

Ultrasound Guided Fine Needle Aspiration Biopsy of Retroperitoneal Masses

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Abstract

The study was undertaken to evaluate the reliability of ultrasound guided fine needle aspiration biopsy (FNAB) in distinguishing benign and malignant lesions in the retroperitoneum and correlate the diagnosis by cytology of retroperitoneal masses with the results obtained by histology. The clinicopathological study was carried out in 50 patients presenting with retroperitoneal masses on ultrasonography. Fine needle aspiration under ultrasound guidance of these masses was performed by 20-22G needle after thorough clinical examination. Malignant lesion constituted the maximum number of cases - 31 (62%) followed by benign and inflammatory lesion - 16 cases (32%). Eleven cases out of 23 renal masses were Wilm's tumour, 4 were renal cell carcinoma and there was a single case of angiomyolipoma of kidney. Out of 20 cases with retroperitoneal lymphadenopathy 12 cases (60%) were inflammatory, mainly tuberculosis and 8 (40%) had malignancy. Out of the 7 cases of miscellaneous retroperitoneal masses, 3 were fibrohistiocytic tumour and 2 were myxoid liposarcoma. Ultrasound guided FNAB is an inexpensive, rapid, safe and accurate procedure for the diagnosis of retroperitoneal masses.

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Key Words : Ultrasonography, retroperitoneal masses, cytopathology.

Introduction

Ultrasound guided fine needle aspiration biopsy of retroperitoneal masses is an increasingly common diagnostic procedure in oncology. Various imaging modalities like lymphography, fluoroscopy and computerized tomography have been utilized in the evaluation of retroperitoneal masses. The advantages of ultrasonography (USG) are that it is rapid, inexpensive, versatile, no ionizing radiation is applied, does not require injection of contrast medium and can be easily repeated when necessary.¹

To evaluate the nature of the mass, ultrasound guided fine needle aspiration can be performed, as it is a safe diagnostic procedure, by which any structure visualized, can be reached quickly and precisely by a fine needle in any desired plane with constant visualization of the needle tip during insertion.² This study plans to correlate cytological morphology with histopathological findings in tissues from retroperitoneum, obtained by ultrasound guided fine needle aspiration biopsy (FNAB) and to evaluate the

role of USG guided FNAB in providing higher diagnostic yield.

Materials and Methods

The present study was conducted in the departments of pathology and radiodiagnosis of Jawaharlal Nehru Medical College, AMU, Aligarh in 50 patients with retroperitoneal masses. After thorough clinical examination, ultrasonographic examination was performed with Sonoline 500 (Siemen's) ultrasound machine having 3.5 MHz sector probe; and those found to have a mass were subjected to fine needle aspiration biopsy by a 20-22 G needle attached to a 10 ml syringe for superficial masses and a 9 cm, 20-22 G spinal needle for deep seated masses. Smears prepared were fixed in 95% ethyl alcohol and stained with Haematoxylin & Eosin and Papanicolaou stains. Subsequent to cytologic diagnosis, tissue obtained from operated patients was processed and stained with Haematoxylin & Eosin stain.

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Observations

Most of the patients included in the study presented with an abdominal mass or with pain in the abdomen and ultrasonographic examination revealed retroperitoneal masses. Thirty (60%) were males and 20 (40%) females.

After ultrasonographic examination, all the patients were subjected to fine needle aspiration of their masses under ultrasound guidance. Malignant lesion constituted the maximum number of cases, 31 (62%) followed by 16 (32%) benign and inflammatory (Table 1).

Twenty-three out of 50 patients had a renal mass and it excluded those patients having simple renal cysts by ultrasonography. Only those masses having solid areas, suspected of being malignant were aspirated. Seventeen (73.9%) patients were males and 6 (26.1%) females. The youngest patient in this study was 1 ½ year old male child having Wilm's tumour (Fig. 1) and the oldest was of 60 years having renal cell carcinoma. The average age for Wilm's tumour was 4.1 years and male: female ratio was 4:1. Patients with renal cell carcinoma ranged from 50-72 years.

On cytology, adequate material for diagnosis was obtained in all cases. Seventeen (73.9%) patients had malignancy, 11 of which were Wilm's tumour with smears showing malignant small cells with high N/C ratio consistent with blastemal component (Fig. 2). A case of Wilm's tumour in a 11 year old female child with metastasis to cervical lymph node, was encountered. There were 4 cases of renal cell carcinoma and 2 transitional cell carcinoma.

Six (26.1%) patients had inflammatory or benign lesion, 5 of which were pyonephrosis and a single case of angiomyolipoma of kidney was detected.

Twenty patients having enlargement of retroperitoneal lymph nodes were aspirated; 13 (65.0%) of which were males and 7(35.0%) females. Maximum number of patients were in the age group of 21-30 years (35.2%), followed by 23.5% in 31-40

Table 1 : Distribution of total number of cases according to cytologic diagnostic category

S. No.	Diagnostic category	Number of cases	Percentage
1.	Inadequate	01	02
2.	Inflammatory + Benign	16	32
3.	Suspicious	02	04
4.	Malignant	31	62
	Total	50	100

years of age. On cytological examination, 12 patients (60%) were found to have inflammatory lesion, mainly tuberculosis which on cytology revealed aggregates of epithelioid cell granuloma in a caseous background. None of the cases were inadequate or suspicious for malignancy. 8 patients (40%) had malignancy; 5 of which were lymphomas and 3 metastatic adenocarcinoma.

Among the 7 cases of miscellaneous masses; the majority were in the age group of 31-40 years (28.6%). On cytology, adequate material for diagnosis was obtained in all and there were no suspicious or benign cases. A single case of neuroblastoma in a female infant, which had metastasized to the ovary, was observed which on cytology revealed typical neuroblastic cells with increased N/C ratio, evenly distributed chromatin and prominent nucleoli (Fig. 3).

There were 3 cases of fibrohistiocytic tumour

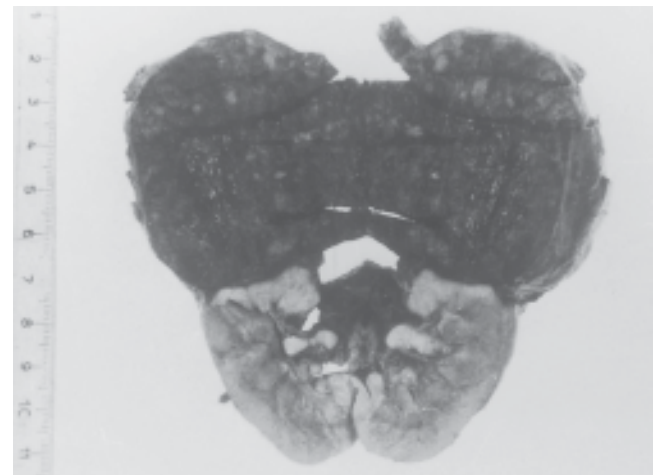


Fig.1 : Wilm's tumour: Gross specimen showing tumour at the upper pole of the kidney.

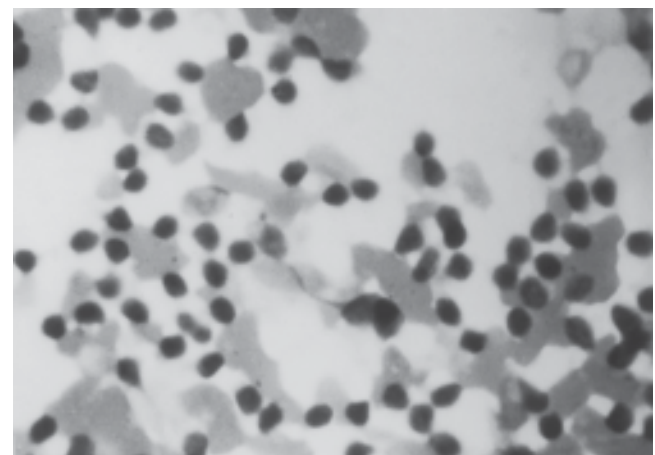


Fig. 2 : Wilm's tumour: Smear showing malignant small cells with high N/C ratio consistent with blastemal component (Pap, x 250).

presenting as solid retroperitoneal masses, the origin of which could not be ascertained on ultrasonographic examination, but were confirmed by histopathology.

Two cases of cystic retroperitoneal masses were observed on ultrasonography, which on cytology revealed only myxoid material and few clusters of columnar cells, and a diagnosis of mucin secreting adenocarcinoma was made. But on histopathology, both turned out to be myxoid liposarcoma.

A single case of seminoma in an undescended testes in the retroperitoneum was observed which on cytology revealed dispersed population of cells with highly fragile cytoplasm, vesicular nuclei and prominent nucleoli in a lymphocytic background (Fig. 4). The diagnosis was confirmed on histopathology.

Of the 9 renal masses in which cytohistological correlation was done, 8 were true positive and 1 true negative with no false positive or negative, giving a sensitivity, specificity, predictive value of positive and negative result and diagnostic accuracy of 100% each (Table 2).

Three out of the 5 cases of lymphadenopathy were true positive and 2 were true negative with no false positives/negatives, giving a 100% result of all diagnostic parameters.

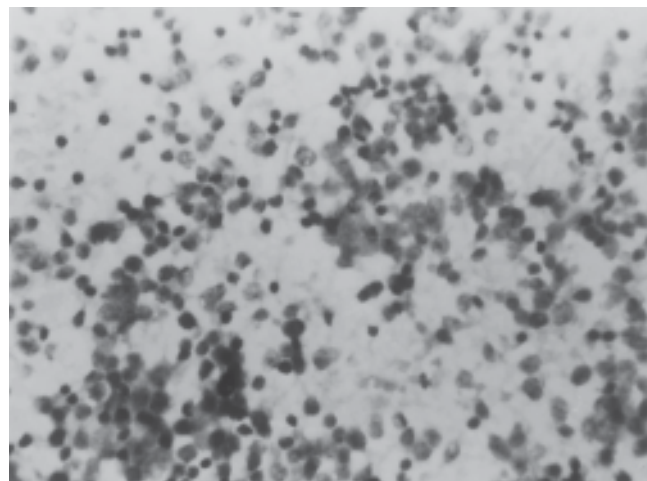


Fig. 3 : Neuroblastoma : Smear showing typical neuroblastic cells with high N/C ratio, evenly distributed chromatin and prominent nucleoli (Pap, x 250).

Of the 4 cases with masses in miscellaneous sites; 2 each were true positive and true negative for malignancy; giving a sensitivity, specificity, predictive value of positive and negative results and diagnostic accuracy of 100% each. Two cases diagnosed as mucin secreting adenocarcinoma on cytology turned out to be myxoid liposarcoma; which was due to few clusters of malignant columnar cells and scanty mucinous aspirate material.

Discussion

On the basis of ultrasonographic findings, the patients were divided into those having; renal masses, retroperitoneal lymphadenopathy and miscellaneous retroperitoneal masses.

The age of patients with renal masses ranged from 1½ year to 72 years in our study; a finding similar to Mondal and Ghosh,³ who studied patients in the range of 4-76 years. The average age for Wilm’s tumour was 4.1years with a male: female ratio of 4:1, a finding in accordance to Dey et al,⁴ who have reported a ratio of 2.5:1.

USG guided percutaneous FNAB of renal masses was first reported by Kristensen et al,⁵ who stated

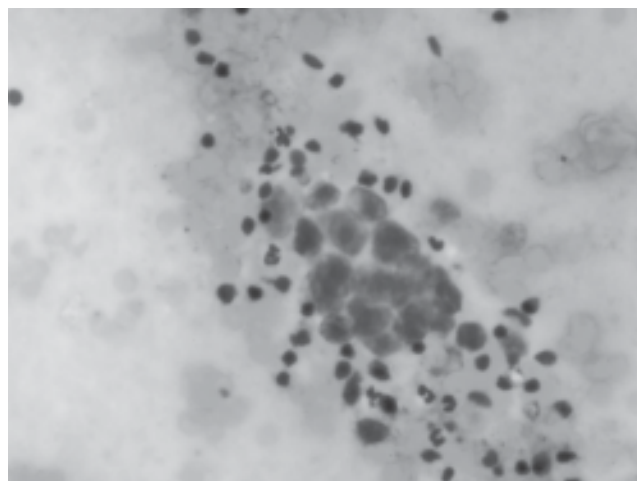


Fig. 4 : Retroperitoneal seminoma : Needle aspirate from seminoma showing dispersed population of relatively uniform sized cells with vesicular nuclei and prominent nucleoli. A suggestive lymphocytic cellularity is seen associated (H & E, x 500).

Table 2 : Diagnostic efficiency of USG guided FNA as a function of site

S. No.	Site	No. of cases	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Diagnostic Accuracy
1.	Renal	23	100%	100%	100%	100%	100%
2.	Retroperitoneal lymphadenopathy	20	100%	100%	100%	100%	100%
3.	Miscellaneous retroperitoneal mass	07	100%	100%	100%	100%	100%
	Total	50	100	100%	100%	100%	100%

that FNAB under the guidance of ultrasound is required for preoperative diagnosis if there is a cystic degeneration in a solid mass or if there are features suspicious of malignancy.

Good cellularity was obtained in all the cases studied by us on cytology. In Wilm's tumour, blastemal component was recognized in all cases with varying degrees of tubular, epithelial, glomeruloid and stromal differentiation; a finding in concordance with those reported by Dey et al⁴ and Hazarika et al.⁶

Since Wilm's tumour carries a risk of operative rupture and spillage, pre-operative chemotherapy is required. Further, this tumour has an overall survival rate of 80%, if adequately treated.⁶ So FNAB is a useful and accurate method for making preoperative diagnosis of Wilm's tumour.

One patient with renal cell carcinoma in our study had disseminated metastasis requiring chemotherapy and irradiation. In such inoperable cases, FNAB is essential for diagnosis and in preventing unnecessary investigations.

A single case of angiomyolipoma was reported by us. Since the treatment of angiomyolipoma differs from that of adenocarcinoma of kidney, pre-operative diagnosis is of great value.⁷ Further angiomyolipoma may clinically mimic adenocarcinoma. Similar to the findings of Nguyen⁸ we obtained smooth muscle cells and fat cells in the aspirate of angiomyolipoma but no epithelial cells, thus excluding a diagnosis of adenocarcinoma.

We obtained a 100% concordance in our diagnosis of FNABs of renal masses on histopathology, thus giving a sensitivity, specificity, predictive value of positive and negative result and diagnostic accuracy of 100% each; a finding similar to Pilotti et al⁹ who aspirated 132 cases of renal masses with sensitivity of 93% and specificity of 96%.

Tuberculosis (9 cases) formed the most common diagnosis among the inflammatory lesions of lymph node enlargement; 2 of which were suspected to have lymphoma on ultrasonography. In all these cases, FNAB diagnosis led to conservative management, preventing diagnostic laparotomy.

Out of the 8 cases of malignant lymphadenopathy, 4 each were lymphoma and metastatic adenocarcinoma. Typing of malignancy helped the clinician in deciding the course of treatment. No complications were encountered, similar to the studies of Porter et al.¹

We achieved sensitivity, specificity, predictive value

of positive and negative result and diagnostic accuracy of 100% each in retroperitoneal lymphadenopathies. These results are better than those reported by other authors (80% by Juul et al¹⁰ and 86% by Droese et al¹¹ which could be because of fewer cases in our study. Further, FNAB was repeated in a few cases with inadequate material on first aspiration.

Among the miscellaneous masses, a single case of neuroblastoma with ovarian metastasis was diagnosed on FNAB and preoperative chemotherapy given to the patient. Since neuroblastoma is the third most common malignancy in children it must be distinguished from other small round cell tumors of childhood especially Wilm's tumour and a definitive diagnosis of neuroblastoma should be rendered only after a combination of complete clinical history, physical examination, radiologic and laboratory studies and cytologic diagnosis.¹² The diagnosis was confirmed on histopathology.

We observed a single case of retroperitoneal seminoma in an undescended testes which was confirmed on histopathology. Quite similarly Tao-Negin and Donat¹³ have reported a case of primary retroperitoneal seminoma on FNAB with cytologic features of uniform neoplastic malignant cells, singly or in groups of 2-3 cells with round nuclei and round regular nucleoli and clear or pale staining cytoplasm.

On cytohistological correlation of miscellaneous retroperitoneal masses, we achieved sensitivity, specificity, predictive value of positive and negative result and diagnostic accuracy of 100% each.

Conclusion

Ultrasound guided fine needle aspiration is reliable, accurate, safe and well tolerated and it should be considered the initial investigation for retroperitoneal masses.

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