

**ROLE OF IMAGE GUIDED FINE NEEDLE ASPIRATION CYTOLOGY IN DIAGNOSIS OF RETROPERITONEAL LESIONS IN PEDIATRIC POPULATION**Priyanka Agrawal<sup>1</sup>, Atul Gupta<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** This study was undertaken to assess the role of image-guided, fine needle aspiration cytology (FNAC) in the diagnosis of retroperitoneal lesions in pediatric population. Over a period of one year, 15 cases of pediatric retroperitoneal lesions presented. Lymph node & adrenal, both, accounted for maximum (26.7% each) whereas pancreas & retroperitoneum proper, both, for minimum (6.7% each) of cases. Male to female ratio was 2:1. Malignant and benign lesions accounted for 86.7 and 6.7% respectively. On correlating clinical, radiological, cytologic features & histology, the sensitivity, specificity & diagnostic accuracy was 92.8%, 100% & 93.3%, respectively.

**KEYWORDS:** FNAC, retroperitoneal lesions, pediatric.

**INTRODUCTION:** Retroperitoneum is an area of curiosity and interest since long time. Considering the numerous and heterogenous contents of this region which includes adrenal, pancreas, kidney, retroperitoneal lymph node, gastrointestinal tract (second part of duodenum, ascending & descending colon) & retroperitoneum proper, lesions that can be potentially encountered here are numerous. Obtaining cytological material in infectious/ inflammatory lesions allows rapid initiation of treatment. In cases with known history of malignancy, and FNAC is performed either to confirm or exclude the presence of metastasis. In patients without a known primary tumor, a positive cytology may be the first indication of malignancy and aid in the search for an occult primary.

**MATERIAL AND METHODS:** Fifteen cases of pediatric retroperitoneal lesions were analysed by image guided FNAC performed during a period of one year (2008-2009), to assess the role of image-guided FNAC in the diagnosis of retroperitoneal. The cytological material obtained in all 15 cases which were stained by May-Grünwald-Giemsa (MGG) (Air-dried smears). FNAC was performed in patients who presented clinically with signs and symptoms related to the retroperitoneum (Including kidney, adrenal gland, pancreas, lymph nodes, ascending & descending colon and duodenum), were co-operative and had no bleeding tendency or coagulopathy.

**RESULTS:** Male to female ratio was 2:1. Of the 15 cases, 4 cases were from adrenal & lymph node each, 3 from the kidney, 2 from intestine, 1 each from pancreas & retroperitoneum proper. All the smears were adequate in terms of cellularity. Age, sex, clinical features, radiological findings, cytological diagnosis & histological diagnosis are illustrated in table 1.

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Sl. No.	Age / Sex	Clinical features	Radiological findings	Cytological diagnosis	Histological diagnosis
1.	2y/M	Mass abdomen	Tumor of adrenal origin with calcification	Neuroblastoma <sup>1</sup>	Neuroblastoma
2.	6m/M	Mass abdomen	Retroperitoneal mass	Neuroblastoma <sup>1</sup>	Neuroblastoma
3.	10y/M	Mass abdomen	Retroperitoneal mass	Ganglioneuro-blastoma <sup>2</sup>	Ganglioneuro-blastoma
4.	4y/M	Mass abdomen	Retroperitoneal (Paraspinal) mass with areas of calcification	Ganglioneuro-blastoma <sup>2</sup>	Ganglioneuro-blastoma, intermixed type
5.	18y/F	Mass abdomen	Mass in region of left adrenal	Pheochromocytoma <sup>3</sup>	Pheochromocytoma
6.	15y/F	Mass abdomen	Well marginated retroperitoneal lesion with central cystic content	Solid pseudopapillary epithelial neoplasm of pancreas <sup>4</sup>	Solid pseudopapillary epithelial neoplasm of pancreas
7.	2y/M	Mass abdomen	Lt. renal mass	Wilms' tumor <sup>5</sup>	Wilms' tumor
8.	4y/F	Mass abdomen	Lt. renal mass with hepatic metastasis	Wilms' tumor <sup>5</sup>	Wilms' tumor
9.	5y/M	Mass abdomen	Rt. Renal mass	Wilms' tumor <sup>5</sup>	Wilms' tumor
10.	4y/M	Constitutional symptoms	Retroperitoneal lymphadenitis	Reactive lymphadenitis	Hodgkin lymphoma
11.	17y/M	Constitutional symptoms	Retroperitoneal lymphadenitis with hepatic involvement	Hodgkin lymphoma <sup>6</sup>	Hodgkin lymphoma
12.	18y/F	Constitutional symptoms	Retroperitoneal lymphadenitis	Tubercular <sup>7</sup>	Tubercular
13.	4y/F	Constitutional symptoms	Retroperitoneal lymphadenitis	Non-Hodgkin lymphoma <sup>8</sup>	Non-Hodgkin lymphoma
14.	16y/M	Mass abdomen	G. I. mass	Adenocarcinoma <sup>9</sup>	Adenocarcinoma, well differentiated
15.	17y/M	Irregular bowel habits	G. I. mass	Adenocarcinoma <sup>9</sup>	Adenocarcinoma, moderately differentiated

**Table 1: Clinical, radiological, cytological & histological findings**

In present study, adequacy was 100%, false positivity 0%, false negativity 6.67%, sensitivity 92.8%, specificity 100%, positive predictive value 100%, negative predictive value 66% and diagnostic accuracy 93.3%.

**DISCUSSION:** Gupta RK et al 2003<sup>10</sup> conducted a study on assessment of pelvic and retroperitoneal masses by FNAC under CT or USG in 112 patients. Eighteen were inflammatory, 17 demonstrated normal cellular elements, 12 cases were unsatisfactory or inadequate, 5 suspicious for malignancy, 39 metastatic tumor, 13 lymphoma and 8 cases were of soft tissue sarcomas.

Ahmad SS et al 2007,<sup>11</sup> carried out clinic-pathologic study in 50 patients presenting with retroperitoneal masses on ultrasonography. Thirty one cases were malignant lesions while 16 benign and inflammatory. Eleven cases out of 23 renal masses were Wilms' tumor, 4 were RCC 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 7 cases of miscellaneous retroperitoneal masses, 3 were fibrohistiocytic tumor and 2 were myxoid liposarcoma, 1 was neuroblastoma and 1 was seminoma.

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Aziz Metal 2008<sup>12</sup> conducted a study over a period of one year. Ultrasonography and computerized tomography guided FNAC was performed in 55 cases. 51 cases were diagnosed and 4 were unsatisfactory smears. 32 were malignant whereas 16 were non-malignant and remaining 3 were suspicious for malignancy. Non-malignant lesions included 8 pott's spine, 3 retroperitoneal tuberculous lymphadenitis, 2 retroperitoneal non-organ specific cystic inflammatory lesions, 1 benign nerve sheath tumor of spinal nerve, 1 acute pyelonephritis and 1 pheochromocytoma. Out of 32 malignant tumors include 7 RCC, 1 Wilms' Tumor, 1 adrenocortical carcinoma, 2 neuroblastoma, 2 metastases to adrenal gland, 1 islet cell tumor, 2 pancreatic duct adenocarcinoma, 4 round cells (undifferentiated) malignancy, 1 immature teratoma, 1 non-Hodgkin's lymphoma, 1 leukemic involvement, 6 spinal metastasis and 1 subdiaphragmatic extension of large cells lung carcinoma.

### STATISTICAL ANALYSIS OF RETROPERITONEAL FNAC:

Literature	Adequacy	False Positivity	False negativity	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Diagnostic accuracy
Ahmed SS et al 2007	98%	0	0	100%	100%	100%	100%	100%
Aziz M et al. 2008	96.4%	5.45%	1.82%	97.1%	84.2%	91.7%	94.1%	92.4%
Present study	100%	0%	6.67%	92.8%	100%	100%	66%	93.3%

Thus, the results were nearly similar to that of the previous studies.

What this study adds: Fine needle aspiration cytology of retroperitoneal lesions, in pediatric population, through imaging guidance is a useful and safe diagnostic procedure, which enables diagnosis with fair degree of ease without resorting to major surgery merely for diagnostic purposes. In current study, sensitivity, specificity & diagnostic accuracy was 92.8%, 100% & 93.3%, respectively.

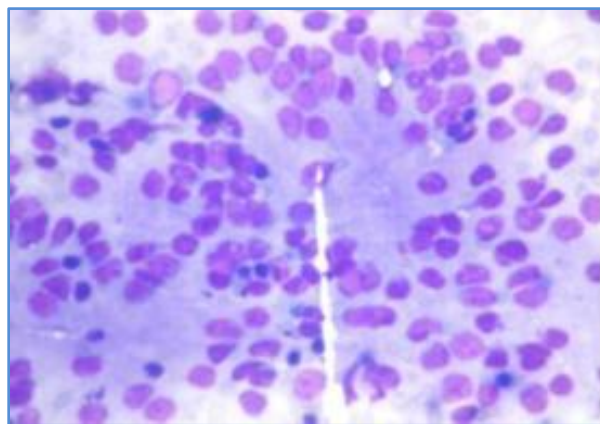
### REFERENCES:

1. Akhtar M, Ali M et al. Aspiration cytology of neuroblastoma. *Cancer* 1986; 57: 797-803.
2. Kumar PV. Fine needle aspiration Cytologic diagnosis of Ganglioneuroblastoma. *Acta Cytol* 1987; 31: 583 – 586.
3. Rupp M. Fine needle aspiration cytology of retroperitoneal paraganglioma with lipofuscin pigmentation. *Acta Cytol*, 1990; 34: 84 – 88.
4. Young NA et al. Differential diagnosis of cystic neoplasm of pancreas by FNA. *Arch Pathol Lab Med* 1991; 115: 571-77.
5. Hazarika D et al. Fine Needle aspiration cytology of Wilms' tumor. A study of 17 cases. *Acta Cytol* 1994; 38: 355 – 360.
6. Kardos TF et al. Hodgkin's disease, diagnosis by fine needle aspiration biopsy. Analysis of cytologic criteria from a selected series. *Am J Clin Pathol* 1986; 86: 286 – 291.
7. Suri R, S. Gupta, SK Gupta, K Singh, S. Suri. Ultrasound guided fine needle aspiration cytology in abdominal tuberculosis. *The British Journal of Radiology*, 1998; 71:723-727.

## ORIGINAL ARTICLE

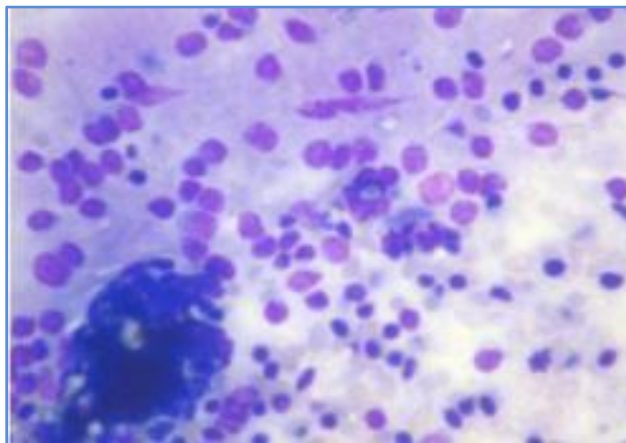
8. Van Heerde P et al. Cytodiagnosis of non-Hodgkin's lymphoma. *Virchow Arch* 1984; 403: 213 – 233.
9. Das D.K., Pant S.S. Fine needle aspiration cytology diagnosis of gastrointestinal tract lesions. A study of 78 cases. *Acta Cytol*; 1994; 38: 723-729.
10. Gupta RK et al. Value of image guided needle aspiration cytology in the assessment of pelvic and retroperitoneal masses. *Acta Cytol* 2003; 47: 393 – 398.
11. Ahmad SS et al. Ultrasound guided fine needle aspiration biopsy of retroperitoneal mass. *J Cytol* 2007; 24: 41 – 5.
12. Aziz M et al. Radiologically guided fine needle aspiration cytology of retroperitoneal and spinal lesions. *J. Cytol* 2008; 25: 123 – 27.

**Fig. 1:** Neuroblastoma (FNA) showing rosette formation around neutrophil (MGG, 400X)



**Fig. 1**

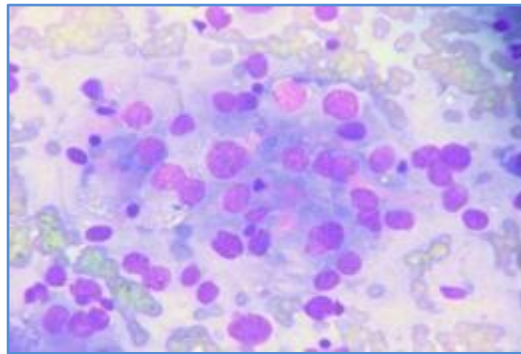
**Fig. 2:** Neuroblastoma (FNA) showing calcification (MGG, 400X).



**Fig. 2**

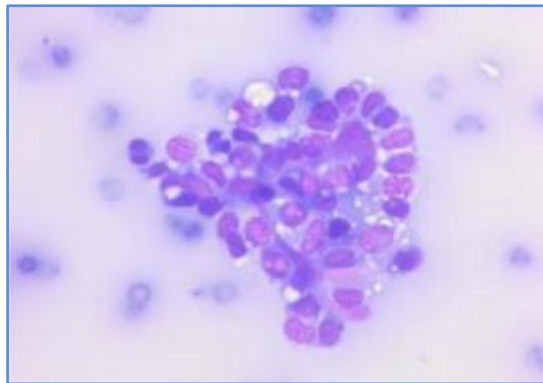
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**Fig. 3:** Adrenal pheochromocytoma (FNA) showing cells in vague acinar pattern, indistinct cell borders, abundant cytoplasm & anisonucieosis (MGG, 400X).



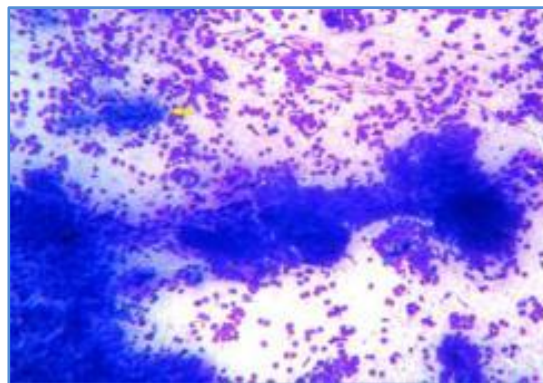
**Fig. 3**

**Fig. 4:** Solid pseudopapillary epithelial neoplasm (FNA) showing branching papillae with central stromal core (MGG, 400X).



**Fig. 4**

**Fig. 5:** Willms' tumour (FNA) showing skeletal muscle differentiation (arrow), epithelial differentiation as tight clusters & blastemal cells in background (MGG, 400X).

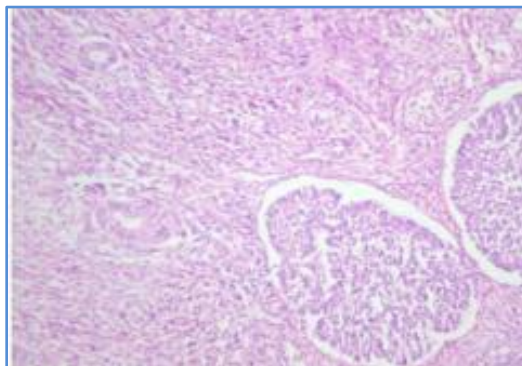


**Fig. 5**



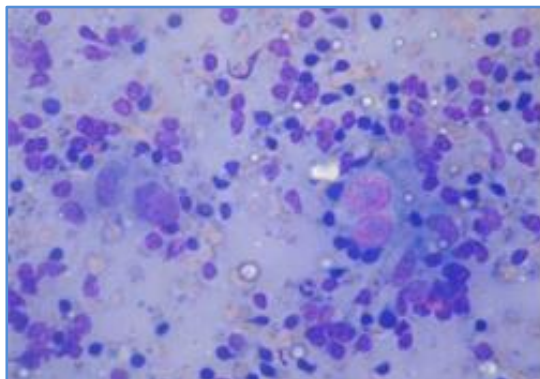
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**Fig. 6:** Willms' tumour (Histo) showing tubules, glomeruli, blastema & stromal component (H & E, 100X).



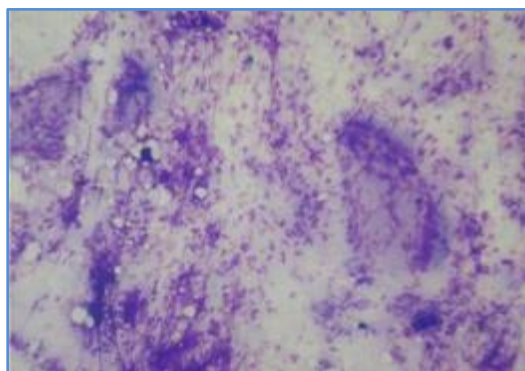
**Fig. 6**

**Fig. 7:** Hodgkin lymphoma (FNA) showing classical Sternberg - Reed cells & eosinophils in reactive background (MGG, 400X).



**Fig. 7**

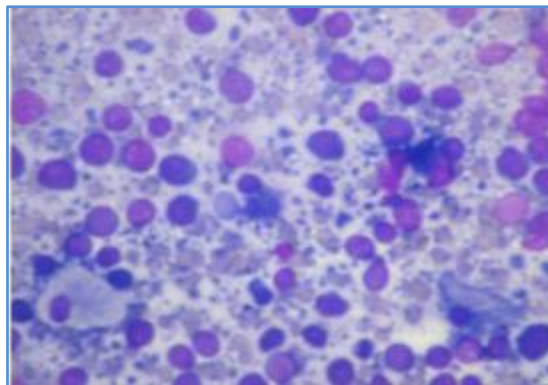
**Fig. 8:** Tubercular lymphadenitis of retroperitoneal lymph node (FNA) showing giant cells (MGG, 400X).



**Fig. 8**

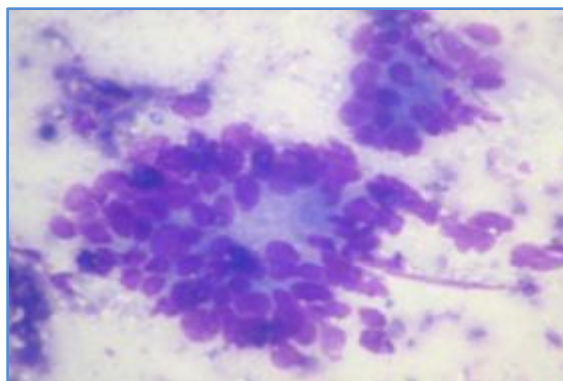
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**Fig. 9:** Large cell NHL (FNA) showing large cells (centroblasts) with open chromatin (MGG, 400X)



**Fig. 9**

**Fig. 10:** Adenocarcinoma of intestine (FNA) (MGG, 400 X).



**Fig. 10**

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