

Ultrasound Guided Fine Needle Aspiration Biopsy of Gastrointestinal Masses

Ahmad SS*, Akhtar K+, Akhtar SS+, Arif SH+, Nasir A#, Khalid M**, Mansoor T**

Abstract

The study was undertaken to evaluate the role of ultrasound guided fine needle aspiration cytology (FNAC) of gastrointestinal masses in providing higher diagnostic yield and assess its reliability in distinguishing between benign and malignant gastrointestinal lesions. 86 patients with gastrointestinal masses after thorough clinical examination underwent ultrasonographic examination. Those found to have a mass were subjected to FNAC. Smears prepared were fixed in 95% ethyl alcohol and stained with Haematoxylin and Eosin and Papanicolaou stains. Forty (46.5%) were males and 46 (53.5%) females with majority of patients in the third decade in both sexes. Malignant lesions constituted the maximum number of 42 (48.8%) cases, followed by 36 (41.8%) cases of benign and inflammatory lesions. Adenocarcinoma was the most common malignancy accounting for 36 (85.7%) cases; out of which 16 (44.4%) cases were adenocarcinoma stomach and 20 (55.6%) cases were adenocarcinoma intestine. Among the inflammatory and benign lesions, 30 (83.3%) cases were tuberculous followed by 4 (11.1%) cases appendicitis, The mean age of malignancy was 39.2 years and the average age of tuberculous patients in our study was 25.5 years. On cytohistological correlation, 30 were found to be true positive for malignancy, 5 true negative and 1 false negative. There were no false positive cases. We obtained a sensitivity of 93.8%, specificity of 100% and diagnostic accuracy of 94.4% in our study. Ultrasound guided FNAC is an effective and useful method which eliminates the need for surgical biopsy and provides sufficient information for the initiation of therapy.

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Key Words : Gastrointestinal masses, ultrasound, cytology.

Introduction

Ultrasound guided fine needle aspiration biopsy is a rapid, accurate, economical and safe diagnostic procedure in which any structure visualized, can be reached quickly and precisely by a fine needle in any desired plane with constant visualization of the needle tip during insertion.¹

Mass lesions of gastrointestinal tract (GIT) are usually diagnosed by conventional barium meal examination or by endoscopy. But barium meal examinations are occasionally limited in their demonstration of exophytic or infiltrating mass lesions which do not significantly encroach on bowel lumen.

Ultrasound can frequently demonstrate a mass in these patients providing a strong evidence of extraluminal extension or infiltrative process, when it is not demonstrable by other radiographic techniques or endoscopy.^{2,3}

Though endoscopic ultrasound guided FNAC (EUS-FNA) is a recent innovation in the evaluation of lesions adjacent to the wall of the upper gastrointestinal tract, there is a greater complication rate for this new technique in the form of infections, perforation and haemorrhagic events after puncturing cystic lesions.^{4,5} Also, the poor condition of the patients precluding the use of barium studies and/or endoscopy, non-

*Professor, *Lecturer, #Senior Resident; Department of Pathology; **Reader, Department of Radiodiagnosis; **Professor, Department of Surgery; Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh.

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Corresponding Author: Dr. S. Shamshad Ahmad, Professor, Department of Pathology, JNMC, AMU, Aligarh-202002, Uttar Pradesh

E-mail : akhtar_kafil@yahoo.com; sahmadjnmc@rediffmail.com

specific radiographic images and inability to obtain an adequate biopsy sample during endoscopy⁶ led us to evaluate the role of ultrasound guided FNAC of gastrointestinal masses as its application is relevant in developing countries, where non-invasive investigations are a luxury for the poor in providing higher diagnostic yield.

Materials and Methods

The present study was conducted in the departments of Pathology and Radiodiagnosis of Jawaharlal Nehru Medical College, AMU, Aligarh in 86 patients with gastrointestinal masses. After thorough clinical examination, ultrasonographic examination was performed with Sonoline 500 (Siemen's) ultrasound machine having 35 MHz sector probe; and those found to have a mass were subjected to fine needle aspiration cytology by a 20-22G needle attached to a 10 ml syringe for superficial masses and a 9 cm, 20-22G spinal needle for deep seated masses. Smears prepared were fixed in 95%

ethyl alcohol and stained with Haematoxylin and Eosin (H&E) and Papanicolaou stains. In all cases where the cytological diagnosis was of a granulomatous disease, Ziehl Neelsen staining was performed to demonstrate acid-fast/ tuberculous bacilli. Subsequent to cytologic diagnosis, tissue obtained from operated patients was processed and stained with H&E stain.

Observations

Most of the patients included in the study presented with an abdominal mass or with pain in the abdomen and ultrasonographic examination revealed gastrointestinal masses. Forty (46.5%) were males and 46 (53.5%) females with majority of patients found in the third decade in both sexes (Table 1). All the patients were subjected to fine needle aspiration of their masses under ultrasound guidance. Malignant lesions constituted the maximum number of cases accounting for 42 (48.8%), followed by 36 cases (41.8%) of benign and inflammatory lesions (Table 2).

Table 1 : Allocation of patients with gastrointestinal masses to age group in relation to sex

Age (yrs)	No. of patients	Percentage of total	No. of Males	Percentage	No. of Males	Percentage
0-10	0	-	-	-	-	-
11-20	14	16.3	10	25	04	8.7
21-30	38	44.1	12	30	26	56.5
31-40	12	14.0	06	15	06	13.0
41-50	16	18.6	10	25	06	13.0
51-60	03	3.5	-	-	03	6.5
>60	03	3.5	02	05	01	2.3
Total	86	100	40	100	46	100

Table 2 : Distribution of cases with gastrointestinal masses according to cytologic diagnostic category and its histologic correlation

Cytologic diagnostic category	No. of cases	Cytohistologically concordant cases	Cytohistologically discordant cases	No. of cases with histology not available
Inadequate	02	-	-	02
Inflammatory + Benign	36	-	-	-
• Tuberculosis intestine	30	-	-	30
• Appendicitis	04	04	-	-
• Benign cystic teratoma	01	-	-	01
• Leiomyoma intestine	01	-	01	-
Suspicious	06	-	-	06
Malignant	42	-	-	-
• Adenocarcinoma stomach	16	09	-	07
• Adenocarcinoma intestine (Well-differentiated)	16	12	-	04
• Adenocarcinoma intestine (Poorly-differentiated)	04	04	-	-
• Undifferentiated carcinoma – intestine	03	03	-	-
• Carcinoid tumour	03	03	-	-
Total	86	86	35	01 50

Adenocarcinoma was the most common malignancy in 36 cases (85.7%), out of which 16 cases (44.4%) were adenocarcinoma stomach with thickened gastric wall on ultrasonography (Fig.1). The smears showed sheets of cells with mild nuclear atypia, nuclear crowding with moderate amount of eosinophilic cytoplasm or mucin vacuoles (Fig. 2). The remaining 20 cases (55.6%) were adenocarcinoma intestine, with bowel mass on ultrasonography (Fig.3) and smears revealed cells in small clusters with acinar formation and having intracytoplasmic mucin (Fig.4). There were 3(3.5%) cases of intestinal carcinoid; the cytomorphic features depicted a profusely cellular smear with groups of small cells in sheets and rosettes. There was a striking degree of cellular and nuclear monomorphism with small round to oval nuclei exhibiting a characteristic fine granular, evenly distributed chromatin pattern and minimal to moderate, finely granular, fragile cytoplasm (Fig.5).

Among the inflammatory and benign lesions, 30

(83.3%) cases were tuberculous, which on cytology demonstrated epithelioid cell granulomas with or without caseous necrosis. Ziehl Neelsen stain demonstrated acid fast bacilli mainly in cases with extensive necrosis. There were 4 (11.1%) cases of

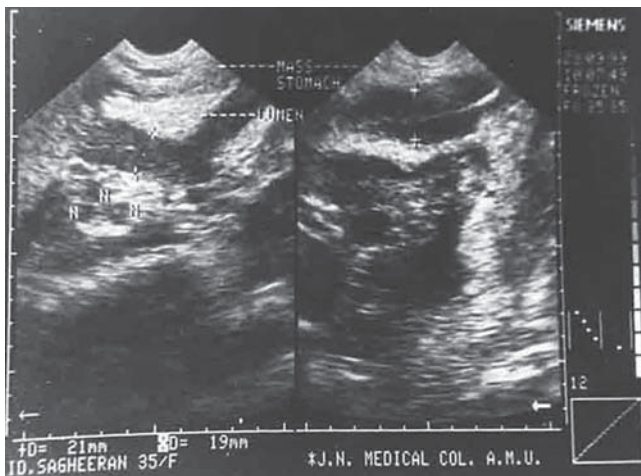


Fig.1 : USG showing thickened gastric wall and few small lymph nodes in peripancreatic region.

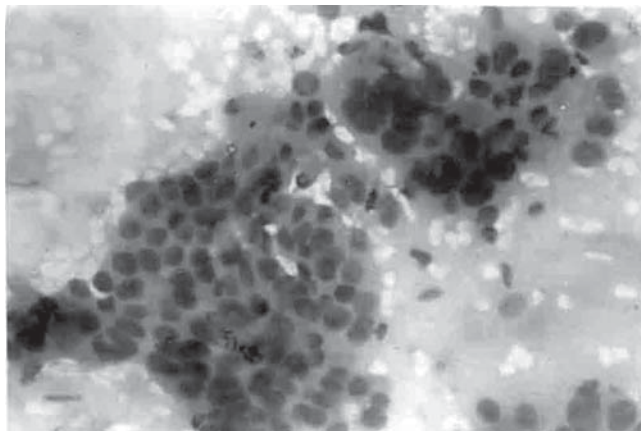


Fig. 2 : Adenocarcinoma stomach: smear showing cells with mild nuclear atypia, nuclear crowding with moderate cytoplasm and mucin vacuoles (H&E, x 500).

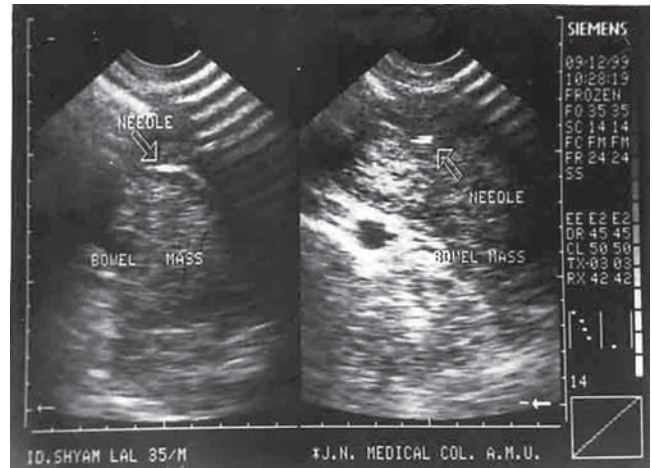


Fig. 3 : USG showing bowel mass.

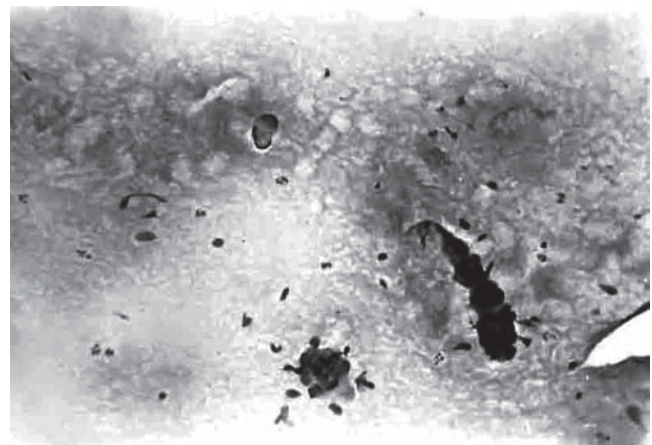


Fig. 4 : Adenocarcinoma intestine. Smear showing cells in small clusters with intracytoplasmic mucin. Signet ring cells are also seen (Pap, x 250).

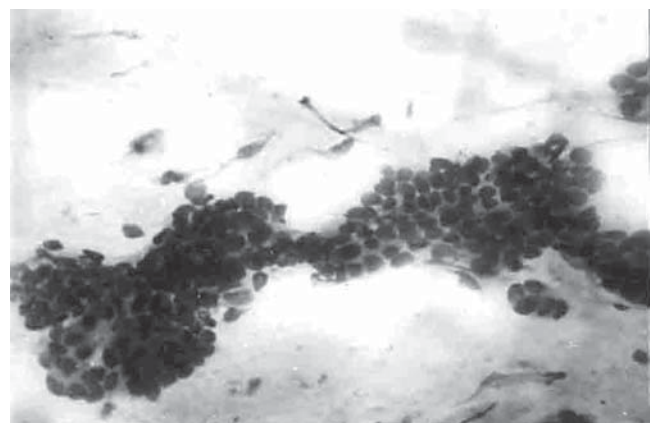


Fig. 5 : Intestinal carcinoid. Smear showing monomorphous population of small neoplastic cells with finely granular evenly distributed nuclear chromatin and small amount of granular fragile cytoplasm (Pap, x 500).

appendicitis, with very atypical clinical findings in the form of mild fever and slight pain in right lower abdominal quadrant, with only leucocytosis on blood examination and ultrasonography revealing a mass effect in 3 cases and non-specific changes in a single case. The mean age of malignancy cases was 39.2% years and the average age of tuberculous patients in our study was 25.5 years.

Histological examination was performed in 36 cases. On cytohistological correlation, 30 were found to be true positive for malignancy, 5 true negative and 1 false negative. The false negative case was that of a leiomyosarcoma of the intestine which was diagnosed as leiomyoma on cytology. There were no false positive cases. We obtained a sensitivity of 93.8%, specificity of 100% and diagnostic accuracy of 94.4% in our study.

Discussion

The present study was conducted on 86 cases with gastrointestinal mass discovered either on clinical or ultrasonographic examination.

Out of the 86 cases, 40 (46.5%) were males and 46 (53.5%) were females. The male patients ranged from 14 to 65 years and females from 17 to 62 years. Das and Pant⁷ reported 78 patients between 1 – 85 years with gastrointestinal masses. The majority of patients were found in the third decade in both sexes with no case in the first decade of life.

On cytologic evaluation, 42 cases (48.8%) were found to have malignancy, 36 cases (41.8%) had inflammatory or benign smears, and 6 cases (6.9%) were suspicious for malignancy. Ballo and Guy⁸ in their study on 20 cases of gastrointestinal wall masses reported neoplastic process in 15 cases (75.0%) whereas Pedersen et al⁹ noted 61 cases (78.2%) of malignant lesions and 17 cases (21.8%) of benign lesions in their study on 78 patients with ultrasonographically demonstrable gastrointestinal masses.

Adenocarcinoma was the most common malignancy in 36 cases (85.7%), similar to the results of 78.2% by Pederson et al⁹ in their study on 61 malignant patients. Most common site was intestine, 20 cases (55.6%) followed by 16 (44.4%) cases in stomach, a finding similar to Carson et al¹⁰ who obtained 34.1% and 65.9% cases of adenocarcinoma stomach and intestine respectively. A slightly higher percentage of cases of adenocarcinoma intestine, 40 cases (80%) were reported by Javid et al¹¹ in their study.

Among the inflammatory and benign cases, the maximum (83.3%) were tuberculous followed by appendicitis (11.1%), with perforation leading to the formation of a periappendiceal mass in 3 cases and fibrous induration in a single case; very similar to the findings of Rex et al¹². Das and Pant⁷ in their study on 25 benign cases reported 72% tuberculous cases. Similarly S Radhika¹³ also reported a high percentage of tuberculous cases among benign lesions on abdominal aspiration biopsy.

The mean age of malignancy in our study was 39.2 years, which was much lower to 71 years as reported as Heriot et al¹⁴ and Misra et al.¹⁵ This could be because the youngest patient in our study was a 14 year old male, found to be suffering from papillary adenocarcinoma of the descending colon, whose diagnosis was confirmed on histopathology. The average age for tuberculosis of the intestine was 25.5 years.

Histopathological examination was performed on 36 cases and on correlation, 30 cases were found to be true positive for malignancy, 5 true negative and 1 false negative. The false negative case was that of a leiomyosarcoma of the intestine which was diagnosed as leiomyoma on cytology. According to Liang-Che and Davidson¹⁶, the histopathological diagnosis of malignancy in well-differentiated tumours of smooth muscle origin is to a large extent dependent on mitotic count, invasive growth and size, which generally cannot be evaluated on FNAC smear.

In one patient, a mass in the ileocaecal region suspected to be a sarcoma on ultrasonography was found to be a benign cystic teratoma on cytology. But the patient refused surgery and the diagnosis could not be confirmed.

We obtained a sensitivity of 93.8%, specificity of 100% similar to that of Heriot et al,¹⁴ who obtained a sensitivity of 94% and specificity of 100%. A diagnostic accuracy of 94.4% obtained by us was similar to 94.1% as reported by Kedar et al¹⁷ and Silverman et al.¹⁸

Conclusion

Ultrasound guided FNAC is an effective and useful method which eliminates the need for surgical biopsy and provides sufficient information for the initiation of therapy. Moreover it helps in arriving at a tissue diagnosis of neoplastic and non-neoplastic lesions, especially tuberculosis.

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