Role of radiological-assisted cytology in intra-abdominal lesions: A 3 years’ experience in a tertiary care center

Shilpi Dosi, Garima Gupta, Mallika Kawatra¹, Preeti Rihal Chakrabarti, Purti Agrawal, Mukul Raj Jain
Department of Pathology, Sri Aurobindo Medical College and PG Institute, ¹Department of Lab Operations, Diagno Lab, Medanta Hospital, Indore, Madhya Pradesh, India

Abstract

Background: Fine needle aspiration (FNA) with assistance of radiological tools such as ultrasonography (USG) and computed tomography (CT) is an effective and safe technique for diagnosing intra-abdominal neoplastic and nonneoplastic lesions.

Aims and Objectives: (1) To assess the utility of image-guided cytology in the diagnosis of intra-abdominal lesions. (2) To categorize various intra-abdominal lesions according to their site of occurrence and study their cytomorphological features.

Materials and Methods: A cross-sectional study was conducted in the Department of Pathology between January 2012 and January 2015. A total of 174 cases with intra-abdominal lesions were included in the study.

Results: In our study, diagnostic yield was 84.5%. The mean age was found to be 52 years with M:F ratio 1.1:1. We found that 92 (52.87%) cases were in hepatobiliary region, 33 (18.96%) in adnexa, 13 (7.47%) in pancreatic-ampullary region, 14 (8.04%) in unknown abdominal lumps, 8 (4.6%) in lymph nodes, 6 (3.4%) in renal, 5 (2.87%) in retroperitoneum, 2 (1.1%) in omental nodules, and 1 (0.5%) in splenic mass. Of total 174 cases, 106 (61%) cases were malignant, 10 (5.7%) benign, 16 (9.1%) inflammatory, 27 (15.5%) inadequate, and 15 (8.7%) suspicious for malignancy.

Conclusion: Ultrasound and CT-guided FNA cytology had a significant role in diagnosis of palpable and nonpalpable intra-abdominal lesions. Being a relatively quick and safe method, it also avoids invasive diagnostic procedures.

Key words: Fine needle aspiration, hepatobiliary, intra-abdominal, pancreatic-ampullary

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Introduction

The diagnosis of intra-abdominal, deep lesions is a cumbersome procedure. These lesions present as palpable as well as deep nonpalpable masses. Their biological nature can be benign, malignant, or inflammatory. Many inflammatory conditions such as hepatic abscesses and tuberculosis can be misleading many times. Imaging techniques do not always distinguish between benign and malignant lesions morphologically. A confirmed diagnosis is essential for management of malignancy.¹

Radiologically assisted cytology in various forms such as USG-guided and computed tomography-guided fine needle aspiration (FNA) is an effective way to obtain diagnostic material.²³ Endoscopic ultrasound (EUS)-guided needling is increasingly used for those lesions accessible through a transgastric approach, mostly in the left lobe of the liver.⁴⁻⁶ Duct brush cytology through endoscopic retrograde

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cholangiopancreatography (ERCP) is important in evaluation of extrahepatic biliary tract and large pancreatic duct lesions.\(^{[1]}\)

The whole process should be a teamwork approach. The presence of pathological staff at the time of procedure increases overall accuracy.\(^{[10‑12]}\) The whole exercise is waste if aspirated material is not properly processed.

With modern day techniques, complication rate is very low. The most common complications are pain, hemorrhage, nausea, and vomiting. With the benefit of less time consumption and cost effectiveness, these procedures are increasing in trend.\(^{[13]}\)

This study was planned with aim to assess the utility of cytological methods assisted by various radiological techniques in diagnosis of intra-abdominal lesions. Our objectives were to categorize various intra-abdominal lesions according to their site of involvement, study their cytomorphological features, and classify them as benign, malignant, suspicious, and inflammatory.

**Materials and Methods**

The present study was conducted in the Department of Pathology between January 2012 and January 2015. The study design being cross-sectional included old as well as new cases. A total of 174 cases were included. Clinical and radiological data were obtained from records. After thorough clinical and radiological examination, for superficial masses, 20–22 gauge needle attached to 10 ml syringe and for deep-seated lesions, 20–22 gauge spinal needle was used. For some cases of pancreas and common bile duct, EUS- and ERCP-guided materials were obtained. Air-dried smears were subjected to stain with MGG and wet-fixed smears with Papanicolaou stain.

**Results**

In our study, 27 cases were inadequate, so diagnostic yield was 84.5%. Male to female ratio was 1.07:1. The mean age of the sample was 52 years with a range of 12–90 years. A maximum number of patients were in the age group of 51–60 years (29.3%) followed by 61–70 years (20.1%).

Of 174 cases, most common 92 (52.87%) cases were from hepatobiliary region followed by 33 (18.96%) ovarian masses, 14 (8.04%) abdominal lumps of unknown origin, 13 (7.47%) pancreatic-ampullary region, 8 (4.6%) lymph nodes, 6 (3.4%) renal, 5 (2.87%) retroperitoneum, 2 (1.1%) omentum, and 1 (0.5%) spleen [Table 1].

According to cytomorphology, most of the lesions were malignant 106 (61%) followed by 16 (9.1%) inflammatory, 15 (8.7%) suspicious, 10 (5.7%) benign, and 27 (15.5%) inadequate [Table 2].

Of total 106 malignant lesions, in hepatobiliary region, 44 (41.5%) cases were metastatic lesions followed by 17 (16%) primary hepatocellular carcinoma [Figure 1], 7 (6.6%) cholangiocarcinoma [Figure 2], and 2 (1.9%) adenocarcinoma of gallbladder. In ovarian masses, 9 (8.5%) cases of adenocarcinoma and 2 (1.9%) cases of papillary carcinoma were diagnosed. In pancreas, 7 (6.6%) cases were of adenocarcinoma [Figure 3]. Of 8 cases of abdominal lymph nodes, 2 (1.9%) cases were metastatic and 2 (1.9%) were non-Hodgkins lymphoma. There were 2 (1.9%) cases of renal cell carcinoma [Figure 4]. Of 14 cases of unknown abdominal lumps and five retroperitoneal masses, 10 (9.4%) cases were malignant, mostly of spindle cell origin [Figure 5]. Two (1.9%) cases were of metastatic omental nodule [Table 3].

**Table 1: Site wise distribution of cases**

| Site                        | Number of cases (%) |
|-----------------------------|---------------------|
| Hepatobiliary region        | 92 (52.87)          |
| Uterine adnexa              | 33 (18.96)          |
| Pancreatic-ampullary region | 13 (7.47)           |
| Abdominal lumps of unknown origin | 14 (8.04) |
| Lymph nodes                 | 08 (4.6)            |
| Renal                       | 06 (3.4)            |
| Retroperitoneum             | 05 (2.87)           |
| Omental nodules             | 02 (1.1)            |
| Splenic mass                | 01 (0.5)            |
| Total                       | 174 (100)           |

**Table 2: Distributions of cases according to their nature of pathology**

| Nature of lesion | Number of cases (%) |
|------------------|---------------------|
| Malignant        | 106 (61)            |
| Suspicious       | 15 (8.7)            |
| Benign           | 10 (5.7)            |
| Inflammatory     | 16 (9.1)            |
| Inadequate       | 27 (15.5)           |

**Table 3: Distribution of malignant lesions**

| Lesion                                | Number of cases (%) |
|---------------------------------------|---------------------|
| Hepatic metastasis                    | 44 (41.5)           |
| Primary hepatocellular carcinoma      | 17 (16)             |
| Cholangiocarcinoma                    | 07 (6.6)            |
| Adenocarcinoma of gall bladder        | 02 (1.9)            |
| Ovarian malignancies                  | 11 (10.4)           |
| Pancreatic adenocarcinoma             | 07 (6.6)            |
| Lymph node metastasis                 | 02 (1.9)            |
| Non-Hodgkins lymphoma                 | 02 (1.9)            |
| Malignant spindle cell tumor           | 10 (9.4)            |
| Renal cell carcinoma                   | 02 (1.9)            |
| Metastatic omental nodule              | 02 (1.9)            |
| Total                                 | 106                 |
Discussion

Radiologically assisted cytology of intra-abdominal lesions is in the favor of both patients and doctors. This procedure has facilitated easy collection of cellular material for rapid and accurate diagnosis. It is a simple way to obtain diagnostic material.

In the present study, 27 (15.5%) cases out of total 174 were inadequate, so diagnostic yield was 84.5%. Of 174 cases, 122 were image guided and 52 were directly aspirated. The diagnostic yield was 92.7% in image guided and 65.4% in nonassisted direct aspirate. Nautiyal et al. in 2004 found a diagnostic yield was 64.81% with direct aspiration of palpable lumps and 93.06% with USG-guided FNAC. Nyman et al. in 1995 found a diagnostic yield of 64% with USG-guided FNAC.

The age range of our patients was 12–90 years with a mean age of 52 years. Most common age group was 51–60 years (29.3%). In the study by Tan et al., age range was 11–82 years. The male to female ratio of 1.07:1 was in accordance with Krishna et al. and Ennis et al. showed a male preponderance.

In our study, the most common site was hepatobiliary region (52.87%), followed by ovary (18.96%), pancreatic-ampullary region (7.47%), abdominal lymph nodes (4.6%), retroperitoneum (2.87%), renal (3.4%), and other lumps of unknown origin (8.04%). This was in accordance with the study of Khan et al., Stewart et al., and Nyman et al.
Of total 174 cases, maximum 106 (61%) cases were malignant followed by 16 (9.1%) inflammatory, 15 (8.7%) suspicious, and 10 (5.7%) benign. Results were in accordance with the study of Khan et al.\textsuperscript{[20]} and Ahmed et al.\textsuperscript{[22]}

In all confirmed malignant lesions, most common 44 (41.5%) cases were from metastatic tumors of liver followed by 17 (16%) cases of primary hepatocellular carcinoma, 11 (10.4%) cases of ovarian carcinoma, and 7 (6.6%) cases of cholangiocarcinoma and pancreatic adenocarcinoma each. Adikari et al.\textsuperscript{[23]} found metastatic tumor of liver as the most common malignancy encountered in the abdomen (38.4%) followed by hepatocellular carcinoma (29.8%). In contrast to our study, Zarger et al.\textsuperscript{[24]} found the most common malignancy as carcinoma of gall bladder followed by hepatocellular carcinoma. There were seven cases of pancreas, compatible with Sheikh et al.\textsuperscript{[2]} found six pancreatic lesions among 120 cases.

Among 33 adnexal tumors, 4 (12.12%) cases were inadequate, in rest of 9 (27.27%) cases were of adenocarcinoma, 2 (6.06%) cases of papillary carcinoma, 6 (18.18%) cases of mucinous neoplasm and benign cystic lesion each, 5 (15.15%) cases of epithelial neoplasm, and 1 (3.03%) case of germ cell tumor. This was in accordance with the findings of Karlsson et al.\textsuperscript{[25]}

Of 8 cases of intra-abdominal lymph nodes, 4 (50%) were reactive, 3 (37.5%) metastatic tumors, and 1 (12.5%) non-Hodgkin lymphoma. Porter et al.\textsuperscript{[26]} found 58.9% inflammatory and 41.7% malignant lesions.

**Conclusion**

In the present study, we found that radiologically assisted cytology is quite effective in intra-abdominal masses. It is simple, economical, and less complicated and less time-consuming procedure to differentiate between malignant and non-malignant intra-abdominal lesions. FNA is the diagnostic procedure of choice for focal hepatic masses, when performed by experienced interventional radiologist and interpreted by experienced cytopathologist, the accuracy is quite high.

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**Conflicts of interest**

There are no conflicts of interest.

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