ASSESMENT OF DIAGNOSTIC ACCURACY OF ULTRASONOGRAPHY ASSISTED FINE NEEDLE ASPIRATION CYTOLOGY IN OVARIAN MASS LESIONS

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ABSTRACT

Objectives: Ultrasonography (USG) guided fine needle aspiration cytology (FNAC) of ovarian lumps is being increasingly used for the successful diagnosis of ovarian mass lesions and it is a rapid, accurate, economical, and safe procedure to diagnose various ovarian mass lesions. The aims of the study were to categorize and study the cytomorphological features of the ovarian mass lesions, study the age distribution and analyzing cytological features of the ovarian mass lesions, and to evaluate the sensitivity, specificity, and diagnostic accuracy of USG-guided FNAC in diagnosing ovarian mass lesions.

Methods: A prospective observational study of 24 patients with clinically and radiologically diagnosed ovarian mass lesions and referred for FNAC in Department of Pathology of a tertiary care hospital. USG-guided FNAC was performed in each patient and cytological features were analyzed.

Results: In our study, out of total 24 USG-guided FNAC of ovarian lesions, ovarian malignancies were most common – 11 cases (45.83%), followed by benign ovarian tumors – ten cases (41.66%), inflammatory lesion – one case (4.16%), and two cases (8.33%) were unsatisfactory smears. In our study, diagnostic accuracy of USG-guided FNAC was found to be 91.66%.

Conclusion: USG-guided FNAC is a simple, safe, quick, reliable, efficient, and easily available diagnostic procedure and with less number of complications that it has a very important role in accurate diagnosis of ovarian mass lesions. It is a safer alternative to the more expensive and time consuming surgical procedure like diagnostic laparotomy.

Keywords: FNAC, Ovarian tumors, Cytology, Ultrasonography, Diagnostic accuracy.

INTRODUCTION

The clinical and pathological evaluation of ovarian mass lesions is a challenging task. Difficulty in reaching the tumor site is itself a major hurdle and the broad spectrum of lesions presents a formidable picture to the pathologist. In recent times, ultrasonography (USG)-guided aspiration is being increasingly used as a safe, rapid, reliable, inexpensive, and efficient method for the pre-surgical diagnosis of ovarian lesions and also for the planning and evaluation of treatment.

FNAC which is used for making a cytological diagnosis has become an Indispensable component of the work-up of many abnormalities. USG-guided FNAC is an effective way to obtain diagnostic material in various ovarian mass lesions.

The ovaries are deep seated, paired, and pelvic female reproductive organs. Lesion are not easily accessible clinically. An ultrasound-guided, transabdominal and transvaginal fine-needle aspiration cytology solves the problem. The use of fine needle aspiration cytology (FNAC) for diagnosis of ovarian lesions used to be limited in past, due to the apprehension of rupture of tumor capsule and peritoneal spread of malignant tumor. With the advent of accurate imaging techniques and monoclonal antibody for immunocytochemistry, image-guided FNAC from ovarian lesions are being increasingly used for diagnosis of ovarian lesions. FNAC can reliably distinguish between benign and malignant ovarian lesions. Ultrasound-guided cytology could be considered as a very valuable investigation for diagnosing abdominal masses in the early stage [1]. Thus, it helps surgeons to plan appropriate treatment for their patients and to avoid more radical surgical interventions in cases where minimal surgery can serve the purpose. This helps in preserving fertility and hormonal profile of such patients [2].

USG-guided aspiration is an inexpensive, versatile, with use of non-ionizing radiation, does not require injection of contrast medium and can be easily repeated when necessary. Thus, it is a valuable tool in assessment and a pre-operative diagnostic procedure in management of ovarian lesions. The biological nature of ovarian lesions can be benign, malignant, or inflammatory. Imaging techniques do not always distinguish between benign and malignant lesions morphologically. A confirmed diagnosis is essential for management of malignancy (for treatment and staging of cancer).

The present study was planned to assess the diagnostic accuracy of USG-guided FNAC in the diagnosis of ovarian masses.

Aims and objectives
The aims of this study were as follows:
1. To categorize the ovarian lesions into inflammatory, benign, and malignant.
2. To study cytomorphological features of ovarian lesions.
3. To study the age distribution of ovarian lesions.
4. To analyze the cytological features of various ovarian lesions.
5. To evaluate the sensitivity, specificity, and diagnostic accuracy of USG-guided FNAC in diagnosing ovarian lesions.

METHODS

Study design
This study was prospective observational study.

Study place
Study was conducted at cytology section of Department of Pathology, N.S.C.B. Medical College, Jabalpur (MP), India.

Study period
The study period was from March 1,2015 to August 31,2016 (1 year and 6 months).

Ethical consideration
This study was approved by the Research and Ethical Committee of the University of NSCB Medical College, Jabalpur (Madhya Pradesh Medical Science University, Jabalpur).

Study population
All the patients with clinically and radiologically diagnosed ovarian lesions and referred for FNAC in Cytology section of Department of Pathology, N.S.C.B. Medical College, Jabalpur (M.P.) were included in the study.

A total 24 patients were subjected to USG-guided FNAC during the study period.

Exclusion criteria
The following patient's were excluded from the study:
1. Patients with hemorrhagic diathesis.
2. Patients with skin infection at the site of aspiration.
3. Patients with suspected peritonitis.
4. Pregnant women with ovarian lesions.

Procedure planned
Detailed clinical data which include the patient's history, physical examination findings, and reports of relevant investigations are recorded from the patients who present with clinically and radiologically diagnosed ovarian lesions. After taking consent from the patients, FNAC of the lesion is done using a 22 gauge lumbar puncture needle attached to a 10 ml syringe under USG guidance taking aseptic precautions and by shortest route possible. Smears were prepared from the aspirated material, fixed in isopropyl alcohol and stained with hematoxylin and eosin, examined and interpreted by experienced cytopathologists. Expert cytopathologists gain enough reputation, so that their diagnosis is taken as final and patient can be safely referred to cancer ward (in case of malignancy).

Statistical analysis
The data were compiled and entered in the Microsoft Excel sheet. It was analyzed using statistical software SPSS 20.0 of windows. The data were represented in tables and graphs. Categorical variables were summarized in frequency and percent distribution and Chi-square test was performed by a statistician. All means were expressed as mean±standard deviation and the proportion as in percentage. The critical value for the significance of the results was considered <0.05 level.

RESULTS

The present study comprises 24 patients with clinical and radiological diagnosed ovarian mass lesions. The mean age group of patients was 54.25±10.42 years and the peak incidence was in the sixth decade. The most common presenting features were an abdominal mass and lower abdominal pain.

In our study, out of total 24 USG-guided FNAC of ovarian lesions, ovarian malignancies were most common – 11 cases (45.83%). The majority of cases were surface epithelial tumors. Malignant ovarian tumors consisted of six cases (25%) of serous cystadenocarcinoma, three cases (12.50%) of mucinous cystadenocarcinoma, and two cases (8.33%) of dysgerminoma. Ten cases (41.66%) were diagnosed as benign ovarian tumors consisting of seven cases (29.16%) of serous cystadenoma and three cases (12.50%) of mucinous cystadenoma. Other than neoplastic lesions, one case was inflammatory lesion (4.16%) and two cases (8.33%) were inconclusive smears. The details are shown in Tables 1 and 2.

Watery fluid mixed with cells is aspirated in case of serous cystadenoma. The FNAC smears were moderately cellular. Smears revealed plenty of epithelial cells having small round vesicular nucleus with scanty cytoplasm. Cells were arranged in acinar pattern (Fig. 1). In cases of mucinous cystadenomas, columnar cells having nuclei placed at bases and vacuolated cytoplasm were seen against the mucinous background.

The smears of malignant papillary serous cystadenocarcinomas revealed large clumps of malignant epithelial cells in sheets, three-dimensional aggregates and in papillary pattern. Neoplastic cells have enlarged moderately pleomorphic nuclei having coarsely granular, irregularly distributed chromatin with prominent nucleoli and moderate to scant amount of cytoplasm (Fig. 2). The smears of mucinous cystadenocarcinoma showed sheets of columnar cells with nuclear enlargement, High N/C ratio and overcrowding against the mucinous background. Apart from surface epithelial tumors, we also diagnosed two cases of dysgerminoma in our study.

Table 1: The details of the cytology diagnosis

Diagnosis	Number of cases
Malignant ovarian tumor	11
Benign ovarian tumor	10
Inflammatory lesion	1
Inconclusive	2

Table 2: Distribution of cases of ovarian lesions

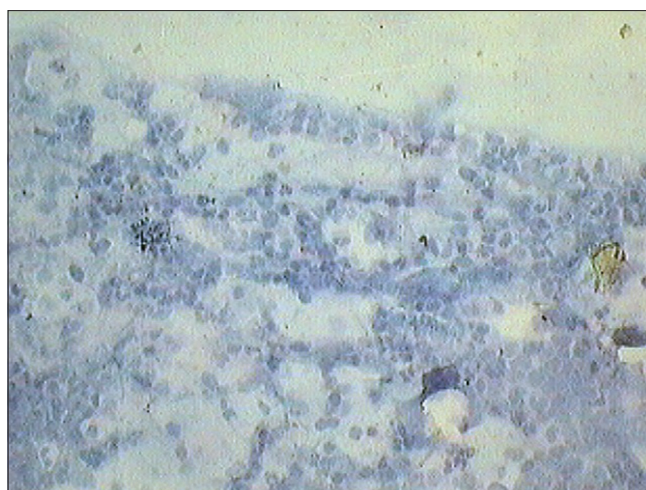| Type of lesion	Number of cases (%)
Malignant tumors	
Serous cystadenocarcinoma	6 (25.00)
Mucinous cystadenocarcinoma	3 (12.50)
Dysgerminoma	2 (8.33)
Benign tumors	
Serous cystadenoma	7 (29.16)
Mucinous cystadenoma	3 (12.50)
Inflammatory lesion	1 (4.16)
Inconclusive smears	2 (8.33)
Total	24 (100.00)

Fig. 1: Serous cystadenoma showing plenty of epithelial cells having small round vesicular nucleus with scanty cytoplasm. Cells were arranged in acinar pattern (H and E, ×40)
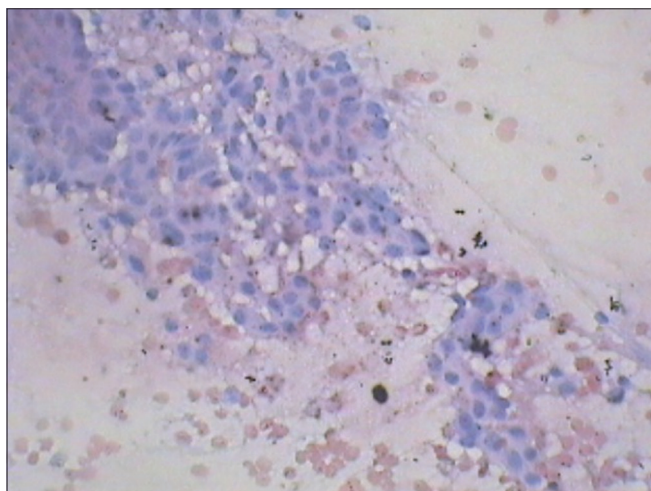
Fig. 2: Serous Cystadenocarcinoma showing large clumps of malignant epithelial cells in papillary pattern. Malignant cells have enlarged nuclei with prominent nucleoli and moderate to scant amount of cytoplasm (H and E, ×40)

DISCUSSION

Age distribution

The youngest patient was 35 years old and the oldest was 80 years, reflecting that ovarian tumors occur mostly after the age of 30 years. Maximum number of patients were in the age group of 51–60 years and are having malignant lesions, reflecting that ovarian malignancies mostly occur after the age of 50 years.

Ovarian lesions

In our study, maximum conclusive aspirates from ovary were neoplastic in nature (benign and malignant lesions). Patients with ovarian lesions, particularly those having malignant tumors, usually present with advanced stage of disease. Majority of patients in our study presented with the complaints of abdominal mass and lower abdominal pain. We got conclusive reports in 91.66% of cases; hence, only 8.34% of smears were inadequate. This was possible due to expert sonologist and cytopathologist.

USG guide FNAC has been widely used in the diagnosis of recurrent and metastatic gynecological malignancies. In our experience also, USG guide FNAC which was done in ovarian tumors was found to be relatively safe and accurate procedure. Besides this, the FNAC diagnosis was helpful especially in young patients with unilateral ovarian masses for the prospect of a conservative surgery to preserve the fertility.

Majority of benign lesions were cystic as compared to malignant lesions which were solid. Majority of malignant lesions were adenocarcinomas, our study correlates with the studies of Aparna *et al.* [3], Dey *et al.* [4], and Bandophadyay *et al.* [5]. In our study, we got good cellular morphology in most cases, which facilitated the diagnosis and was in accordance with the documented literature [6,7].

Among malignant lesions, serous cystadenocarcinoma – six cases (54.54%) was the most commonly diagnosed malignant ovarian tumor and mucinous cystadenocarcinoma was the second most commonly diagnosed malignant ovarian tumor – three cases (27.27%), our study correlates with the study of Mehdi *et al.* [8]. Among benign lesions, serous cystadenoma – seven cases (70%) was the most commonly diagnosed benign ovarian tumor followed by mucinous cystadenoma – three cases (30%), our study correlates with studies of Mehdi *et al.* [8] and Shobha Rani *et al.* [9]. We achieved a high diagnostic accuracy of 91.66 % in diagnosing ovarian tumors (for both benign and malignant tumors), which was in accordance to the studies of Mehdi *et al.* [8], Hemlatha *et al.* [10], Sood *et al.* [11], Kedar *et al.* [12], and Khan *et al.* [13].

Most of the deep seated ovarian lesions are non-palpable, the idea of their size, shape, and extent of the lesion are not possible. Therefore, ultrasonography-guided fine needle aspiration cytology (USGFNAC) is a rapid, accurate, economical, and safe diagnostic procedure in which any ovarian lesion visualized can be reached quickly and precisely by a fine needle in any desired plane with constant visualization of needle tip during insertion [14].

The use of aspiration cytology to diagnose ovarian lesions has been widely discussed [2,15-17]. It is extremely useful in young patients with benign lesions, such as benign cysts, where an early diagnosis can help in avoiding surgery in some cases [2,16,18]. It also helps in minimizing unnecessary surgery in post-menopausal patients and those at high risk for surgery [2]. In cases of malignant tumors, FNAC has a definitive role in evaluating patients with suspected recurrence of the tumor and to assess spread of the disease [19,20].

Sensitivity of USG-guided FNAC ranged from 80% to 95.3%. In our study, it was 91.50% which was comparable to most of the studies. Maximum studies observed specificity around 85%, the same observation what we have made in our study (88% specificity). Our study found diagnostic accuracy of 91.66% which is comparable to most of the studies.

Limitation of USG-guided FNAC

The only absolute contraindication for the procedure is uncorrectable severe coagulopathy.

CONCLUSION

USG-guided FNAC is a simple, safe, reliable and cost-effective procedure with a high diagnostic accuracy for the diagnosis of ovarian lesions. It helps in differentiating between inflammatory, benign, and malignant lesions and also in categorizing different malignant lesions of ovary. Therefore, USG-guided FNAC can serve as a highly efficient method for early diagnosis of ovarian lesions.

CONFLICTS OF INTEREST

None declared.

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