Original Article

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

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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.[2-5] Endoscopic ultrasound (EUS)-guided needling is increasingly used for those lesions accessible through a transgastric approach, mostly in the left lobe of the liver.[6-8] 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.[9]

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 attach 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

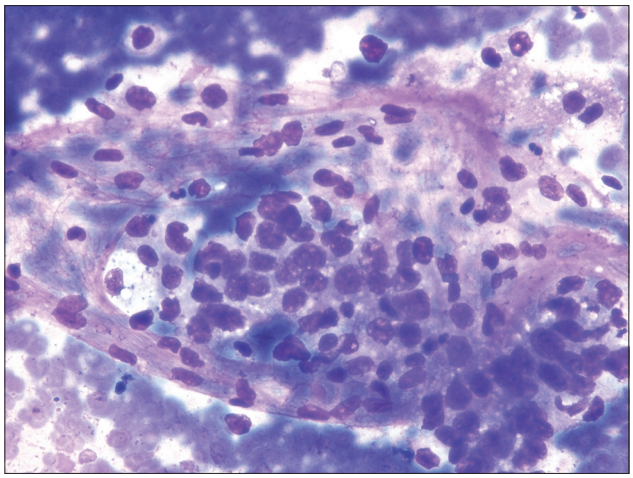

Figure 1: Photomicrograph of primary hepatocellular carcinoma showing sheets of pleomorphic hepatocytes peripherally traversed by endothelial cells (Giemsa, ×400)

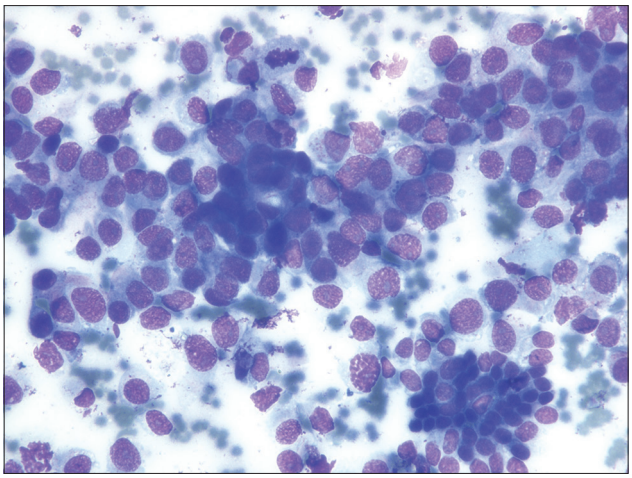

Figure 2: Photomicrograph of cholangiocarcinoma showing atypical columnar epithelial cells forming acinar pattern (Giemsa, ×400)

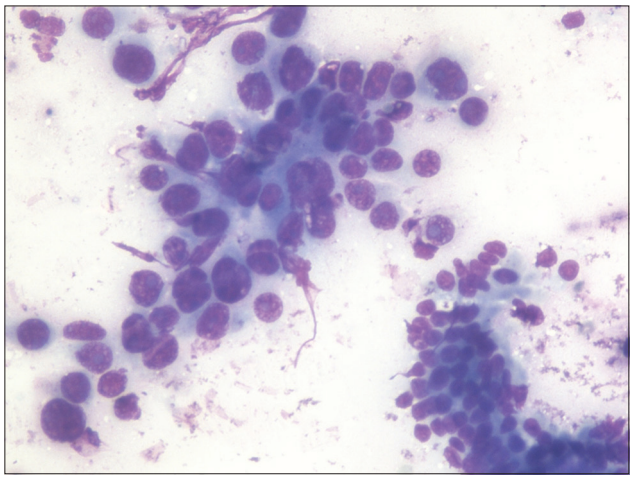

Figure 3: Photomicrograph of pancreatic adenocarcinoma showing clusters of atypical epithelial cells forming glandular pattern with sheet of normal ductal epithelial cells (Giemsa, ×400)

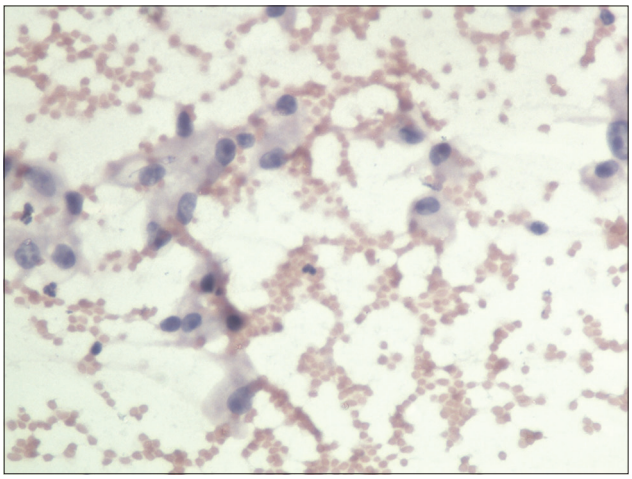

Figure 4: Photomicrograph of renal cell carcinoma displaying tumor cells with prominent nucleoli with clear to eosinophilic cytoplasm (Pap, ×400)

Of total 16 cases of inflammatory lesions, 4 cases were of hepatic abscess, 4 were of reactive lymph nodes, 3 were of unknown origin with one showing granulomtous change [Figure 6], 2 were of renal abscess, 2 were of pancreatic origin, and 1 was of splenic abscess.

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.[14] 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.[15] Nyman *et al*. in 1995 found a diagnostic yield of 64% with USG-guided FNAC.[16]

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.[17] The male to female ratio of 1.07:1 was in accordance with Krishna *et al*.[18] and Ennis *et al*.[19] 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*.,[20] Stewart *et al*.,[21] and Nyman *et al*.[16]

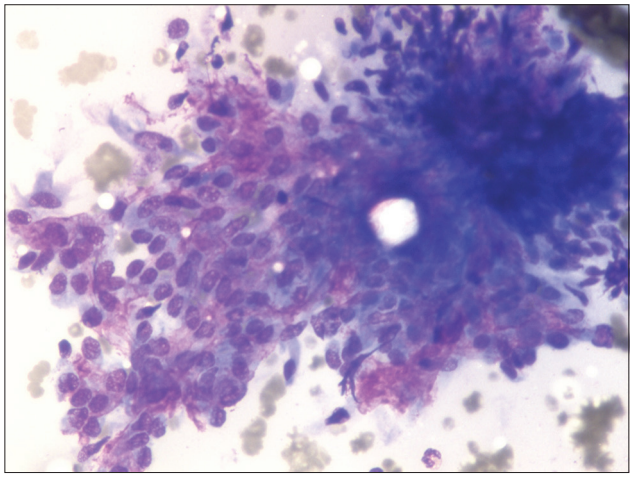

Figure 5: Photomicrograph of malignant spindle cell tumor showing cluster of atypical spindle cells with moderate pleomorphism (Giemsa, ×400)

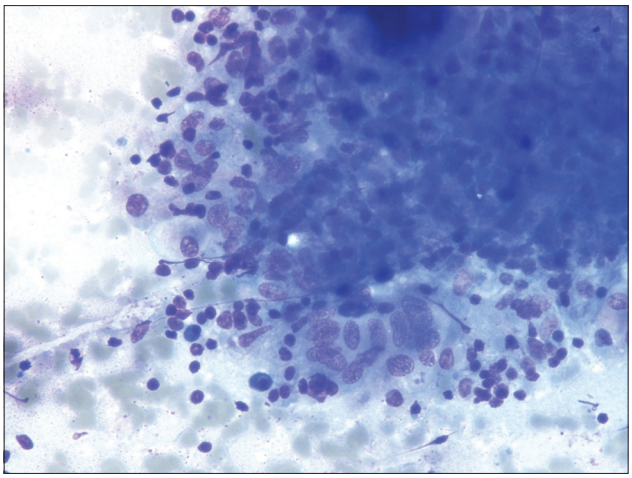

Figure 6: Photomicrograph of granulomatous lesion showing epithelioid cell granulomas and giant cells (Giemsa, ×400)

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*.[20] and Ahmed *et al*.[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*.[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*.[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*.[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*.[25]

Of 8 cases of intra-abdominal lymph nodes, 4 (50%) were reactive, 3 (37.5%) metastatic tumors, and 1 (12.5%) non-Hodgkins lymphoma. Porter *et al*.[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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