

**FINE NEEDLE ASPIRATION CYTOLOGY OF OVARIAN TUMOURS**Mangesh Virkar<sup>1</sup>, Ravindra Karle<sup>2</sup><sup>1</sup>Head of the Laboratory Operations and QA, Department of Pathology, Golwilkar Metropolis Health Services (I) Pvt Ltd., Maharashtra, India.<sup>2</sup>Professor, Department of Pathology, Rural Medical College, Loni, Maharashtra, India.**ABSTRACT****BACKGROUND**

Recent trends towards delayed child bearing have bolstered efforts to preserve ovarian tissue throughout the reproductive years. This trend combined with improvements in technology of high frequency sonography and increasing experience in cytopathological interpretation of ovarian cyst fluid has led to broader acceptance and utilization of ovarian FNAC.

**MATERIALS AND METHODS**

The study was undertaken on 47 patients from February 2003 to March 2005.

FNAC of ovarian lesions by using 23 Gauge needle and Cameco syringe pistol with disposable 10 cc syringe and whenever required use of USG or CT guidance. The technique of aspiration and preparation of the slides closely followed those recommended by Franzen and Zajicek et al.

**RESULTS**

The study included 47 cases of which 55.32% were benign and 44.68% were malignant. The commonest benign tumour was simple ovarian cyst (13cases) and the commonest malignant tumour was mucinous cyst adenocarcinoma (09 cases). 13 (27.65%) cases were simple cysts which formed the major portion of this study.09 (19.14%) cases were diagnosed as mucinous cystadenocarcinoma. 08 (17.02%) cases were diagnosed as serous cystadenocarcinoma.

Serous cyst adenocarcinomas in 02 cases were bilateral.

Recurrence was diagnosed in 02 cases of known mucinous cystadenocarcinomas and 01 case of serous cystadenocarcinoma.

**CONCLUSION**

So, with the knowledge of limitations of FNAC, judicious use of this procedure along with detailed clinical history, use of USG/CT guidance and a skilful procedure as well as interpretation of smears, this method proves to be very effective and rewarding.

**KEYWORDS**

FNAC, Ovarian Tumours, Ovarian Malignancies, Ovary.

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**BACKGROUND**

Ovarian malignancies are difficult to diagnose clinically; at the time of initial diagnosis more than 60% to 70% are already in stage III or IV. In most instances the physician's discovery of a pelvic mass is followed by an exploratory laparotomy and surgical resection of part or the entire tumour. Histopathologic examination establishes the diagnosis, the cell type, and the degree of differentiation.<sup>1</sup>

Ovarian masses are common at various ages, although, in general, malignant neoplasms mostly affect postmenopausal patients while non-neoplastic cystic conditions and benign neoplasms are seen in younger patients.<sup>2</sup> A documentary evidence of nature of pathology before institution of therapy is mandatory. In some cases

malignancy is undoubtedly evident on clinical examination while in majority of cases diagnosis obtained by FNAC is a substitute for surgical procedures like diagnostic laparotomy.<sup>3</sup>

Despite some initial scepticism as to its accuracy and efficacy, FNAC is rapidly becoming the primary diagnostic and therapeutic manoeuvre for the evaluation of clinically and radiologically nonsuspicious cystic ovarian masses that persist in women of reproductive age.<sup>4</sup>

In this present paper we have evaluated the role of FNAC in the diagnosis of ovarian tumours. The cytomorphologic features of various neoplasms along with histological correlation have also been studied.

*Aims and Objectives*

1. To find out incidence of ovarian neoplasms.
2. To establish the accuracy of FNAC in diagnosing ovarian neoplasms.
3. Using FNAC to conclude regarding the malignant or benign nature as well as the specific type and classification of ovarian neoplasms.
4. To discuss advantages and limitations of FNAC as compared to histopathology.

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## MATERIALS AND METHODS

### a) Inclusion Criteria-

- Patients with ovarian lesions found on USG

### b) Exclusion Criteria-

- Patients with history of haemorrhagic diathesis.
- Patients on oral anticoagulants.
- Patients with pelvic mass and associated pregnancy.
- Patients with associated local skin infection.

The present study was done in department of pathology. The cases of ovarian tumour having diagnostic dilemma to the clinicians formed the material for this study. The study was undertaken on 47 patients from February 2003 to March 2005.

However patients clinically detected with a pelvis mass but having the following features were excluded in the present study.

### The following procedure was adopted-

1. The entire procedure was explained to the patients
2. The detailed clinical history, relevant clinical findings and investigations were noted.
3. The procedure was carried out in the side rooms of surgical OPD, ward and USG room. All the patients attending OPD / admitted in IPD having ovarian as well as adnexal masses were evaluated as follows:

#### Detailed clinical history-

A complete general and systemic examination including detailed pelvic examination.

Detection of pelvic mass on clinical examination in OPD or on USG.

4. FNAC of ovarian lesions by using 23 Gauge needle and Cameco syringe pistol with disposable 10 cc syringe and whenever required use of USG or CT guidance. The technique of aspiration and preparation of the slides closely followed those recommended by Franzen and Zajicek et al.

In the case of transcutaneous aspiration, a 22 Gauge spinal needle was used. Transvaginal and transrectal aspirations were performed with 21 cm long, 23 Gauge needle passed through a needle guide specially designed.

The needle was attached to a 10 cc syringe contained within a pistol handle (Cameco Type).

The mass was palpated and stabilized with one hand to ascertain the correct introduction of the needle.

When the needle guide was used, the mass is localized with the tip of index finger. The needle could thus be introduced directly into the mass without being contaminated.

A vacuum was established and the needle passed in different directions within the mass to ascertain a representative sampling of cells.

The suction was released before the needle was withdrawn.

The contents of the needle were spread over slides (2-3) with the flat of 0.4 mm cover slip by applying minimum pressure.

Any large fragments that collected at the end of the smear were firmly squeezed by gentle pressure of the flat of 0.4 mm cover slip.

One slide is immediately fixed in alcohol and remaining slides are allowed to air dry before being submitted to the laboratory.<sup>5,6</sup>

These principles were also applied to lesions outlined by imaging techniques such as radiography and ultrasound. Under these circumstances longer needle were used and asepsis maintained.<sup>7</sup>

5. After smears were obtained they were evaluated for adequacy, nature and type of material.
6. Staining of smears with MGG, Papanicolaou and H & E as and when required was done.

The smear for Pap and H & E staining were immediately fixed in 90% ethanol.

Air dried smears were used for MGG stain.

While drying the smears, care was taken to dry them very fast so as to avoid drying artefacts.

2-3 slides were kept unstained for special staining to be carried out if required.

## RESULTS

47 patients having adnexal mass were studied. The FNAC was advised in cases having clinical dilemma, regarding benign or malignant lesions.

The commonest presentation in 47 cases of adnexal masses studied was pain in abdomen seen in 32 cases (68.08%); followed by lump in abdomen seen in 19 cases (40.42%).

Majority of the cases of ovarian lesions were observed in 6<sup>th</sup> decade (29.78 %) followed by 5<sup>th</sup> decade (21.27 %). The mean age in this study was 50 years with the age range of 10 to 80 yrs. The youngest patient presented at the age of 18 years and the eldest was at the age of 71 years.

Majority of the cases of benign lesions were observed in between 40 to 50 years (42.30%) with the mean age of 50 years.

Majority of the cases of malignant lesions were observed in 6<sup>th</sup> decade (47.60%) with the mean age of 53.33 years. The youngest patient presented at the age of 18 years and the oldest was at the age of 71 years.

The study included 47 cases of which 55.32% were benign and 44.68% were malignant. The commonest benign tumour was simple ovarian cyst (13 cases) and the commonest malignant tumour was mucinous cystadenocarcinoma (09 cases).

13(27.65%) cases were simple cysts which formed the major portion of this study.

09(19.14%) cases were diagnosed as mucinous cystadenocarcinoma. 08(17.02%) cases were diagnosed as serous cystadenocarcinoma.

Serous cystadenocarcinomas in 02 cases were bilateral.

Recurrence was diagnosed in 02 cases of known mucinous cystadenocarcinomas and 01 case of serous cystadenocarcinoma.

In 02 cases of simple ovarian cyst due to poor cellularity diagnosis could not be made and 01 case biopsy was not done. Biopsy was not done in 01 case of serous cystadenoma and 01 case cellularity was poor. In 01 case of tuberculosis and 01 case of ovarian abscess surgical removal was not done. Hence 07 cases out of 47 cases histopathological specimens were not available. In the 40 cases (85.10 %) specimen for histological diagnosis were available. It was correlated well in 37 cases (92.5%).

There were 13 case of simple ovarian cyst. Out of these 10 cases were histologically confirmed. In 02 cases diagnosis could not be made due to poor cellularity and one case was not histologically confirmed due to loss of follow up. There were 04 cases of serous cystadenoma. Out of these 02 cases were confirmed on histology. 01 case of mucinous cystadenoma, 01 case of mature teratoma and 02 cases of cystadenofibroma were confirmed on histology.

In other non-neoplastic lesions like abscess (02 cases) and tuberculosis (01 case) histological confirmation could not be done. In benign lesions 02 cases diagnosis was false negative. These were 01 case of fungal oophoritis, which was diagnosed as non-specific infection, and 01 case of leiomyoma, which was diagnosed as benign ovarian disease. In malignant lesions, serous cystadenocarcinoma (08 cases), mucinous cystadenocarcinoma (09 cases), malignant Brenner tumour (01 case), dysgerminoma (01case), and sex-cord stromal tumour (01 case) were histologically confirmed. We had only one false negative result in malignant lesions, of endometrioid carcinoma, which was diagnosed as serous cystadenocarcinoma.

In our study following false negative cases were noted.

*False Negative Cases-*

Case no.	FNA diagnosis	Histopath diagnosis
1.	Benign ovarian disease	Leiomyoma
2.	Nonspecific infection	Fungal oophoritis
3.	Serous cystadenocarcinoma	Endometrioid tumour

**Table 1**

We had no false positive lesions in our study.

Accuracy was calculated for the cases in which histopathology was available for confirmation.

Accuracy was 95.0% for benign, 97.5% for malignant and 96.25 % for the entire study.

Sensitivity of FNAC for benign and malignant lesions was 89.47% and 95.5 % respectively.

Specificity was 100% for benign as well as malignant lesions.

**DISCUSSION**

Cytopathology is a visual science dependent on colour, texture, form, spatial relationships, the cadence of repetitive

structure and pattern. It is at once sculpture and music art a lyrical descriptive word, a cellular concerto or epic poem of disease in process. It is charmingly enchanting and not unexpected that practitioners of cytopathology grasp the arts for an aesthetic of expression of balance and spirit in their quest for scientific inquiry, as if in that union there is possibility of beauty and perfection. There lives within the physician and scientist an artist and sometimes that duality is openly expressed.<sup>8</sup>

FNA as a diagnostic tool in Cytopathology was introduced in India, initially by Dr. M.S. Sukumaran (Personal communication) in the southern city of Madras and by Dr. Subhash Kumari Gupta (personal communication) in the post graduate institute of medical education and Research in the northern Indian City of Chandigarh, in the early 1970s, after their training in Scandinavia.<sup>9</sup>

Most intra-abdominal masses are non-palpable and even if palpable the idea of size, shape, and extent of lesion is not possible, therefore various imaging modalities like Fluoroscopy, Computerized Tomography (CT), Ultrasound (USG) are used as a guide for fine needle aspiration. Out of these, ultrasonography is advantageous over others because it is rapid, less expensive, and versatile; no ionizing radiation is applied and easily reproducible. Advent of real time sonography is a major advantage as the exact localization of needle tip during the procedure is possible and manipulations can be made.

Patients with non-neoplastic pelvic masses due to causes such as endometriosis and inflammatory conditions will benefit most from this diagnostic technique because the risk and the cost of major surgery can be avoided.

The incidence of benign lesions like simple cysts correlates with the studies above mentioned. Thus present study concludes that the most common tumour of ovary is simple cysts. FNAC can diagnose the simple cysts and thus is useful, particularly in young patients who want to preserve their fertility as well as reduces the anxiety. The diagnosis also prevents the subsequent surgical intervention.

Present study could identify these inflammatory lesions by FNAC. Thus, subsequent surgical procedures were prevented and adequate therapy could be started. All clinically indicated FNAC were done. As tuberculosis is not that uncommon in developing countries like India, ovarian abscesses need to be aspirated. Cytological smears may be done to rule out tuberculosis and other non-tubercular inflammatory lesions. Thus, subsequent surgical procedure can be avoided

The method enables satisfactory classification of ovarian carcinoma and thereby facilitates the choice of adequate therapy.

The choice of treatment of a given case of ovarian carcinoma may be problematic, as the indications for the therapeutic methods available, viz. surgery, radiation and administration of chemotherapy, vary with the type of tumour. The decision as to what is the most suitable sequence of methods in combined therapy may also offer difficulties. Surgery is the rule for mucinous tumours, but is of less value for disseminated serous cystadenocarcinoma

and ovarian carcinoma of Endometrioid type. Primary operation for anaplastic disseminated ovarian carcinoma is inexpedient. Therefore, it is essential first to decide whether an ovarian tumour is malignant before treatment is planned, and second if the tumour is malignant, to type it.

Therefore present study can conclude that the FNAC of ovarian tumours can diagnose the primary tumours as well as classification of them is also possible. FNAC has a specific role to play especially in young patients in whom preservation of ovarian function was advisable as well as surgical procedure is avoided. Present study classified simple cysts and benign lesions in the premenopausal women with the perspective of keeping fertility. In postmenopausal women with a unilocular cystic mass, FNA may be considered as an important step in the diagnosis.

In the present study the sensitivity for malignant cells was 95.5% and the specificity was 100%. The use of ultrasound-guidance can achieve high degree of sensitivity and specificity. Recent studies on the management of gynaecological malignancies utilizing fine needle aspirations have reported a sensitivity rate ranging from 61-92%. In each study the specificity was 100%.

Present study had no false positive outcomes.

In present study diagnosis of 3 cases of recurrence was done. 02 cases were of mucinous cystadenocarcinoma and 01 case was of serous cystadenocarcinoma. These cases were correlated with previous diagnosis. FNAC can be used to diagnose primary disease but it is particularly useful in ruling out or confirming the presence recurrent diseases. In several instances, it is possible to avoid the trauma of exploratory laparotomy and other surgery to obtain diagnosis. Thus, radiotherapy and chemotherapy can often be initiated without undesirable delay. FNAC is a simple, reliable and cost-effective diagnostic technique for superficial and deep-seated recurrent gynaecologic malignancies.

In the present study of 47 cases, patients had mild pain immediately after FNAC. The pain was relieved by simple analgesics. There were no other short or long-term complications. The study showed that FNAC of ovarian cysts under ultrasound control is without any complications.

In the present study no case of trans-abdominal needle tract spread of tumour was found. Other studies like Pranab Dey et al,<sup>10</sup> Ramzy et al,<sup>3,5</sup> Ashim Kumar et al,<sup>11</sup> Nadji et al,<sup>12</sup> Kjellgren et al<sup>13</sup> also did not reveal any case of tumour spread along the needle tract.

The proper evaluation of the patient at the time of initial investigation or of suspected recurrence or persistence of disease is necessary for planning therapy. FNA enables the clinician to avoid major surgical procedures. Its advantages over open biopsy are rapid reporting of results, minimal morbidity and complications and good patient tolerance.<sup>14</sup>

So, with the knowledge of limitations of FNAC, judicious use of this procedure along with detailed clinical history, use of USG/CT guidance and a skilful procedure as well as interpretation of smears, this method proves to be very effective and rewarding.

This technique can be employed safely and reliably in young patients for prospect of conservative surgery in order to preserve future fertility as well as is also useful in diagnosing cases of recurrence and helpful for patients where laparotomy is contraindicated.

Lastly after reviewing extensive literature on the subject it was found out that possibility of trans-abdominal needle tract spread of tumour is a thing far from reality and no substantial scientific proof for this could be obtained.<sup>15</sup>

## CONCLUSION

1. In our study total 47 cases of ovarian tumours were found, out of which 26 cases (55.32%) were benign and 21 (44.68%) were malignant.
2. In benign cases simple cysts were common (13 cases), followed by serous cystadenoma (04 cases), mucinous cystadenoma (01 case), mature teratoma (01 case), and other non-neoplastic lesions (05cases).
3. In malignant cases mucinous cystadenoma formed the commonest tumour (09 cases), closely followed by serous cystadenocarcinoma (08 cases). Other malignant tumours were endometrioid carcinoma (01 case), malignant Brenner tumour (01 case), dysgerminoma (01 case), and sex-cord stromal tumour (01 case).
4. Comparison of cytology with subsequent histology was done and 92.5% correlation was observed.
5. Overall accuracy of the study was 96.25%.
6. The sensitivity and specificity of the study was 95.5% and 100 % respectively.
7. No complication was observed during the study.
8. Results of our study were satisfactory and comparable with those in literature.

So, with the knowledge of limitations of FNAC, judicious use of this procedure along with detailed clinical history, use of USG/CT guidance and a skilful procedure as well as interpretation of smears, this method proves to be very effective and rewarding.

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