INTRODUCTION

Image guided fine needle aspiration biopsy of retroperitoneal masses is an increasingly common diagnostic procedure in oncology (Porter, 1981). It has brought a revolution in the field of cytopathological diagnosis of a less accessible site like retroperitoneum (Ghazala Mehdi et al., 2013). The problem of dealing with retroperitoneal masses is due primarily to their growth with no boundaries often leading to the large size attained before the development of symptoms and the establishment of a diagnosis (Murtaza et al., 2008) The proximity to vital vascular and neural structures as well as intra-abdominal organs add to the problem (Murtaza et al., 2008). In the majority of cases, there is a known history of malignancy, and FNAC is performed either to confirm or exclude the presence of metastasis (Agarwal et al., 1997; Mondal, 2002). Fine Needle Aspiration Cytology is a simple, safe, inexpensive and rapid procedure which renders surgical intervention and exploratory laparotomy unnecessary (Langlois, 1999). Amongst the various imaging modalities, many prefer the speed of ultrasound guidance being (versatile, inexpensive, no ionising radiation while others are reassured by the greater resolution of computed tomography (Langlois, 1999). The aim of our study was to assess efficiency of image guided FNAC in pre-operative diagnosis and management of retroperitoneal lesions. Our objectives were to assess the cytomorphological features, anatomic site wise distribution, age and sex distribution of the patients with retroperitoneal lesions, to classify the malignant lesions and non malignant lesions, and to correlate the histopathological diagnosis with cytological diagnosis wherever possible.

MATERIAL AND METHODS

Ours was a observational study conducted in the department of pathology, SKIMS for a period of three years from june 2014 to june 2017. It included analysis of 108 patients who presented clinically and radiologically with retroperitoneal lesions. Aspirations were performed using 18-22 gauge needles of suitable length. The aspirate was forcibly ejected on the glass slide to check the onspot adequacy using the diff quick method. Whenever the material was found inadequate for...
evaluation, the procedure was repeated. The remaining slides were stained with May Grünwald Giemsa or fixed in 95% alcohol and stained by Papanicolaou’s stain. Special stains like gram stain/Ziehl Neelson were done whenever required. Histopathological correlation was done wherever feasible.

RESULTS

Site and gender: Out of the total 108 retroperitoneal lesions studied majority of the cases were from the pancreas (62.9%) followed by kidney. The site wise distribution and gender distribution of lesions is given in Table 1 and Table 2 respectively.

Age distribution and behaviour of lesions: Majority of the patients were (39.13%) seen in the 5th decade of life and the malignant lesions were more common (Table 3). Histopathological correlation could be done in 38 cases and all the 38 cases were compatible with the cytological diagnosis (Table 4)

<table>
<thead>
<tr>
<th>Site</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreas</td>
<td>68</td>
<td>62.9</td>
</tr>
<tr>
<td>Retroperitoneal</td>
<td>10</td>
<td>9.2</td>
</tr>
<tr>
<td>Adrenal</td>
<td>5</td>
<td>4.6</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>(63 (58.3)</td>
</tr>
<tr>
<td>Females</td>
<td>(45 (41.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>Malignant</th>
<th>Suspicious</th>
<th>Benign</th>
<th>Total (%)</th>
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</thead>
<tbody>
<tr>
<td>1-10</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (1.08)</td>
</tr>
<tr>
<td>11-20</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2 (2.17)</td>
</tr>
<tr>
<td>21-30</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4 (4.34)</td>
</tr>
<tr>
<td>31-40</td>
<td>3</td>
<td>0</td>
<td>5</td>
<td>8 (8.99)</td>
</tr>
<tr>
<td>41-50</td>
<td>17</td>
<td>1</td>
<td>8</td>
<td>26 (28.2)</td>
</tr>
<tr>
<td>51-60</td>
<td>26</td>
<td>6</td>
<td>4</td>
<td>36 (39.13)</td>
</tr>
<tr>
<td>61-70</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>13 (14.13)</td>
</tr>
<tr>
<td>71-80</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2 (2.17)</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>9</td>
<td>22</td>
<td>92</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Cytodiagnoses</th>
<th>No. of cases</th>
<th>Compatible</th>
<th>Incompatible</th>
</tr>
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<tbody>
<tr>
<td>Malignant</td>
<td>38</td>
<td>38</td>
<td>0</td>
</tr>
</tbody>
</table>

Pancreas: A total of 68 cases (62.9%) with pancreatic lesions were seen with a mean age of 55 years (Table 5).36 were males and 32 were females (Table 6). A good cellularity was obtained in 61 cases, 7 cases however were inadequate for any cytological diagnosis (Table 6). Most of the cases were malignant which included a total of 42(61.7%) cases whereas 5(7.35%) cases were diagnosed suspicious for malignancy. 14(20.5%) cases showed a benign cytological picture. Among the malignant tumors adenocarcinoma constituted 63.9% (39) of the cases (Table 5).

Kidney: Renal lesions contributed to 23.2% of the total cases. Out of the total 25 cases, 19 showed adequate cellularity. Malignant lesions were more common (57.8%) than non
malignant lesions (31.5%). Among the malignant lesions RCC was the most common diagnosis (Table 7) constituting 47.4% (n=9) of the total cases with the mean age of 55 years and a male predominance (Table 7,8).

**Lymph Node:** The most common cause of retroperitoneal lymphadenopathy was metastatic adenocarcinoma seen in 4 patients followed by non hodgkins lymphoma in 2 patients (Table 9).
Adrenal: USG guided aspiration of 5 adrenal lesions revealed pheochromocytoma in three, NHL in one and one was diagnosed as suspicious for malignancy

DISCUSSION

Our study was an observational study conducted in the department of pathology, SKIMS, Soura for a period of three years from June 2014 to June 2017. A total of 108 guided aspirations were done for retroperitoneal lesions. 101 cases were done under ultrasound guidance and 8 cases were done under CT guidance. CT scan was used in those cases in which mass localisation was not possible by USG and repeated USG guided FNAC failed to yield enough material. Majority of the patients presented with chief complaint of abdominal pain or discomfort; other symptoms included abdominal mass, weight loss, fever and hematuria. P Gupta (Gupta et al., 2017) and Chakrabarti et al. (2014) described similar clinical presentation in their studies. Out of the total 108 retroperitoneal lesions studied majority of the cases were from the pancreas (62.9%) followed by kidney (23.2%), retroperitoneal lymph nodes (9.2%) and adrenal (4.6%). These results were similar to study done by P Gupta et al. (2017). However contradictory to this, some studies (Misra et al., 2015; Sengupta et al., 2014) had kidney while a few others (Chakrabarti et al., 2014; Gangopadhyay et al., 2012) had lymph nodes as the most common site of retroperitoneal lesions in their studies. The study revealed a male preponderance that included 63(58.3%) males and 45 (41.6%) females. This was in concordance with studies done by Suman et al. (2015) and Aziz et al. (2008). Cases from all the age groups were analysed and it was observed that majority of the patients belonged to the age group of 51-60 years (39.13%). A similar age range was observed by P Gupta and Namshikhar (Aparna Amogh Naik Namshikar, 2016) in their studies. The findings of the study were grouped as malignant, suspicious for malignancy and benign. The malignant lesions predominated and constituted a total of 61(56.4%) cases. These results are comparable with the findings of Mangal et al. (2009). Out of 108 cases, 16 cases showed scant cellularity and material could not be aspirated even after multiple passes. Hence, a proper cytological diagnosis was not possible in these cases.

Pancreas: A total of 68 cases (62.9%) with pancreatic lesions were seen and most of the cases were malignant which included a total of 42(61.7%) cases. Among the malignant tumors adenocarcinoma constituted 63.9% (39) of the cases a finding that was similar to that observed by Mehdi et al. (2013) and Jorda et al. (1992) in their studies. Smears were highly cellular showing cells arranged in sheets, clusters, three dimensional aggregates and microaglandular pattern. The background varied from clean, necrotic, inflammatory to cystic. Individual cells were large, discohesive and hyperchromatic. Histopathological correlation was obtained in 22 cases and there was 100% cytohistological agreement. A single case of solid pseudopapillary neoplasm was diagnosed in a 13 year old female. Smears were moderate to hypercellular and showed papillae formation, acinar arrangements and pseudorossettes. The patient underwent surgical resection of the pancreatic mass and histopathological correlation was established. On IHC, tumor cells were strongly positive for progesterone receptors. The patient, a 53-year-old female who was a known case of non Hodgkins lymphoma had a large tumor in the head of the pancreas. Serum LDH levels were raised, CA19.9 levels were however normal. FNAC smears showed large atypical cells with round or very irregular nuclei, with single or multiple nucleoli and scant cytoplasm, or round/irregular nuclei with a single prominent nucleolus and evident cytoplasm. A diagnosis of non hodgkins lymphoma was made. The tumor was invading the duodenum and pancreaticoduodenectomy was performed. This tumor was identified, by histopathology and immunohistochemistry, as diffuse mixed type lymphoma with a B-cell phenotype. Ueda et al. (2000) and Anastasia Shnitser et al. (2016) also found pancreatic involvement by NHL in their studies. FNAC of a 48 yr old female who presented with a 3x3cm heterogeneous mass with areas of cystic and necrotic change on CT showed a cellular aspirate; abundant dispersed cells and dyscohesive cell clusters; minimal nuclear pleomorphism, infrequent mitotic figures; fine, evenly dispersed nuclear chromatln with inconspicuous nucleoli; a scant-moderate amount of amphophilic, well-defined cytoplasm; perivascular arrangement of tumor cells leading to pseudorossette formation. A cytological diagnosis of neuroendocrine tumor was made. N al-Kaisi (1992) found a similar cytological picture of neuroendocrine tumors in their study. Histopathological correlation could not be done in this patient. Histopathological correlation was possible in two out of five cases diagnosed as suspicious for malignancy and both were found out to be cases of adenocarcinoma. Similar findings were seen in study done by S C Krishnamurthi et al. (1993). The sensitivity and specificity for image guided pancreatic FNACs in our study was 100% each.US or CT guided FNA of pancreatic tumors has an average sensitivity and specificity of 80% and 90% respectively (Afifi et al., 2003). A total of 14 cases (22.9%) were diagnosed as benign. Fareeha, (2009) et al also found a similar percentage of benign tumors in their study. Out of the 14 benign cases, 6 cases were that of an abscess and 5 cases were of chronic pancreatitis.

Case was a benign cystic lesion and 2 cases showed normal acinar and ductal cells with a few inflammatory cells only.

Kidney: Renal lesions contributed to 23.2% of the total cases and malignant lesions were more common (57.8%) than non malignant lesions (31.5%). Among the malignant lesions RCC was the most common diagnosis constituting 47.4% of the total cases. RCC was also the most common malignant tumor in studies done by Mehdi et al. (2013) Aziz et al. (2008) and Mondal et al. (2002) USG-guided percutaneous FNAC of renal masses was first reported by Kristensen et al. (1972) Renal aspirates in RCC showed cellular smears with tumor cells having abundant, fragile, vacuolated cytoplasm, mild nuclear pleomorphism and occasional intranuclear inclusions in a necrotic background. All the 9 patients underwent nephrectomies and histopathological correlation was established in all the cases. Ahmad SS et al. (2006) and Pilotti et al. (1988) revealed similar results in their studies as well. Hence with regard to renal FNACs, we had a sensitivity and specificity of 100%. The sensitivity was 80% and specificity was 100% for image guided FNA of renal masses in the study conducted by Nicefro et al. (1993). Wilms tumor was diagnosed in a 10 yr old female in whom the the FNAC smears showed small round cells with raised NC ratio, scant cytoplasm with occasional epithelial and mesenchymal components. Histopathological correlation was obtained in the same case. A 38 yr old female who was a known case of infiltrating ductal carcinoma and had undergone mastectomy presented with 2 cm cortical, regularly demarcated, hypoechoic solid mass in the right kidney on USG. She was
diagnosed with metastatic deposits of IDC in the kidney. Renal metastasis from breast cancer is a rare entity and was reported by Akin, (2012) and Asim Armagan Aydin (2016) in their studies. 2 cases diagnosed as suspicious for malignancy were diagnosed as clear cell RCC on histopathology. 6 (10.5%) cases were diagnosed with benign lesions. Brierly, (2000) showed a similar percentage of benign tumors in their study. Out of the six benign cases three were that of an abscess and 3 were benign cystic lesions revealing benign degenerating epithelial cells and scattered macrophages in a clear background.

**Lymph node:** Out of the 10 cases of retroperitoneal lymph nodes 4 cases, two males and two females showed metastatic deposits of adenocarcinoma. Among these, two were known cases of pancreatic adenocarcinoma, and one was of cholangiocarcinoma. In one patient, primary malignancy was not detected clinically. Gangopadhyay et al. (2011) also had metastatic adenocarcinoma as the most common diagnosis in retroperitoneal lymph nodes in their study. The cytodiagnostic accuracy of Hodgkin’s lymphoma by FNA is high, approaching 90% but it is much lower for NHL. However, an accuracy rate greater than 80% has been reported in some recent series of NHL. In our study cytological diagnosis of NHL was made in 2 patients whose age ranged from 40-60 yrs. Smears were cellular and revealed a diffuse population of large, pleomorphic cells with abundant cytoplasm, prominent nucleioli and a good number of mitotic figures. Biopsy was done in one patient and the diagnosis of NHL as diffuse large B cell lymphoma was confirmed on histopathology. Follow up was lost in the other patient.

A thirty year old female was diagnosed with metastatic deposits of pheochromocytoma. The patient had a concomitant adrenal lesion which had invaded the adjacent structures. FNA smears showed loosely cohesive clusters and scattered tumor cells with prominent anisokaryosis, abundant eosinophilic granular cytoplasm and irregular cell borders, background showed hemorrhage and fragments of blood vessels. Although rare but whenever pheochromocytoma metastasizes, lymph nodes are one of the common sites (Michael, ?). In their study done by Park et al. (2011) 1 out of the 17 malignant pheochromocytomas studied metastasized to the lymph node. Among the two benign cases in one patient who was a 50 yr old male, USG guided aspirate was thick, caseous and blood mixed. CT revealed solid enhancing lesion in the right iliac fossa. Exploratory laparotomy was done and the intraoperative findings confirmed tuberculosis. Other case showed non specific reactive hyperplasia only. Certain authors (Chakrabarti, 2014; Nirmal Kumar Bhattacharya, 2011; Nahar Siakia, 2003) found tuberculosis as the most common benign lesion in their studies. Our study had lesser number of lymphadenopathy cases as compared to other studies (Gupta, 2017; Chakrabarti, 2014; Gangopadhyay, 2011; Mehar aziz, 2008; Mangal, 2009) with lymph node being the most common organ involved in some of them (Chakrabarti, 2014; Gangopadhyay et al., 2011).

**Adrenal:** USG guided aspiration of 5 adrenal lesions revealed pheochromocytoma in three, NHL in one and one was diagnosed as suspicious for malignancy. This was in contrast to studies done by Aziz et al. (2008) and Namshilkar et al. (2016) which had neuroblastoma and P Gupta et al. (2017) which had adenocortical carcinomas as most common adrenal lesions. Histopathology could be done in three cases of pheochromocytoma and that confirmed the FNAC diagnosis. For evaluating 39 cases statistical analysis showed 100% sensitivity and 100% specificity. There were no false positive or false negative cases. However with regard to typing of malignant lesions diagnostic accuracy was 93.54%.

**Conclusion**

The study revealed that image guided FNAC is an excellent diagnostic modality and shows high accuracy and high sensitivity in diagnosing retroperitoneal lesions with minimal complications. With the use of FNAC, an accurate pre-operative diagnosis of retroperitoneal lesions is possible and the need for surgical exploration may be obviated in a large number of cases facilitating initiation of appropriate therapy as well as saving manpower and cost of hospitalisation.

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**REFERENCES**


Michael H Johnson, R Sherburne Figenshau. Malignant and metastatic pheochromocytoma: Case report and review of literature


