

Fine Needle Aspiration Cytology of Retroperitoneal Masses Under Radiological Guidance

Archana Deshpande¹, Vedita Bobde², Anuradha Shrikhande³

ABSTRACT

Introduction: Advances in diagnostic radiologic techniques has made Fine needle aspiration cytology more specific especially in hard to access areas like retroperitoneum. Rapid enlargement of tumors occur before clinical signs and symptoms develop in retroperitoneal area. Present study was undertaken to study the utility and efficacy of FNAC in early diagnosis of neoplastic and nonneoplastic retroperitoneal masses, to study the cytomorphology and diagnostic accuracy of FNAC with respect to tissue diagnosis wherever possible.

Material and methods: Study was done in Indira Gandhi Government Medical College, Nagpur on 70 patients with diagnosed retroperitoneal masses on radiology either by CT or USG over a period of 2 years. Appropriate staining was done and results were compared to histopathology wherever available. No major complications occurred during the procedure or post procedure period. Results were analysed to determine sensitivity, specificity, diagnostic efficacy of guided FNAC.

Results: Adequate cellular material was obtained in 66 cases to study cytomorphology. 46(65.72%) retroperitoneal masses were malignant. 3(4.28%) were benign while 14(20%) were inflammatory. 3 (4.28%)cases were suspicious for malignancy. Cytology was correlated with histopathological diagnosis in all 39 cases where tissue diagnosis was available. Interpretation: No major complications were seen during the procedure or post FNAC period. Statistical analysis showed sensitivity, specificity and diagnostic accuracy were 100% in these cases in the present study.

Conclusion: FNAC is advantageous in terms of accuracy, rapidity, safety and convenience if done in close cooperation with radiologist and clinicians. Performed as an OPD procedure, diagnosis obtained in 24 hours helps to avoid surgical laparotomy and numerous preoperative investigations in advanced and inoperable cases and inflammatory lesions.

Keywords: Retroperitoneum, Guided FNAC, Diagnostic Accuracy

areas in better visualization of lesion.¹ Retroperitoneum is potential space comprising various tissues such as adrenal glands, kidneys, pancreas, major blood vessels, lymph nodes and loose connective tissue.² Retroperitoneal lesions mostly present with abdominal pain and lump. Masses presents in retroperitoneal space subject to FNAC under radiologic guidance ensure representative material by avoiding large areas of necrosis and hemorrhage. The present study was done to know the cytomorphology and diagnostic accuracy of guided FNAC in retroperitoneum. It is now widely accepted as safe diagnostic procedure.

MATERIAL AND METHODS

The study was undertaken in department of Pathology IGGMC Nagpur over a period of 2 years. All cases were subjected to FNAC under appropriate radiological guidance with close cooperation between clinicians and radiologists. Patients of all age groups were included after proper clinical workup and consent were taken. A detailed clinical history and through clinical examination of the patient were carried out. Patients having history of uncontrolled bleeding tendencies, deranged coagulation profile, suspected vascular or non neoplastic cystic renal lesions were excluded. Procedure was explained to patient to allay anxiety and gain cooperation. The lesion to be aspirated was localized with USG or CT scan.¹ Under all aseptic precaution aspiration was carried out using 22 – 23 gauge needle attached to 10 ml syringe. Lumbar puncture needle was used in deep seated masses. Slides were grossly examined on the spot. If the slides were found to be excessively bloody or lacking in tissue fragments a repeat aspiration was done at the same time only once. Smears were stained with Hematoxylin and Eosin (H&E), Papanicolaou stain for alcohol fixed smears and May Grunwald Giemsa (MGG) for air dried smears. Additional smears were kept if required for special stains such as Ziehl Neelsen (ZN), Periodic acid Schiff's (PAS),

INTRODUCTION

Radiologic guidance in aspiration cytology has made FNAC more useful and cost effective technique. In difficult to aspirate areas like retroperitoneum where both inflammatory and neoplastic masses can grow to large extent before getting detected, FNAC helps in early diagnosis. By ultrasonography constant visualization of needle tip during insertion gives better cell yield as deep seated masses can also be reached. USG have the advantage of being inexpensive and can be easily repeated without radiation exposure. Computed tomography is superior in critical

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etc. Diagnosis was made by light microscopic examination and correlated with histopathological diagnosis wherever available.³

RESULTS

Total 70 patients were evaluated to study cytomorphology of retroperitoneal mass lesions done under radiological guidance. 38(54.28%) were males and 32(45.72%) were females. The youngest patient in the series was a 3 yr old female and oldest was 70 yr old male. Median age was 44 yrs. The most common complaints of the patients were lump in abdomen 30(42.85%) followed by pain in abdomen 27(38.57%), loss of weight and appetite 16(22.85%). Adequate material for cytological interpretation was obtained in 66(94.28%) cases. In 4(5.72%) cases a repeat aspiration revealed only blood, necrotic material with scanty cellularity and were classified as inadequate for interpretation. 46(65.72%) retroperitoneal masses were malignant. 3(4.28%) were benign while 14(20%) were inflammatory. 3 (4.28%) cases were suspicious for malignancy. Organ wise distribution of 66 adequate aspirates is shown in table 1.

Cytological criteria for diagnosis given by various authors were taken into consideration for interpretation of smears.^{2,3,6} Organ wise distribution of malignant neoplasms is shown in table 2.

Malignant neoplasms formed the largest category in our study (70%). Most common malignant lesions were that of retroperitoneal lymph nodes 16(34.78%) including 10 cases (21.7%) of metastasis and 6 cases (13.04%) of lymphoma. Following this was renal malignancy 12 cases (26.08%) comprising 9 cases(19.56%)of renal cell carcinoma and 3 cases (6.53%) of Wilms tumor. 9 cases (19.56%) were adenocarcinoma pancreas, 7(15.22%) cases were malignant mesenchymal tumors and 1 case of adrenocortical carcinoma was seen. 10 cases (21.7%) primarily presented with metastasis to retroperitoneal lymph nodes. In all cases attempt was made to identify the primary tumor site, taking into account the past and present history, radiological finding and cytological features. In 9 cases primary site was ascertained.

In our study most common non malignant condition was of inflammatory lesions of retroperitoneal lymph

Organ	Malignant	Benign	Inflammatory	Suspicious	Total
Retroperitoneal lymph-nodes	16	-	13	-	29(44)
Kidney	12	1	-	1	14(21)
Pancreas	9	-	1	2	12(18)
Retroperitoneal soft tissue	8	2	-	-	10(15)
Adrenal gland	1	-	-	-	1(2)
Total	46(70)	3(4.5)	14(21)	3(4.5)	66(100%)

Table-1: Organ wise distribution of 66 adequate aspirates

Organ or site of origin	Cytological diagnosis	No. of cases (%)	Total (%)
Retroperitoneal lymphnodes	metastasis of epithelial malignancy	10 (21.7)	16 (34.78)
	Lymphomas	6 (13.04)	
Kidney	RCC – clear cell	6 (13.04)	12 (26.08)
	Sarcomatoid RCC	1 (2.18)	
	Papillary RCC	1 (2.18)	
	TCC	1 (2.18)	
	Wilms Tumor	3 (6.53)	
Pancreas	Adenocarcinoma	9	(19.56)
Retroperitoneal soft tissue	Malignant mesenchymal tumors	7 (15.22)	8 (17.30)
	Germ cell tumor	1 (2.18)	
Adrenal gland	Adrenocortical carcinoma	1	2.18
Total		46	100

Table-2: Organ wise distribution of malignant neoplasms

Cytological category	No. of cases and diagnosis	Number	Percentage
Inflammatory	TB Lymphadenitis	8	40%
	Granulomatus Lymphadenitis (ZN stain negative for AFB)	5	25%
	Pancreatic cyst	1	5%
Benign	Dermoid cyst	1	5%
	Schwanoma	1	5%
	Angiomyolipoma	1	5%
Suspicious of malignancy	Pancreatic malignancy	2	10%
	Renal malignancy	1	5%
	Total	20	100%

Table-3: cytological diagnosis of non malignant cases

Cytological diagnosis	No. of cases in which HP correlation is available	No. of cases consistent with HP	No. of cases not consistent with HP
Renal			
Clear cell RCC	6	6	0
TCC	1	1	0
Sarcomatoid RCC	1	1	0
Papillary RCC	1	1	0
Wilm's Tumor	3	3	0
RCC suspicious of malignancy	1	1	0
Adrenal			
ACC	1	1	0
Pancreas			
Adenocarcinoma	9	9	0
Lymphnodes			
II° epithelial malignancy	9	9	0
Lymphomas NHL	2	2	0
Miscellaneous RP masses			
Dermoid cyst	1	1	0
Schwanoma	1	1	0
Seminoma	1	1	0
Malignant mesenchymal tumor	2	2	0
Total	39	39	0

Table-4: Cyto-histopath correlation: 39 cases

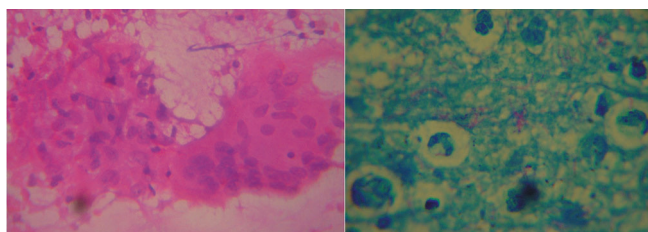


Figure-1: H & E stain – tuberculous lymphadenitis- Caseation necrosis eosinophilic amorphous granular material. Langhans and foreign body giant cells. Epithelioid histiocytes X400, ZN stain numerous acid fast tuberculous bacilli seen X1000

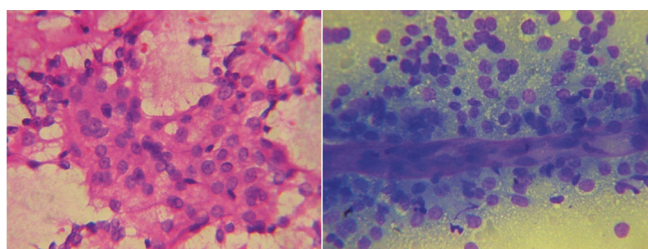


Figure-2: H & E stain- RCC clear cell type- Smear rich in cells against necrotic background. Single cells and sheet like, alveolar or papillary aggregates. Abundant pale cytoplasm with lipid droplets and finely granular with distinct cell borders. Tumor cells adhering to strands of basement membrane X400, RCC MGG stain X400

node 13 cases (18.57%) out of which 8 were tuberculous lymphadenitis and 5 were granulomatous lymphadenitis. 3 cases of suspicious of malignancy were found which were showing cellular features of malignancy such as cellular atypia, high N:C ratio, hyperchromasia but not fulfilling all the criterias of malignancy due to low cellularity, necrosis or inflammatory cells obscuring the cellular details. 1 case each of dermoid cyst, schwanoma and angiomyolipoma was

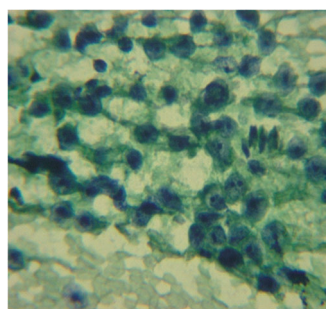


Figure-3: seminoma- PAP stain. Cell rich smears. Dispersed cells with few in clusters. Highly fragile cytoplasm and nuclei (tigroid background, nuclear smudging) Large vesicular nuclei distinct nucleoli. Abundant fragile pale cytoplasm, some vacuolation. Lymphocytes in background seen X400.

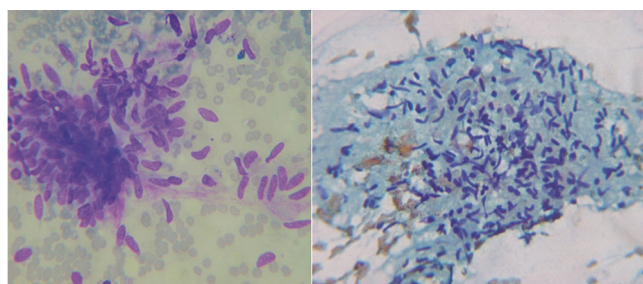


Figure-4: schwannoma- MGG stain, fragments of cohesive cells: Antony A areas. Mainly dispersed cells and myxoid background: Antony B areas. Fibrillar appearance of intercellular stroma Nuclear palisading with nuclei long and slender with pointed ends. Moderate degree of nuclear pleomorphism with uniformly bland chromatin pattern X400, schwannoma- PAP stain X100

found. Cytological diagnosis of non malignant cases is given in table 3

Histopathological diagnosis was available in 39 cases as shown in table 4.

We found 100% correlation between cytological and histopathological diagnosis giving 100% sensitivity, specificity and diagnostic accuracy. That led to early diagnosis; reduce open biopsy and time required for processing of surgical specimen. Close co-operation between radiologist, cytologist and clinician gives maximum efficiency of available techniques. It minimizes patient discomfort in diagnosing mass lesions in the set up of hospitals which caters patients from low socio economics groups and where advanced ancillary tests are not available. No major complications noted in present study except mild pain at puncture site during and after aspiration for few hours. Validated by the results of other study it is a safe procedure if done by experienced hand.^{4,5}

Characteristic cytological features were noted according to the available published studies in books and references.^{3,6} Histopathological diagnosis was available in 39 cases excluding inflammatory lesions where biopsy was not necessary. Sensitivity and diagnostic accuracy of 100% is comparable to high rate of sensitivity of other studies.^{4,7,8} Cytological aspirates were categorized as malignant 46 (69.70%) cases, benign 3(4.54%) cases, inflammatory 14(21.21%) cases, and suspicious of malignancy 3(4.54%) cases out of 66 adequate aspirates. % of malignancy is similar to other studies.^{8,9}

Retroperitoneal lymph-node- We got maximum number of aspirates from masses arising in lymph nodes (16 malignant and 13 inflammatory).⁸ 10 were metastasis of epithelial malignancy correlated with histopath diagnosis of primary tumor and 6 were non Hodgkin's lymphoma. NHL cases showed predominantly monotonous population of lymphoid cells with slightly large nuclei, more granular chromatin and no histiocytes. One case was diagnosed as Burkitt's lymphoma showing uniform cell population with high mitotic rate, intermediate size rounded nuclei having multiple small nucleoli, dense blue cytoplasm with small lipid vacuoles.^{10,11} Out of 13 cases of inflammatory lesions of lymph nodes 5 were granulomatous and 8 were tuberculous lymphadenitis.¹² (Figure 1). Four patients out of these were HIV positive similar to Jayaram G¹³ Nahir Saika.¹⁴ In all these cases FNAC led to conservative management preventing diagnostic laparotomies.

Renal masses- Total 14 cases which includes 6 cases of clear cell renal cell carcinoma showed cells in sheets, aggregates or dispersed singly having abundant pale finely granular vacuolated cytoplasm with distinct cell borders, low N:C ratio, bland nuclear chromatin, tumor cells adhering to strands of basement membrane. (Figure 2). One patient of clear cell RCC had disseminated metastasis to chest and head requiring preoperative chemo-irradiation. One case of sarcomatoid RCC showed poorly differentiated highly pleomorphic anaplastic spindle shaped tumor cells, hyperchromatic nuclei.^{15,16} One case each of papillary RCC and transitional cell carcinoma renal pelvis showed finding similar to Ahmad SS,⁹ Andrew A,¹⁷ Nidhi mangal.⁸ We got good cellularity in 3 cases of Wilms tumor. Blastemal component was recognized in all cases with varying degree of tubular epithelial,

glomeruloid and stromal differentiation.^{18,19} Preoperative chemotherapy is required in Wilms tumor to avoid operative rupture thus making FNAC necessary. A single case of angiomyolipoma showed smooth muscle cells and fat cells but no epithelial cells in aspirate thus excluding diagnosis of adenocarcinoma.^{20,21,22} Pancreas: 9 cases of adenocarcinoma pancreas show cohesive and detached abnormal ductal cell, disordered monolayered sheets, microglandular pattern, nuclear crowding, loss of cohesions, moderate amount of cytoplasm, mucin vacuoles. Indistinct cell borders, necrosis, mitosis, macronucleoli and hyperchromasia were seen in poorly differentiated forms.^{23,24} One case was suspected pseudocyst of pancreas showed turbid fluid with few inflammatory cells against proteinaceous background similar to findings of Barbara A et al.²⁵

Miscellaneous retroperitoneal soft tissue masses: Out of 12 cases 8 were malignant, 2 benign, 2 inadequate for interpretation. 7 malignant mesenchymal tumors(MMT) out of which 2 were classified as leiomyosarcoma showed spindle shaped cell with moderate amount of cytoplasm, pleomorphic hyperchromatic cigar shaped nuclei, distinct small nucleoli, few multinucleated tumor giant cell. Diagnosis was confirmed on histopathology. Sub typing of other 5 cases was not done, diagnosed as 2 round cell sarcoma and 3 poorly differentiated MMT of which histopathological co-relation was not available.^{26,27,28}

One case of retroperitoneal seminoma showed mainly dispersed cell with highly fragile cytoplasm, distinct nucleoli and few lymphocytes in background similar to Tao L C.²⁹ (Figure 3)

Benign cystic teratoma in 18 yr old female revealed pultaceous material showing anucleate keratinized squams, few inflammatory cells and macrophages. Cell from other differentiated tissue were not found. Diagnosis was confirmed on histopathology. One case of 26 yr old female having lump in abdomen show cohesive cells in antony A areas and mainly dispersed cells in mixoid background in antony B areas, nuclear palisading with long and slender nuclei with pointed end and bland chromatin. (Figure 4). Fibrillar appearance of intercellular stroma in fragments is seen and confirmed on histology as schwannoma. Single case of adrenocortical carcinoma was detected showing cells in moderately cohesive sheets with central thin walled vascular core, monomorphic cell population, eccentric nuclei, prominent nucleoli, focal anisonucleosis and focal spindling with crushing.^{3,6,27}

CONCLUSION

Compared to an open biopsy which has the disadvantage of being a lengthy procedure with high risk of complication, FNAC is advantageous in terms of accuracy, rapidity, safety and convenience. It can be performed as an OPD procedure. It is useful in avoiding laparotomies and numerous preoperative investigations in advanced and inoperable cases resulting in cost saving and reduced hospitalization. Even in inflammatory lesions it results in detecting responsible microorganisms and suitable antibiotic can be given.

Thus present study concluded that in retroperitoneal masses FNAC is useful if done under proper radiological guidance in skillful hands in close cooperation between radiologist and cytologist.

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