shah A. Et al[9] in 2002), and 94.3%(Balani et al[14] in 2013).The lowest inadequacy rate of 1% has been reported by Guo et al[15] in 2002.

In the present study the age ranged from 10 to 88 yrs with a mean age of 54 yrs..Out of 130 cases in which the diagnosis was made,70(53.8%) were males and 60(46.2%) were females. Male to female ratio was 1.16:1 Rasania et al[5] reported an age range from 8 to 80 yrs with a male predominance. In their studies by Meena et al[16] and Nazir et al[17] male:female ratio of 1.2:1 and 1.7:1 respectively. Mean age reported by these studies respectively was 56 yrs and 55yrs.

The most common age group affected was 51-60 yrs constituting 38.5% of the patients. Similar results were obtained by Rasania et al[5] and Meena et al[16] in their studies done in 2006 and 2015 respectively.Some authors in their studies reported 6th and 7th decades to be the most common age group affected[18,19]

The most common presenting complaint of the patients was pain abdomen followed by hepatomegaly.

Out of the total 130 hepatic lesions studied,110 (84.6%) were malignant and 20(15.3%) were benign. Most of the other similar studies done reported malignant lesions to be more common [9,5,16,19-22]

Among the 20 benign cases reported, 16(12.3%) cases were reported as liver abscesses.USG guided FNAC revealed dense acute inflammatory cell infiltrate along with areas with necrosis and sheets of benign hepatocytes. Liver abscesses constituted 2% of hepatic masses in studies by R C Adhikari et al[23] and Ruchika et al[24]

Two patients were diagnosed with chronic granulomatous disease. The FNA smears revealed epitheloid cell granulomas and langhans giant cells in a background of caseous necrosis. AFB stains done on these slides were positive. These patients were subsequently put on ATT and successfully treated .Harter et al [25] had one case of tuberculosis in their study of 133 patients.

A 45 yr old male was diagnosed with cirrhosis, The ultrasonography had revealed surface nodularity with an overall heterogenous echotexture. Multiple aspirations revealed clusters of benign hepatocytes entangled within fibrous strands with endothelial investment, bile duct epithelium and few kupfer cells. One male patient aged 32 yrs was diagnosed with

hydatid cyst. The CT revealed a cystic mass in the right hepatic lobe. Cytology revealed laminated membrane with parallel striations, dispersed refractile hooklets and brood capsules in a background of granular debris and multinucleated giant cells (Fig 1).Diagnosis of hydatid cyst in liver by FNAC has been reported by some authors [26-28]

Among the 110 malignant lesions, metastatic tumors were more common, noted in 93(84.5%) cases. Next frequent malignancy was hepatocellular carcinoma noted in 15(13.6%) patients. This was comparable to the study done by Tailor et al[19] in 2016 who reported metastatic tumor to be the more common malignancy, noted in 85.07% of cases which was followed by HCC noted in 14.93% of the cases. Many other authors also reported metastatic tumors to be the more common malignancy [5,16, 29-32].2 were diagnosed as suspicious for malignancy. The smears of these two cases revealed few atypical cells but a conclusive diagnosis could not be reached in them. These two patients when followed up further were found to have primaries in ovary and stomach respectively.

Among the metastatic tumors, adenocarcinoma was the most common, noted in 68(73.1%) patients. The same was observed by most authors in their studies of hepatic lesions[5,18, ˙31,32,33,34].The metastasis were most commonly from the colon seen in 21 patients which was followed by gall bladder in 16 patients. Most other studies in literature have found colon to be the more common primary site of malignancy [5˙30-33].

In the smears examined metastatic adenocarcinoma showed microglandular pattern, papillae, nuclear crowding, high NC ratio, nuclear membrane irregularity, intra and extracytoplasmic mucin with disordered discohesive monolayered sheets (Fig 2). HCC on the other hand showed cells forming trabeculaeor acini,cells with high NC ratio, macronucleoli, multinucleation, intranuclear cytoplasmic inclusions and endothelial cells transgressing clusters of tumor cells (Fig 3). The other metastatic tumors observed were neuroendocrine carcinoma in 11(11.8%) patients ,9(9.6%)patients with squamous cell carcinoma metastasis(Fig 4) and 2(2.1%) patients with metastasis of pleomorphic sarcoma. Metastasis of malignant melanoma, medullary carcinoma thyroid and non hogkins lymphoma was seen in one patient (1.07%) each. All the patients were known cases of these malignancies. Tumor markers were done in 83 cases and contributed to diagnosis of 73(87.9%) of cases.

The different tumor markers used were CEA(adeno carcinomas),CA125(ovariancarcinomas),CA19.9(pancreatic carcinoma, PSA(prostatic carcinomas).AFP was helpful in confirming the diagnosis of HCC in 86.7% of the cases (Table 5).This was comparable to the study by Bonde et al[18] where the tumor markers contributed to the diagnosis of 87.5% of the cases.

Conclusion

We found that incidence of malignant hepatic lesions was more than benign. Metastatic tumors were more common malignant lesions than primary. Adenocarcinoma was most common metastatic tumor while in the primary tumor, HCC were most common.

To conclude, image guided FNAC is a quick, minimally invasive and economically effective procedure which helps in accurately diagnosing both benign and malignant liver lesions without major complications. It helps very effectively in the diagnosis of metastatic liver lesions and gives an impression about the primary site too in most of the cases. It thus acts as a very efficient substitute to the more invasive core biopsy for the confirmation and categorisation of liver lesions guiding the clinician towards further investigations and in taking the therapeutic decision quickly.

Table 1: Age and sex distribution of hepatic lesions

S.no	Age group	No. of Males	% age	No. of Females	%age	Total	%age
1	1-10	1	.77	0	0	1	.77
2	11-20	0	0	1	.77	1	.77
3	21-30	2	1.53	1	.77	3	2.3
4	31-40	9	6.9	6	4.6	15	11.5
5	41-50	13	10	13	10	26	20
6	51-60	27	20.7	23	17.6	50	38.5
7	61-70	15	11.5	12	9.2	27	20.7
8	71-80	2	1.54	4	3.07	6	4.6
9	>80	1	.77	0	0	1	.77
	Total	70	53.8	60	46.2	130	100

Table 2: Cytological Diagnosis

Liver lesions	Frequency(%age)
Neoplastic	110(84.6%)
Non neoplastic	20 (15.3%)
Total	130

Table 3: Age And Sex Distribution Of Malignant Hepatic Lesions

AGE	Mets adca		HCC		Mets NEC		Mets SCC		Mets med ca		NHL		Mets m.melanoma		Mets pl. sarcoma		Suspicious for malignancy	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
0-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-30	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
31-40	4	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
41-50	7	5	1	0	1	1	2	0	1	0	0	1	0	0	0	0	0	0
51-60	15	13	6	2	4	2	2	1	0	0	0	0	0	0	0	0	0	0
61-70	8	5	1	2	0	1	1	1	0	0	0	0	1	0	0	1	1	1
71-80	2	1	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
81-90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
TOTAL	38	30	10	5	7	4	6	3	1	0	0	1	0	1	1	0	1	1
	68		15		11		9		1		1		1		2		2	

Table 4: Primary sites of metastatic adenocarcinoma

Site of primary adenocarcinoma	frequency
colon	21
gall bladder	16
pancreas	7
stomach	9
breast	3
ovary	5
lung	4
prostate	3
total	68

Table 5 : Comparison of tumor markers in lesions of liver with cytologic diagnosis

Cytological Diagnosis	Total No	Increased Level Tumor Markers					Consistent With Cytological Diagnosis
		AFP	CEA	Ca19/9	Ca 125	PSA	
Metastasis	68	_	47/53	5/7	5/5	3/3	60/68(88.2%)
Hcc	15	13/15	_	_	_	_	13/15(86.7%)
Total	83						73/83(87.9%)

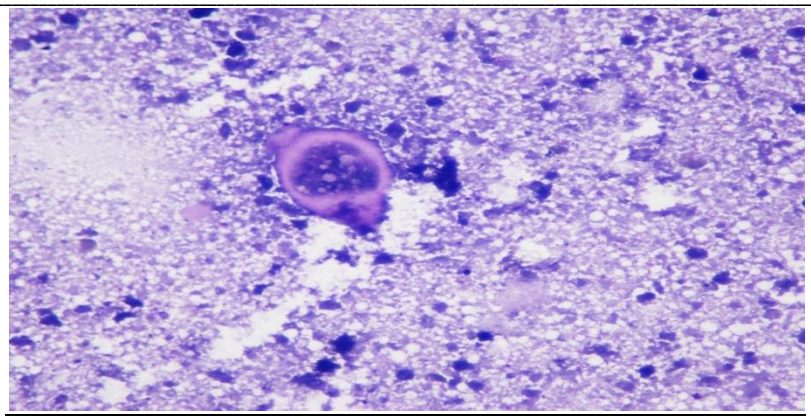

Fig 1: Photomicrograph showing brood capsule in a hydatid cyst (MGG 40X)

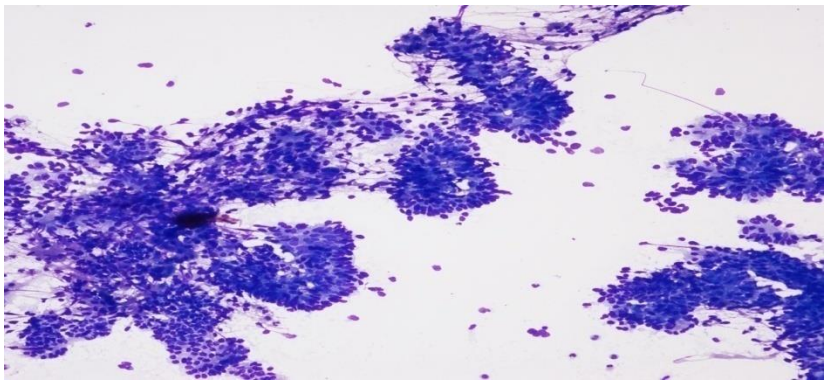

Fig 2: Photomicrograph showing metastatic adenocarcinoma(MGG 10X)

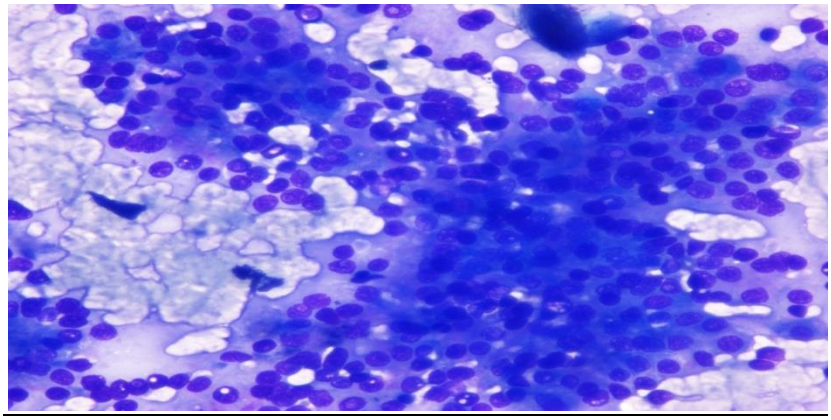

Fig 3: Photomicrograph showing hepatocellular carcinoma (MGG 40X)

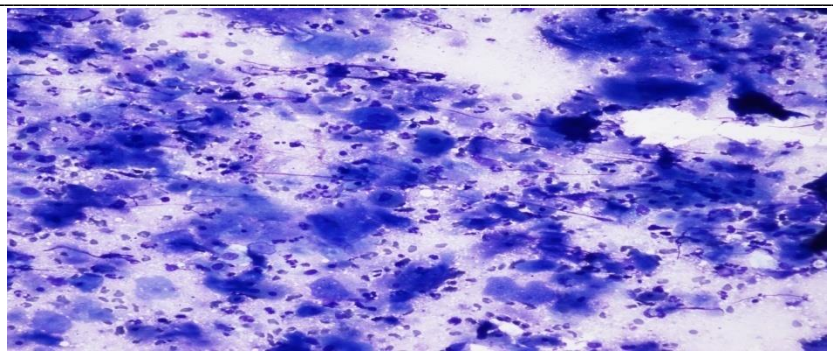

Fig 4: Photomicrograph showing metastatic deposits of squamous cell carcinoma (MGG 40X)

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