

Ultrasound /Computed tomography Guided Fine Needle Aspiration Cytology of Abdominal Lesions

Beecha Ramya¹, Nihal Amrohi², Rajesh Patil^{3*}, Anitha A M³, Anuradha Patil³

¹Assistant Professor, Department of Pathology, TRR Medical College and Hospital, Hyderabad, Telangana

²Senior Resident, Department of Pathology, Mahadevappa Rampure Medical College, Sedam Road, Kalaburagi, Karnataka

³Professor, Department of Pathology, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India

**Corresponding Author:*

Rajesh Patil, Professor, Department of Pathology, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India

E-MAIL: dr Rajeshpatil007@gmail.com

Date of Submission: 21/11/2021

Date of Review: 27/12/2021

Date of Acceptance: 05/02/2022

ABSTRACT

Background: Abdominal masses always are mystery in clinical practice. Improvements have taken place in fine needle aspiration cytology with technical advances in imaging methods of ultrasound and CT.

Aims: To study the utility of guided FNAC in the diagnosis of abdominal lesions and categories the abdominal lesions. To study cytological features of abdominal lesions and correlate with histopathological features wherever possible.

Materials and methods: The study included 82 abdominal lesions. History, clinical features, radiological investigations were obtained in each case. USG or CT guidance was used and the FNA procedure was done. Smears were stained with Giemsa and viewed under the microscope for diagnosis. Diagnostic yield was 95%. Extra material obtained was given for cell block.

Results: The age was from 14 years old to 82 years and majority of them were in the age group of 40 – 60 years. Male to female ratio is 1:1.1. Among 82 cases, 45 cases (54.87%) were malignant, followed by 17 cases (20.74%) benign, 14 cases (17.08%) inflammatory, 04 cases (4.87%) suspicious of malignancy and 02 cases (2.44%) unsatisfactory for evaluation. Majority of the cases are in liver and hepatocellular carcinoma was the most common malignant lesion. In 60 cases histopathological correlation was available and for these cases the diagnostic accuracy is 95%, sensitivity is 92.1%, specificity is 100% and p value is <0.001 which is highly significant.

Conclusion: Abdominal fine needle aspiration cytology is simple, cost effective, rapid and repeatable procedure which helps in categorizing the abdominal lesions.

KEYWORDS: Abdominal lesions, USG guided FNA

INTRODUCTION

Fine needle aspiration cytology which is an important investigation now was started in 19th century. This

procedure began to flourish in the 1950s and 1960s in Europe. Lebert, Kun and Menetrier were the scientists who used needles for obtaining tissue fragments to diagnose conditions like cancer. [1, 2]

The technique of fine needle aspiration cytology is minimally invasive, inexpensive and gives quick results. It was initially considered as a means to confirm suspicion of metastasis or local recurrence of a known case of cancer. After this it has been used to diagnose all types of conditions from inflammatory to malignant in any organ of the body. Nowadays fine needle aspiration cytology has become part of service of all sophisticated departments of Pathology. [1–3]

Continuous improvements have taken place in fine needle aspiration cytology along with technical advances in imaging methods of ultrasound and CT. All the imaging techniques have their own advantages and disadvantages. Presence of pathologist in the procedure is known to give better results when compared to radiologist alone. [1]

Ultrasonography is the method in which imaging is possible in any plane. It allows the radiologist to monitor and guide the needle tip throughout the procedure. The easy use of it and the portability makes it favorable and commonly used method for aspiration [1].

CT can be used for extremely small lesions like mass of few millimeters in size. Needle tip visualization within the lesion is accurate with CT. Detailed cross-sectional images are available and they are limited to one plane [1, 2].

MATERIAL AND METHODS

Source of data of this study comprised of all ultrasound and computed tomography guided abdominal lesions received at Basaveshwar Teaching and General Hospital attached to Mahadevappa Rampure Medical College, Kalaburagi. Three-year retrospective study was carried out from June 2015 to May 2018 with sample size of 82 cases. Inclusion criteria for this study included all the abdominal lesions sent for guided fine needle aspiration cytology

to Basaveshwar teaching and general hospital/MRMC Kalaburagi. Exclusion criteria of this study was to exclude all the patients with bleeding disorders, patients with uncorrectable severe coagulopathy, patients who do not give consent for the procedure and the patients with abdominal lesions like hydatid cyst.

Method of collection of data and sampling procedure:

The aspirations have been done by the pathologist in conjunction with the radiologist. Before the start of procedure PT is done. The patients are subjected to an ultrasonographic evaluation to assess the origin of the mass and its relationship with the adjacent organs. FNAC of the mass is done under guidance, in the Department of Radiology, while taking absolute aseptic precautions, by the shortest route to the site of the lesion. A 10ml disposable plastic syringe and a 22 gauge needle is used for superficial and accessible lesions. For deep-seated lesions, a 20-22 gauge spinal needle of 9cm length is used and the standard FNAC procedure has been followed. Each aspirate is smeared on an average of four to five slides. The air dried and 95% alcohol fixed smears are prepared for Giemsa and H&E stains, respectively and then viewed under the microscope for the diagnosis. Any material in excess has been given for cell block and if the biopsy was done, it was sent to histopathology for further processing. Chi square test and Fischer exact test were done for statistical analysis wherever possible. The assistance of medical records section was taken where ever necessary.

RESULTS

The 82 cases studied were broadly classified into 5 categories: inflammatory (15 cases), benign (16) cases, malignant (45 cases), Suspicious for malignancy (4 cases) and unsatisfactory for evaluation (2 cases). : The age was from 14 years old to 82 years and majority of them were in the age group of 40 – 60 years. Males were 39 and females 43 (M:F ratio= 1:1.1). Males presented with more malignant cases than females Table 1. The overall diagnostic yield from the FNACs was 95%. Majority of cases were in Liver, 36 cases (43.92%), of which 13 were HCC, 16 were metastasis to liver, 3 inflammatory lesions, 2 suspicious for malignancy and 2 were unsatisfactory for evaluation. HCC on cytology showed large round to oval tumor cells with irregular nuclear borders and prominent nucleoli. One case presented with microfilaria in the smear. Table 2.

Of 15 ovarian FNAC, 14 were benign lesions and 1 malignant (Dysgerminoma). Benign lesions were cyst contents in majority cases: serous cystadenoma 6 cases, mucinous cystadenoma 4 cases and 2 were mature cystic teratoma which showed keratin material on FNAC. 1 case of Brenner showed spindle shaped cells with nuclear grooving. 1 case diagnosed as benign fibroblastic proliferation on histopathology turned out to be fibroma. FNAC of lymph node shows 7 cases of reactive lymphadenitis, 5 cases of

tuberculosis, 1 case each of metastatic adenocarcinoma and metastatic squamous cell carcinoma, and 1 case was suspicious for malignancy. 6 cases from kidney showed Renal cell carcinoma of which 3 were clear cell variant. 1 case was diagnosed as papillary renal cell carcinoma which on histopathology was metanephric carcinoma. 2 cases in retroperitoneal region were benign, leiomyoma, and 2 cases were malignant, leiomyosarcoma, which showed pleomorphic spindle cells and high mitotic rate. 3 cases in bowel were adenocarcinoma, of which one was mucin secreting. Showed large round to oval cells with vesicular nucleus, prominent nucleoli and abundant cytoplasm in mucoid and hemorrhagic background. FNAC from spleen lesion was suspicious for malignancy and turned out to be NHL. 1 case from pancreas showed adenocarcinoma, on FNAC pleomorphic malignant cells arranged in acinar pattern. Among the 82 cases 80 smears were good for diagnosis and 2 were unsatisfactory.

Histopathological correlation was available in 60 cases of which only 3 cases differs. Statistically it was highly significant. $\chi^2_{\text{yates}} = 10.75$, $p < 0.001$. The diagnostic accuracy was 95%, sensitivity was 92% and specificity was 100%.

| Organ | Age in years | Sex* | Inflammatory | Benign | Suspicious | Malignant | Total No. (%) |
|----------------------|--------------|-----------|--------------|--------|------------|-----------|---------------|
| Liver | 22-80 | M=23 F=13 | 03 | - | 02 | 29 | 36 (43.9) |
| Bowel | 46-55 | M=3 | - | - | - | 03 | 03 (3.7) |
| Spleen | 60 | F=1 | - | - | 01 | - | 01 (1.2) |
| Kidney | 17-60 | M=5 F=2 | - | - | - | 07 | 07 (8.5) |
| Ovary | 14-70 | F=15 | - | 14 | - | 01 | 15 (18.3) |
| Retroperitoneal mass | 42-65 | F=4 | - | 02 | - | 02 | 04 (4.9) |
| Pancreas | 72 | F=1 | - | - | - | 01 | 01 (1.2) |
| Lymph node | 19-85 | M=8 F=7 | 12 | - | 01 | 02 | 15 (18.3) |
| Total | 14-85 | M=39 F=43 | 15 | 16 | 04 | 45 | 82 (100) |

Two cases were unsatisfactory liver lesions
* M=Male, F=Female

Table 1: Age, sex and organ distribution of lesions

| Organ | No. | Cytological diagnosis | Histopathological diagnosis |
|-----------------------|-----------|-----------------------------------|--|
| Liver | 3 | Abscess | Abscess |
| | 6 | Hepatocellular carcinoma | Hepatocellular carcinoma |
| | 6 | Metastatic carcinoma | Metastatic carcinoma |
| | 5 | Metastatic adenocarcinoma | Metastatic adenocarcinoma |
| | 6 | Cyst content | Serous cystadenoma |
| Ovary | 4 | Mucinous material | Mucinous cystadenoma |
| | 2 | Keratin material | Benign cystic teratoma |
| | 1 | Brenner tumour | Brenner tumour |
| | 1 | Benign fibroblastic proliferation | Fibroma |
| | 1 | Dysgerminoma | Dysgerminoma |
| Lymph node | 5 | Granulomatous lymphadenitis | Tubercular lymphadenitis |
| | 4 | Reactive lymphadenitis | Reactive lymphadenitis |
| | 3 | Renal cell carcinoma | Renal cell carcinoma |
| Kidney | 3 | Renal cell carcinoma | Renal cell carcinoma – clear cell type |
| | 1 | Papillary renal cell carcinoma | Metanephric adenoma |
| Retro-peritoneal mass | 2 | Benign spindle cell lesion | Leiomyoma |
| | 2 | Malignant spindle cell lesion | Leiomyosarcoma |
| Bowel | 2 | Adenocarcinoma | Adenocarcinoma |
| | 1 | Mucin secreting adenocarcinoma | Mucin secreting adenocarcinoma |
| Spleen | 1 | malignancy suspected | Lymphoma |
| Pancreas | 1 | Adenocarcinoma | Adenocarcinoma |
| Total | 60 | | |

Table 2: Cytological and histopathological correlation of the lesions

| Type of lesion | Shamshad et al. ^[4] | S Reddy, et al. ^[5] | BharatiJha et al. ^[2] | Present study |
|----------------|--------------------------------|--------------------------------|----------------------------------|---------------|
| Inflammatory | 30.5% | 10.2% | - | 18.29% |
| Benign | - | 22.4% | 23% | 19.51% |
| Malignant | 57.5% | 60.3% | 69% | 54.9% |
| Suspicious | 5.5% | 0.6% | 4% | 4.87% |
| Unsatisfactory | 6.5% | 6.5% | 4% | 2.43% |

Table 3: Comparative analysis of distribution of the lesions

| Organ | S Reddy, SK Andola ⁵ 2008 | B S Sumana et al ¹⁰ 2015 | J A Glaxon et al ¹¹ 2018 | Present study |
|----------------------|--------------------------------------|-------------------------------------|-------------------------------------|---------------|
| Liver | 38% | 40% | 46.9% | 43.92% |
| Bowel | 1.3% | 18.3% | - | 3.66% |
| Spleen | 1.3% | - | - | 1.22% |
| Kidney | 5.2% | 3.3% | 1.5% | 8.53% |
| Ovary | 21.1% | - | 4.5% | 18.29% |
| Retroperitoneal mass | - | 10% | - | 4.87% |
| Pancreas | 3% | 6.7% | 13.6% | 1.22% |
| Lymph node | 7.9% | 13.3% | 12.1% | 18.29% |

Table 4: Comparative analysis of organ distribution of lesions:

DISCUSSION

Abdominal masses are considered as mystery in clinical practice. All these lesions are visible radiologically but cannot be determined as benign or malignant. Confirmation from the pathologist is essential in these conditions^[1,2]. The diagnosis obtained from FNAC guides for the treatment and also is a substitute for few surgical procedures. Eg: diagnostic laparotomy. FNAC is sensitive, easy, less expensive, fast, repeatable procedure. Previous studies and literature have shown that imaging modalities are used as it provides us size, shape and extent of the lesion giving good quality of smears. FNAC plays a major role in diagnostic evaluation of abdominal lesions. In the present study, the total number of cases are 82. Diagnostic yield obtained is 95%. This is higher than study done by T A Riyaz et al in 2016^[6]. Age incidence in the present study ranged from 14 years to 82 years with majority of cases i.e 42 cases (51.22%) in the age range of 41 – 60 years which is in accordance to the other studies done

by Sidhaling Reddy, S K Andola^[5] in 2008, Islam T et al^[7] in 2013 and T A Riyaz et al.^[6] in 2016. Table 3 There were 39 males and 43 females with male to female ratio of 1:1.1. This was in accordance with the observations done by S Reddy, SK Andola^[5]. Other studies done by AS Tuladhare et al^[8], V Ghodasara et al.^[9], T A Riyaz et al.^[6] showed male preponderance. Differentiation into malignant and benign tumors is possible by careful evaluation of cytoarchitecture and background features. In this study, malignant lesions are most common diagnostic category which is in accordance with the observations made by S Shamshad et al.^[4], S Reddy, SK Andola^[5], Bharati Jha et al.^[2]. This is followed by category of benign lesions in the present study which is in accordance with the observations of the studies done by S Reddy, SK Andola^[5] and Bharati Jha et al.^[2]. Most common organ involved was liver which is in accordance with the observations done by S Reddy, S K Andola^[5], B S Sumana et al^[10], J A Glaxon et al.^[11] Table 4. HBsAg was done in 10 cases of which 09 cases showed positivity and 01 case was negative. Positive percentage was found to be 90%. Histopathological correlation was available in 6 cases of HCC, diagnostic accuracy was 100%. Table 4. 15 cases of ovarian mass subjected to FNAC showed diagnostic accuracy in 93.3%. All cystic lesions showed diagnostic accuracy of 100%. Only one case which was on FNAC diagnosed as benign proliferative lesion turned out to be fibroma. Diagnostic accuracy in FNAC of kidney lesions was 85.7%. It was 100% in retroperitoneal mass, bowel lesions and pancreatic lesion. Diagnostic accuracy was in accordance with S Reddy, SK Andola, BS Sumana et al. and JA Glaxon et al. one case of splenic lesion was lymphoma which on FNAC was given as Suspicious for malignancy.

In the present study out of 82 cases histopathological correlation was available in 60 cases. For these case sensitivity, specificity and diagnostic accuracy were found to be 93.1%, 100% and 95.2% respectively.

CONCLUSION

Abdominal fine needle aspiration cytology is simple, cost effective, rapid and repeatable procedure for the diagnostic purpose. It helps in categorizing the lesions as inflammatory, benign and malignant. It also helps to know about the categories of malignant lesions and the presence of metastasis. It is easy, reliable, sensitive and specific method with high diagnostic accuracy in malignant conditions.

REFERENCES

- Orell SR, Sterrett GF, R S. Orell and Sterrett's Fine Needle Aspiration Cytology. Edinburg: Churchill Livingstone; 2012,.
- Jha BM, Shah R, Patel J. International journal of medical science and public health. Effectiveness of image guided fine needle aspiration cytology in cases of deep seated lesions. 2013;2:439–442.

3. Zawar MP, Dr, Bolde S, Dr, Shete SS. Correlative study of fine needle aspiration cytology and histology in intra-abdominal lumps. SMJ. 2007;4.
4. Ahmed SS, Kafilakhtar, Akthar S. Ultrasound guided fine needle aspiration biopsy of abdominal masses. JK science. 2006;8(4):200–204.
5. Reddy S, Sainath K, Andola. Fine needle aspiration cytology of intra- abdominal lesions. Journal of clinical and diagnostic research. 2011;5(3):551–558.
6. Reyaz TA. USG guided FNAC of intra-abdominal and pelvic masses in Kashmir: a study at tertiary care center. International journal of medical research and health sciences. 2016;5(4):169–175.
7. Islam T, Hossain F, Rumpa AP, Sikder NH, Bhuiyan MA, Karim E et al. Ultrasound guided fine needle aspiration cytology: a sensitive diagnostic tool for diagnosis of intra-abdominal lesions. Bangladesh Med Res Counc Bull. 2013;p. 14–17.
8. Tuladharas A, Rc, Shrestha S, Sharma SK, Pradhan S, Shrestha A et al. Role of USG guided FNAC in diagnosis of abdominal and thoracic lesions. Nepal Med Coll J. 2012;14(4):271–274.
9. Venughodasara H, Gowsami H, Desai S, Patel. Ultrasound guided fine needle aspiration cytology study of intra-abdominal mass lesions. BJKines - NJBAS. 2015;7(2):32–37.
10. Sumana BS, Muniyappa B. Ultrasonography guided fine needle aspiration cytology with preparation of cell blocks in the diagnosis of intra-abdominal masses. Journal of clinical and diagnostic research. 2015;9(12):8–12.
11. Glaxsonja, Saldanha P, Vasudevan S. Utility of ultrasound guided fine needle aspiration cytology in the diagnosis of intra abdominal masses. Annals of pathology and laboratory medicine. 2018;5(5):349–353.

How to cite this article: Ramya B, Amrohi N, Patil R, A M A, Patil A. Ultrasound /Computed tomography Guided Fine Needle Aspiration Cytology of Abdominal Lesions. Perspectives in Medical Research. 2022;10(1):74-78
DOI: [10.47799/pimr.1001.14](https://doi.org/10.47799/pimr.1001.14)