Role of USG guided FNAC in diagnosis of abdominal and thoracic lesions

AS Tuladhar,[1] RC Adhikari,[4] S Shrestha,[5] SK Sharma,[2] S Pradhan,[1] A Shrestha[1] and A Giri Tuladhar[3]

[1]Department of Radiology and Imaging, [2]Department of Surgery, [3]Department of Gynaecology and Obstetrics Nepal Medical College and Teaching Hospital, Attarkhel, Jorpati; [4]Department of Pathology and [5]Department of Oncology, Om Hospital and Research Centre, Chabahil,

Corresponding author: Dr. Abhushan Siddhi Tuladhar, MBBS, MD (Radio-diagnosis), Assistant Professor, Department of Radiology and Imaging, Nepal Medical College and Teaching Hospital, Jorpati, Kathmandu, Nepal; e-mail: abhushant@gmail.com

ABSTRACT

A prospective study was carried out during 2010 – 2012 in which a total of 194 patients underwent USG guided FNAC from lesions in deep seated thoracic and abdominal organs. These included liver, lungs, intra-abdominal lymphnodes, gall bladder, ovary and adnexa, pancreas, stomach, omentum, other mass of unknown origin in peritoneal cavity, mediastinum, kidney, colon, small intestine, pleura, appendix and adrenal gland. Of these, FNAC was diagnostic in 168 (86.7%) cases, in 15 (7.7%) cases it was not conclusive. In next 6 (3.1%) it was suspicious of malignancy and the smears were acellular and /or contained blood only in 5 (2.6%) cases. Of all diagnosed cases, 153 (78.9 %) cases were malignant, 28 (14.4%) were non-noplastic which included inflammatory, infective and granulomatous lesions and 13 (6.7 %) were benign neoplastic lesions. In liver, metastatic adenocarcinoma was the most common FNAC diagnosis, in lungs non-small cell carcinoma. The aim of this study was to evaluate the overall role of USG guided FNAC in diagnosis of abdominal and thoracic lesions.

Keywords: USG guided FNAC, malignant, benign.

INTRODUCTION

Imaging techniques, alone or combined; like USG, CT scan, MRI etc. may fail to allow distinction between benign and malignant lesions or fail to come to a definite diagnosis of a non-neoplastic lesion, on the basis of morphological features. Tissue diagnosis, on the other hand is essential both for management and staging of malignant diseases or else to, rule out malignancy.[1,2] Therefore, USG guided FNAC has become a widely used tool for diagnosis of deep seated lesions which are not ealisy accessible for FNAC without guidance of imaging modality. This technique is highly reliable, yields quick result, has less severe and less number of complications, and is relatively cheap and less painful.[3] Because of high accuracy and low complications, USG guided FNAC has been considered as the initial evaluation method of choice for abdominal and thoracic lesions.[4] Nevertheless, its associated risk and complications should never be underestimated, particularly haemorrhage, peritonitis, pneumothorax, needle tract tumour seedling etc. Although needle tract tumour implantation after FNAC has been reported, the survival outcome of the patients has not been studied in detail.[5-7]

CT guided FNAC has advantage in lung and mediastinal lesions which are obscured by the aerated lungs in the USG, an in thoracic and abdominal lesions which are better visualized in CT scan that are difficult to visualize or at all not visualized in USG. But CT guided FNAC is a longer procedure, has risk of radiation hazard and is relatively expensive as compared to USG guided FNAC.

FNAC is used in evaluation of tissue diagnosis of neoplastic as well as non-neoplastic lesions. This study was undertaken with the aim of evaluating the overall utility of USG guided FNAC in the diagnosis of benign and malignant abdominal and thoracic lesions.

MATERIALS AND METHODS

A prospective study was carried out in which 194 patients underwent USG guided FNAC for lesions in thoracic and abdominal organs, in Nepal Medical College Teaching Hospital and Om Hospital and Research Centre, during a period of 24 months, from February 2010 to January 2012. All FNAC procedures were performed jointly by the radiologist and the pathologist. FNAC aspirates were obtained with 22 G needle attached to a 20 ml disposable syringe. All procedures were performed under local anaesthesia; 2% Lignocaine. Dry and wet smears were prepared in all cases, for Giemsa and Papanicolou stains. And the slides prepared were taken to the pathology department for cytological examination.

RESULTS

Altogether 194 patients between the age of 14 years and 81 years, with M:F ratio of 1.3:1, underwent USG guided FNAC from lesions in the abdominal and thoracic organs. Out of these, 76 aspirates were from liver, 28 from lungs, 20 from intra- abdominal lymphnodes, 11

Table-1: Sites of FNAC

Sites of FNAC	No. of cases	Percentage
Liver	76	39.2
Lungs	28	14.4
Intra-abd. L N	20	10.3
Gall bladder	11	5.7
Ovary and adnexa	9	4.6
Pancreas	8	4.1
Stomach	8	4.1
Omentun	6	3.2
Mass in per. Cavity	6	3.2
Mediastinum	6	3.2
Kidney	4	2.0
Colon	4	2.0
Small intestine	3	1.6
Pleura	2	1.0
Appendix	2	1.0
Suprarenal gland	1	0.5
Total	**194**	**100.00**

Table-2: FNAC results

FNAC results	No. of cases	Percentage
Conclusive	168	86.6
Inconclusive	15	7.7
Suspicious of malignancy	6	3.1
Acellular / blood only	5	2.6
Total	**194**	**100.00**

from gall bladder, 9 from ovary and adnexa, 8 from pancreas, 8 from stomach, 6 from omentum, 6 from other mass of unknown origin in peritoneal cavity, 6 from mediastinum, 4 from kidney, 4 from colon, 3 from small intestine, 2 from pleura, 2 from appendix and 1 from suprarenal gland. Of these, FNAC was diagnostic in 168 (86.7%) cases, in 15 (7.7%) cases it was not conclusive. In next 6 (3.1%) it was suspicious of malignancy and the smears were acellular and / or contained blood only in 5 (2.6%) cases. Of all diagnosed cases, 153 (78.9 %) cases were malignant, 28 (14.4%) were non-noplastic which included inflammatory, infective and granulomatous lesions and 13 (6.7 %) were benign neoplastic lesions. The FNAC diagnosis of liver, lungs, intra-abdominal lymphnodes and gall bladder are tabulated. 140 patients did not have any complications during and after the procedure. Forty one patients complained of pain during and after the procedure, and 9 among them had severe pain and were relieved by intramuscular injection of analgesic. Seven patients had vaso-vagal attack, all of them recovered completely with conservative management. 5 patients complained of difficulty in breathing after the procedure and and all of them got better after half an hour to one hour of rest. One among these was of FNAC from lung lesion and had chest x-ray done, but did not have any pneumothorax. 1 patient complained of low grade fever on the day after the procedure. Among 194 patients, 57 cases of FNAC were done in admitted patients and 137 cases were done on OPD basis, none of the OPD patients had to be admitted after the procedure.

DISCUSSION

USG guided FNAC aids in collection of cellular material with high accuracy rate.[8] In this study, FNAC gave definite conclusive diagnosis in 86.6% of cases which is higher and comparable to other studies done elsewhere in the past.[9-11] In a study conducted by Sheikh *et al*, of all FNAC results, 63.7 % were malignant lesions where as it is 78.9 % in our study which could be attributed to high number of patients attending Cancer Care Center in Om Hospital. Aspiration done under real time USG guidance after adequate localization and visualization of the lesion and after proper planning is very important for aspiration from accurate site, thus giving high rate of conclusive result and minimizing chance of inconclusive FNAC reports and acellular / blood only smears.

In 7.7% cases, it was inconclusive and in next 2.6% it was acellular/ contained blood only, which could be attributed to many reasons and depends on many factors like location, size, accessibility, vascularity,

Table-3: FNAC diagnosis

FNAC diagnosis	No. of cases	Percentage
Malignant	153	78.9
Non-neoplastic	28	14.4
Benign neoplastic	13	6.7
Total	**194**	**100.00**

Table-4: FNAC diagnosis of hepatic lesions

FNAC diagnosis	No. of cases	Percentage
Mets. Adeno Ca	21	27.6
HCC	17	22.4
Mets.Small cell Ca	8	10.5
Mets. Sq. cell Ca	5	6.6
Mets.Ductalcell Ca	4	5.4
Inconclusive	4	5.4
Poorly diff. Ca	3	3.9
Abscess	3	3.9
Adenoma	2	2.6
Cirrhotic nodules	2	2.6
Cholangio Ca	2	2.6
Mets. Melanoma	1	1.3
Hydatid cyst	1	1.3
FNH	1	1.3
Acellular	1	1.3
Suspiciou of Mn	1	1.3
Total	**76**	**100**

necrotic component, consistency, nature and histologic tumour type of the lesion. Consideration of these factors in selection of the case for FNAC, or selection of lesion among many lesions, or the site within the same lesion would significantly minimize the number of inconclusive and acellular/ blood only smear FNAC reports. In certain cases repeat FNAC might also yield conclusive report.

Presence of pathologist during the pathologist during the procedure, is an added advantage for both in terms of sharing case history, imaging findings and differential diagnoses (both radiological and pathological), clinical experience and knowledge. Above all it fulfills a sense of team work.

With less severe types of and less severe number of complications, USG guided FNAC being an OPD based minimally invasive diagnostic procedure, should be a first investigationof choice for tissue diagnosis in deep seated thoracic and abdominal lesions.[9]

USG guided FNAC due to its high sensitivity and specificity, because of high diagnostic yield and low complications reate has proved to be more useful and sensitive than needle core biopsy in the radiologically detectable and approachable abdominal and thoracic lesions.[10-14]

As in this study, other studies also showed liver and lungs as the most common two sites for FNAC.[11,15-17]

USG guided FNAC, in expert hands, being a cheap, quick, reliable and easily available OPD based procedure and with less number of less severe forms of complications, has a very important role in accurate diagnosis of any deep seated accessible mass lesions in abdomen and thorax. USG guided FNAC has minimized many other more invasive procedures like biopsies, CT guided FNAC/ biopsy procedures, laparoscopic and thoracoscopic FNAC/ biopsy or more invasive unnecessary procedures like laparotomy and thoracotomy for the sake of obtaining the sample for tissue diagnosis of the lesion alone. USG guided FNAC can be performed in patients of almost any extreme of age group and in patients with deteriorated general condition, without much risk of complications. FNAC yields accurate tissue diagnosis in malignant and non-malignant neoplastic lesions and also in different types of non-neoplastic lesions.

Table-5: FNAC diagnosis of lung lesions

FNAC diagnosis	No. of cases	Percentage
Adeno Ca	6	21.4
Non small cell Ca	5	17.9
Sq. cell Ca	4	14.3
Large cell Ca	4	14.3
Tuberculosis	2	7.1
Inconclusive	2	7.1
Acellular	2	7.1
Small cell Ca	1	3.6
Abscess	1	3.6
Inflammatory	1	3.6
Total	**28**	**100**

Table-6: FNAC diagnosis of abdominal lymphnodes

FNAC diagnosis	No. of cases	Percentage
Tuberculosis	9	45
Mets. Adeno Ca	4	20
NHL	4	20
Mets. Sq. cell Ca	1	5
Mets. Smallcell Ca	1	5
Reactive	1	5
Total	**20**	**100**

Table-7: FNAC diagnosis of gall bladder lesions

FNAC diagnosis	No. of cases	Percentage
Adeno Ca	5	45.5
HCC	3	27.2
Adenomyomatosis	1	9.1
Chr. Choleccystitis	1	9.1
Cholangio Ca	1	9.1
Total	8	100

Table-8: Complications after FNAC

Complications	No. of cases	Percentage
No complications	140	72.2
Pain	41	21.1
Vaso-vagal attack	7	3.6
Difficulty in breathing	5	2.6
Fever	1	0.5
Total	194	100

REFERENCES

1. Nadir P, Rune L, Bjorn H *et al*. Diagnostic accuracy of fine needle aspiration cytology in pancreatic lesions. *Acta Cytol* 1993; 37: 889-93.
2. Boiselle PM, Patz EFs, Vining DJ, Weissleder R, Shepoard JA, Mc lound TC. Imaging of mediastinal lymphnodes: CT, MR and FDGPET. *Radiographics* 1998; 18: 1061-9.
3. Orell SR, Sterrett GF, Walters MN, Whitaker D. Manual and atlas of fine needle aspiration cytology 2nd ed. 1992; 2-5.
4. Pitman MB. Fine needle aspiration biopsy of the liver. Principal diagnostic challenges. *Clin Lab Med* 1998; 12: 483-506.
5. Roussel F, Dalion J, Benozio M. The risk of tumoral seedling in needle biopsies. *Acta Cytol* 1989; 33: 936-9.
6. Navarro F, Taourel P, Michel J *et al*. Diaphragmatic and subcutaneous seedling of hepatocellular carcinoma following fine needle aspiration biopsy. *Liver* 1998; 18: 251-4.
7. DeSio I, Castellano L, Calandra M, Del Vecchio-Blanco C. Subcutaneous needle-tract seedling after fine needle aspiration biopsy of pancreatic liver metastasis. *Eur J Ultrasound* 2002; 15:65-9.

8. Nobrega J, dos Santos G. aspiration cytology with fine needle in the abdomen, retroperitoneum and pelvic cavity: a seven year experience of the Portugese Institute of Oncology, Centre of Porto. *Eur J Surg Oncol* 1994; 20: 37-42.
9. Barrios S, Hamana N, Quiros E. Cytology and biopsy by fine needle aspiration with ultrasound guidance in abdominal tumours. *GEN* 1989; 43:155-60.
10. Lin BPC, Chu JMG, Rose RA. Ultrasound fuided fine needle biopsy of the liver for cytology and histology. *Australas Radiol* 1999; 35: 33-7.
11. Sheikh M, Sawahney 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.
12. Stewart CJR, Coldewey J, Stewart IS. Comparison of fine needle aspiration cytology and needle core biopsy in the diagnosis of radiologically detected abdominal lesions. *J Clin Pathol* 2002; 55: 93-7.
13. Livraghi T, Sangalli G, Giordano et al. Fine needle aspiration versus fine cutting needle and comparison between smear cystology, inclusion cytology and microhistology in abdominal lesions. *Tumori* 1998; 74: 361-4.
14. Diacon AH, Sh\chuurmans MM, THeron J, Schubert PT, Wtight CA, Bollinger CT. Safety and yield of ultrasound-assisted transthoracic biopsy performed by pulmonologists. *Respiration* 2004; 71:519-22.
15. Talukder SI, Huq MH, Haque MA et a. Ultrasound guided fine needle aspiration cytology for diagnosis of mass lesions of liver. *Mymensingh Med J* 2004; 13: 25-9.
16. Adhikari RC, Sayami G, Lee MC, Dali S, Shrestha HG. Ultrasound guided fine needle aspiration cytology in diagnosis and classification of liver masses. An experience in T.U. Teaching Hospital. *Post Graduate Med J Nepal* 2003; 69-74.
17. Huq MH, Talukder SI, HAque MA, Sarkar CB, Saleh AF, Debnath CR. Role of fine neelde aspiration cytology in the diagnosis of pulmonary lesions. *Mymensingh Med J* 2004; 16-9.