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Original Research Article

Image Guided Fine Needle Aspiration Cytology of Abdominal, Pelvic and Thoracic Lesions- Analysis of 125 Cases

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ABSTRACT

Background – Ultrasonography (USG) and Computed Tomography (CT) scan is a safe and well known procedure for diagnosis of masses which are nonpalpable and deep seated in the body.
Methods – This is a retrospective study done in Life guard hospital private limited and Sriram diagnostic clinic in Biratnagar, Morang Nepal for the period of three years, January 2012 to February 2015. Fine needle aspiration cytology (FNAC) under USG /CT guided was performed in total 125 cases including 113 abdominal- pelvic cases and 12 thoracic cases. The smears were made, stained with both papanicolaou and giemsa stain and the slides were examined under light microscope. In cases where it was necessary Ziehl Neelsen (Z-N) stain for acid fast bacilli (AFB) was done.
Results – One hundred and twenty five (125) image guided FNAC were performed. Of total 125 cases, 76 (60.8%) cases were malignant, 3 (2.4%) benign, 37 (29.6%) inflammatory, 5 (4%) inadequate, and 4 (3.2%) suspicious for malignancy. Maximum number of cases were from liver 47 (37.6%) followed by intraabdominal lymph nodes 38 (30.4), gall bladder 12 (9.6%), lungs 12 (9.6%) , intestine 9 (7.2%), stomach 3 (2.4%), ovary 2 (1.6%), pancreas 1 (0.8%) and kidney 1 (0.8%).
Conclusions- USG / CT-guided FNA cytology plays an important role in diagnosis of nonpalpable abdominal, pelvic and thoracic deep seated lesions. It is safe, outpatient procedure for rapid diagnosis of malignancy.

Key words - Computed Tomography Scan, Fine Needle Aspiration Cytology, Nonpalpable, Ultrasonography

INTRODUCTION

Image guided FNAC from deep seated and non palpable intraabdominal, pelvic and intrathoracic lesion is simple, safe and a rapid method for confirmation of suspected malignant masses. Many studies are found in literature explaining the advantage of image guided FNAC of various sites. [1-6] It also helps to localize a solid focus within a cystic lesion. Even in a solid tumor image helps to determine the necrotic and hemorrhagic area. Thus unnecessary sampling of such areas can be avoided. [7] Image also helps in guiding a small swelling which is present adjacent to vessels. Moreover both pathologist and radiologist are present during the aspiration procedure. The combined consultation between a pathologist and a radiologist along with a proper clinical history is most likely to yield an accurate diagnostic result. [8] Thus image guided FNAC is valuable in diagnosis of mass lesion involving either liver, gall bladder, pancreas, kidney, lungs, ovaries and other intraabdominal, pelvic and thoracic organs. [9] Most of the carcinoma of

various organs metastasizes to liver. So FNAC of liver mass becomes valuable to differentiate primary and metastatic tumours of liver. The main contraindications of FNAC are unconscious patients or patients having hemorrhagic diathesis. FNAC helps in diagnosis of enlarged intraabdominal lymph node. It can distinguish a reactive lymphadenitis from a tubercular lymphadenitis as well as it also helps in diagnosis of a metastatic tumor from a primary lymphoma of lymphoid organs. [10] Thus it can avoid unnecessary surgery. But for further categorization and subtyping of malignant tumors immunocytochemistry or surgical histopathology examination is necessary. [11]

USG helps in diagnosis of a renal mass. But if all criteria for diagnosis are not met, CT scan may be a useful adjunct for this purpose. When it becomes Difficult to identify a renal lesion as a benign or malignant by radiographic FNAC is needed. The main indication of FNAC of the kidney includes diagnosis of renal masses, classification of neoplasms, confirmation of advanced lesions where surgery is not indicated and grading of tumours. FNAC can be done under CT scan or USG guidance in order to diagnose a lung neoplasm. Many of the lung masses abutting the chest wall are indentified by sonography. Vascular and other cardiac structures can be identified and needle injury to vessels can be avoided by use of colour Doppler. FNAC can be used to differentiate both neoplastic and inflammatory conditions of the masse. The present study was done to find out the accuracy and ability of image guided aspiration cytology to differentiate benign, malignant and inflammatory pathology for early diagnosis and management of patients.

MATERIALS AND METHODS

This is a retrospective study done in Life Guard hospital private limited and Sriram diagnostic clinic in Biratnagar, Morang Nepal. Relevant clinical datas like age, sex, duration of disease, size, site and number of lesions, were obtained from the hospital record form. Image guided FNA was done in all 125 patients of any age and both sexes presenting with abdominal, pelvic and thoracic masses either suspected clinically or detected on imaging techniques. These patients either visited OPD or were admitted in hospital ward. The coagulation profile was assessed in every patient particularly before doing FNAC from liver and gall bladder mass. This included platelet count, bleeding time, clotting time, prothrombin time (PT), and activated partial thromboplastin time (APTT). FNAC was done only in patients with normal coagulation profile.

The procedure was explained to patient. USG or CT scan guided aspiration were carried out by a pathologist in the department of radiology with the help of a cytotechnician. The site of puncture was marked by the radiologist on skin and the area was cleaned with antiseptic solution. Disposable plastic syringes of 10 ml with a 22 gauge needle were used. For deep-seated lesions, a 20-22 gauge disposable spinal needles were used. The aspirates were spread on glass slides, and at least four slides were made. In the cases were aspiration was inadequate a respiration was done to obtain adequate material. Slides fixed in 90% alcohol, were stain with Papanicolaou stain and air dried slides were stained with May Grunewald Giemsa (MGG) stain. Wherever necessary Z-N stain for AFB was also done. Each of the slides was examined carefully under microscope and the diagnosis was made. All the lesions were classified and diagnosed according to the cytologic criteria set for the respective organs. In most of the patients only one needle passage was sufficient for diagnosis. However in few of the cases were material was insufficient for opinion a repeat aspiration was done after taking consent from the patient.

RESULT

There were total 125 cases. The age range of our patients was from 10 years old

boy to 92 years old female. 67 patients were female and 58 patients were male. Majority of the lesions were malignant. Maximum number 47 (37.6%) cases were from liver followed by intraabdominal lymph nodes 38 (30.4%). 12 (9.6%) cases were from gall bladder as well as 12 (9.6%) cases were also from lungs. 9 (7.2%) cases were from bowel wall including both small and large intestine followed by stomach 3 (2.4%), ovary 2 (1.6%), pancreas 1 (0.8%) and kidney 1 (0.8%). Of total 125 cases, 76 (60.8%) cases were malignant, 3 (2.4%) benign, 37 (29.6%) inflammatory, 5 (4%) inadequate, and 4 (3.2%) suspicious for malignancy. (Table 1) Maximum number of malignant cases were from liver comprising of 40(32%) of the total cases followed by lung comprising of 11(8.8%). Most common site for inflammatory lesion was intraabdominal lymph node comprising of 31(24.8%) of total lesion. In 5(4%) of the cases the aspirates were not adequate for diagnostic opinion. (Table 2) As either the cellularity was less or the aspirate only showed red blood cells and its elements.

Table 1 – Organ wise distribution of 125 cases

Organ	Total	Benign	Malignant	Inflammatory	Suspicious	Inadequate
Liver	47	3	40	1	1	2
Lymph node	38		7	31		
Gall bladder	12		7	1	1	3
Lungs	12		11		1	
Intestine	9		5	3	1	
Stomach	3		3			
Ovary	2		2			
Pancreas	1			1		
Kidney	1		1			
Total	125	3	76	37	4	5

Table 2 - Organ wise distribution of Benign, Malignant and Inflammatory lesion

Organ	Number and types of benign lesions	Number and types of malignant lesions	Number and types of Inflammatory lesions
Liver	2 Hemangioma 1 Hepatic Adenoma	20 Metastatic Carcinoma 12 Hepatocellular carcinoma 8 Malignant tumor needs immunocytochemistry	1 Liver Abscess
Lymph Node		4 Metastatic deposits of carcinoma 3 Non Hodgking lymphoma	14 Tuberculosis 17 Reactive Lymphadenitis
Gall Bladder		7 Adenocarcinoma deposits in gall bladder needs immmunocytochemistry	1 Empyema Gall Bladder
Lungs		9 Non small cell carcinoma 2 Squamous cell carcinoma.	
Intestine (including both small and large)		5 Adenocarcinoma	3 Chronic inflammatory lesion
Stomach		3 Adenocarcinoma	
Ovary		1 Krukenberg tumor 1 Adenocarcinoma	
Pancreas			1 Chronic inflammatory lesion
Kidney		1 Clear cell Renal Cell Carcinoma.	

DISCUSSION

In our study of 125 cases, 116 (92.8%) cases FNAC yielded diagnostic material. Only in 5 (4%) cases the material was inadequate for any opinion. In 4 (3.2%) cases the aspiration cytology was not sufficient enough to give definite evidence of malignancy and they were reported as suspicious of malignant tumor. In various other studies the inadequacy rates for image guided FNAC varies from 2.8% to 33.6%. [12-14] The adequacy rate depends upon the expertise of the both guiding radiologist as well as pathologist along with the location and nature of lesion. Like highly vascular, predominantly cystic lesions and lesions with large areas of necrosis and hemorrhage are less likely to yield diagnostic cellular material.

In our study 92.8% of the cases were adequate for opinion. One of the reasons for high adequacy rate could be that we have repeated the FNAC passage twice or thrice in lesions which did not give diagnostic

yield in the first attempt. In our study most of the FNAC (47 cases) were done from liver. J Nobrega et al. also found liver as the most common site of FNAC in the abdomen. [15] We also found liver as the commonest site for malignant tumors. (Figure2) This is in accordance of the study done by RC Adhikari et al and Sheikh et al. [1,16] There study showed metastatic tumor of the liver as the most common malignant tumor found in the abdomen (38.4%) followed by hepatocellular carcinoma (24.8%). In malignant tumors of liver we have to differentiate between metastatic tumors and primary Hepatocellular carcinoma (HCC). The cytologic features which help to diagnose primary HCC are presence of sheets and clusters of malignant polygonal cells with prominent nucleoli, and some may also show intranuclear inclusions. Many of the times liver cancers are metastatic tumors. The diagnosis of metastatic carcinoma in liver in our study was made on aspirates which show features of malignancy but did not show classic cytologic features of primary HCC. Since we did not have Immunocytochemical markers, in difficult cases we just reported as malignant tumors in liver which needs further categorization by Immunocytochemistry. We found three benign tumors in liver. Two cases were liver Hemangioma and one case was Hepatic Adenoma.

The case of Hemangioma was already diagnosed by radiologist as a vascular lesion which on microscopy also showed few clumps of fibrous spindle cells along with RBCs. The cytologic features of Hepatic Adenoma showed proliferation of benign hepatocytes. Our patient was a young 30 years old female who gave history of oral contraceptive use since past 6 years. Study done by Rooks et al found that the increasing duration of oral contraceptive use increases the risk of occurrence of Hepatic Adenoma. [17] One case of liver abscess was seen which yielded pus on FNAC. The second common site for our study was intraabdominal lymphnode comprising of total 38 cases. (Figure3). Out of which 31 cases were inflammatory. In intraabdominal lymph node enlargement in patients, the common lesions found are tuberculosis, reactive lymphadenitis, lymphoma, and lymph node metastases from an unknown primary. [18,19] Inflammatory lesions in our study were reactive lymphnode and granulomatous lymphadenitis suggestive of tuberculosis. We found 14 cases of tuberculosis. We reported cytologic features suggestive of tuberculosis only after seeing epithelioid cell granulomas, caseous necrosis and langhans giant cells in our smear. Few of our cases also showed acid fast bacilli positivity on Z-N stain. Our study showed 17 cases of reactive lymphadenitis. Such intraabdominal reactive lymph nodes were predominantly seen in children and young adults. Seven cases of malignant tumors were seen in lymphnode out of which 3 were Non Hodgkin lymphoma (NHL) and 4 were metastatic deposits of carcinoma. NHL was diagnosed on the basis of monotonous population of immature lymphoid cells containing hyperchromatic nuclei, immature chromatin and nucleoli.

The common tumor found in our study from lung was malignant tumor comprising of 11 out of total 12 FNAC. The commonest malignant tumors which we found were non small cell carcinoma. Among this group adenocarcinoma was most common (Figure1). This finding is also in accordance with other studies in literature. [20] Immunostaining for TTF-1 is the marker for confirmation of primary pulmonary adenocarcinoma. Since we did not have facilities for Immunostaining, and also there are no definite cytologic features to differentiate between primary from secondary adenocarcinomas in lung. [21] So we reported all cases as adenocarcinoma and advised Immunostaining for further subcategorization and to rule out primary or secondary neoplasm. Pneumothorax is one of the common complications which can develop in patients who undergo FNAC

from lungs. None of our patients develop pneumothorax.

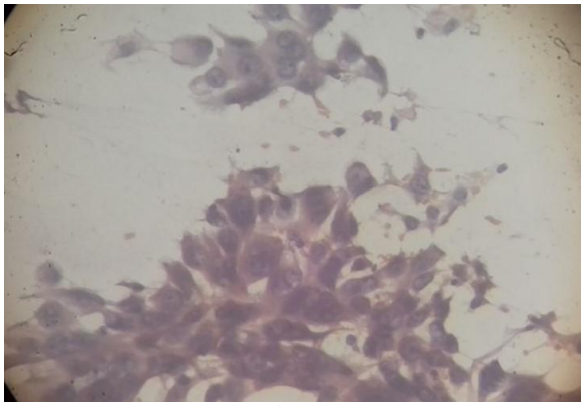

Figure 1 Papanicolaou stain of Bronchogenic Adenocarcinoma

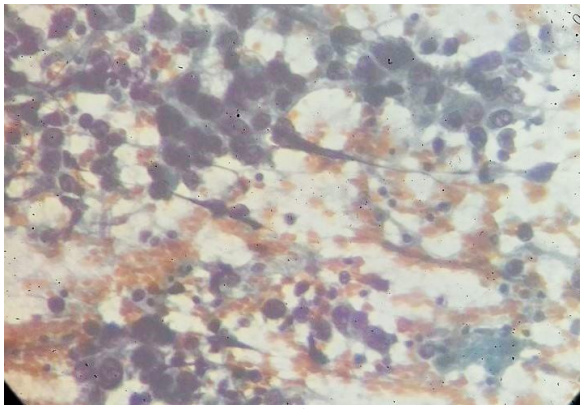

Figure 2 Papanicolaou stain of Hepatocellular Carcinoma

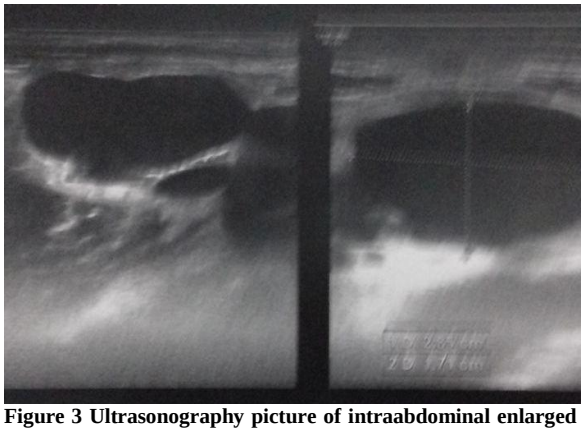

Figure 3 Ultrasonography picture of intraabdominal enlarged lymphnode

Similarly in gall bladder most common malignancy in our study was adenocarcinoma. Clinical presentation of patients with carcinoma of gall bladder is almost similar to benign gall bladder disease. Therefore clinical diagnosis of malignancy at an early stage of disease is difficult. [22] Thus, aspiration cytology gives us a rapid diagnosis of malignancy which is helpful for further management of patient. It was difficult for us to differentiate whether the carcinoma is primary of gall bladder or it is metastatic deposits from other sites like liver. So here also we advised Immunocytochemistry. One of the cases was of inflammatory lesion, empyema gall bladder which yielded purulent material on FNAC. Various other abdominal sites which revealed malignant tumors were stomach, small and large intestinal wall, ovary, pancreas, and kidney. We found one case of Krukenberg tumor of ovary. Here patient was a 22 year old female who presented with bilateral ovarian solid mass. Most of the time this tumor presents with bilateral ovarian mass and such was seen also in our patient. FNAC was done from both the ovaries. We were also lucky to study histopathology of endoscopic biopsy from stomach of the same patient which revealed gastric adenocarcinoma. So the primary tumor was confirmed from the stomach. Another malignant tumor from ovary was adenocarcinoma which presented as a solid cystic mass of one side. As it is known that adenocarcinoma is the commonest malignant epithelial tumor, originating from epithelial cells of small and large bowel. Five cases including both colon as well as small intestinal masses reveal features of adenocarcinoma. We also found one case of clear cell renal cell carcinoma which is also one of the commonest malignant renal tumor. A single FNAC done from pancreas and three cases from bowel just showed chronic inflammatory cells. They were labeled as inflammatory lesions. Thus we found that FNAC was both safe as well quick methods for diagnosis of deep seated abdominal, pelvic and thoracic lesions. The age distribution of our patients varied from 10 years old boy to 92 years old female. None of our patients develop any major complications due to FNA. Though, it is known that CT scan is more accurate for localization of a lesion compared to USG. CT scan in our study was used in very few cases especially for lung masses in which mass localization was not possible by USG.

USG was used in maximum number of cases and it showed a high adequacy rate.

CONCLUSION

Thus, our study shows that image guided FNAC of deep seated intraabdominal, pelvic and thoracic lesions can be used in children and even older individuals without any major complications. Though, our study included wide variety of organs, however in order to arrive at a definite conclusion larger series of study for individual organ is necessary.

REFERENCES

1. Adhikari RC, Tuladhar A, Shrestha S, Sharma SK. Deep-seated thoracic and abdominal lesions: Usefulness of ultrasound guided fine needle aspiration cytology, a 3 year experience. Nepal Med Coll J. 2010;12:20-5.
2. Sobha Rani G, Md K Faheem N, Sai Prasad B V, Sudhakar Reddy E. Efficiency of ultrasound guided aspiration cytology in deep seated lesions-a diagnostic evaluation. Int J Med Health Sci. 2012;1:1-12.
3. Parajuli S, Tuladhar A, Basnet RB. Ultrasound and computed tomography guided fine needle aspiration cytology in diagnosing intra-abdominal and intra-thoracic lesions. J Pathol Nepal. 2011; 1:17-21.
4. A L H, Sindhuram V S, S S, J K S, I V, Aditya A. Ultrasound guided fnac of abdominal-pelvic masses-the pathologists' perspective. J Clin Diagn Res. 2013; 7:273-7.
5. Mehdi G, Maheshwari V, Afzal S, Ansari HA, Ahmad I. Image guided fine-needle aspiration of retroperitoneal masses: The role of the cytopathologists. J Cytol. 2013; 30:36-41.
6. Jha BM, Shah R, Patel J. Effectiveness of image guided fine needle aspiration cytology in cases of deep seated lesions. Int J Med Sci Public Health. 2013; 2:439-42.
7. Juul N, Torp-Pedersen S, Holm HH. Ultrasonically guided fine needle aspiration biopsy of retroperitoneal mass lesions. Br J Radiol. 1984;57:43–6
8. Ibrahim Ch B. Fine needle aspiration biopsy versus core biopsy in rural setting. Acta Cytol 1998; 42: 883-87.
9. Gompel BM, Pike CP.Fine needle aspiration cytology. Lancet 1979; 11: 424.
10. LioeTF, Elliot H, Allen DC, Spence RAJ. The role of fine needle aspiration cytology in the investigation of superficial lymphadenopathy; uses and limitation of technique. Cytopathology 1999; 10: 291-97.
11. Park IA, Kim CW. Fine needle aspiration cytology of malignant lymphoma in an area with a high incidence of T cell lymphoma. Correlation of accuracy of cytologic diagnosis with histologic subtype and immunophenotype. Acta Cytol 1999; 43: 1059-69.
12. Jha BM, Shah R, Patel J. Effectiveness of image guided fine needle aspiration cytology in cases of deep seated lesions. Int J Med Sci Public Health. 2013;2: 439-42.
13. Kim MJ, Kim EK, Park SI, Kim BM, Kwak JY, Kim SJ, Youk JH, Park SH. US-guided fine-needle aspiration of thyroid nodules: Indications, techniques, results. Radiographics. 2008;28:1869-86.
14. L ee MJ, Hong SW, Chung WY, Kwak JY, Kim MJ, Kim EK. Cytological results of ultrasound-guided fine-needle aspiration cytology for thyroid nodules: Emphasis on correlation with sonographic findings. Yonsei Med J. 2011; 52:838-44.
15. Nobrega J, dos Santos G. Aspiration cytology with fine needle in the abdomen, retroperitoneum and pelvic cavity: a seven year experience of the Portuguese institute of oncology. Eur J Surg Oncol1994; 20:37-42.
16. Sheikh M, Sawhney S, Dev P, al-saeed O, Behbehani A. Deep seated thoracic and abdominal masses: usefulness of ultrasound and computed tomography guidance in fine needle aspiration cytology diagnosis. Australas Radiol 2000;44:155-60.
17. Rooks JB, Ory HW, Ishak KG, et al. Epidemiology of hepatic adenoma: the role of oral contraceptive use. JAMAS 1979; 242:644–648.

18. Yoneda S, Yoshiji H, Kuriyama S, et al. Stage I mantle-cell lymphoma that was difficult to differentiate from abdominal tuberculous lymphadenitis and metastatic pancreatic cancer. J Gastroenterol. 2002;37:859–862
19. Claro I, Leitão CN, Oliveira P, et al. Tuberculous mesenteric lymphadenitis mimicking pancreatic carcinoma. Hepatogastroenterology. 1996; 43:1653–165
20. Wu X, Groves FD, McLaughlin CC, Jemal A, Martin J, Chen VW. Cancer incidence patterns among adolescents and young adults in the United States. Cancer Causes Control. 2005; 16:309–20.
21. Singh HK, Silverman JF. Lung, chest wall and pleura. In: Orell SR, Sterrett GF, Whitaker D, editors. Fine Needle Aspiration Cytology. 4th Ed. New Delhi, India: Elsevier, Reed Elsevier India Private Limited; 2005.
22. Pandey M, Pathak AK, Gautam A, Aryya NC, Shukla VK. Carcinoma of the gallbladder: A retrospective review of 99 cases. Dig Dis Sci 2001; 46:1145-51.

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