ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

FNAC IS IT USEFUL IN DIAGNOSIS AND CLASSIFICATION OF OVARIAN LESIONS?

A STUDY CONDUCTED IN TERTIARY CARE HOSPITAL IN SOUTH INDIA

Dr.M.VijayaSree[1], Dr.M.Padma[2], Dr.G.Sudhakar[3]*,Dr.C.Padmavathi Devi[4] ,

Dr.K.Prasanthi[5], Dr.S.Priya Madhooli[6]

[1]Professor, Department of Pathology, Guntur Medical College, Guntur.

[2&3]Associate Professor, Department of Pathology, Guntur Medical College, Guntur.

[4]Professor and HOD, Department of Pathology, Guntur Medical College, Guntur.

[5&6]Post Graduate, Guntur Medical College, Guntur.

***Corresponding Author-Dr .G.Sudhakar, Associate Professor, Department of Pathology, Guntur Medical College, Guntur.Email-drgsudhakarjournals@gmail.com**

ABSTRACT:

Introduction: Fine needle aspiration cytology (FNAC) is a safe and quite helpful investigation in diagnosing as well as classifying ovarian lesions.

Objectives: Our aim is to assess the efficacy of fine needle aspiration cytology in diagnosis and subsequent classifications of ovarian masses.

Material and methods: In our study total number of 52 ovarian lesions was included from January 2015 to December 2019. We tried to assess the adequacy rates, render cytodiagnosis and then correlated with histology.

Results: Out of 52 ovarian lesions 16(30.7%) were malignant. Among the malignant tumors 12 (23.02%) were surface epithelial tumors and 4 (7.68%) were primitive germ cell tumors. Out of 12 surface epithelial tumors 6 (11..5%)were low grade serous carcinomas, 3(5.76%) were high grade serous carcinomas and 3 (5.76%)were mucinous carcinomas.Among 4 (7.68%) germ cell tumors3(5.76%)) were dysgerminomas and one was yolk sac tumor.The total number of benign tumors include in the present study were 29(55.76%)cases. Among the benign tumors benign serous cyst adenoma were 13(25%) and borderline serous tumors were 2(3.84%).The other category of benign tumors incorporated were mucinous cystadenomas 8 (15.38%) and borderline mucinous tumors3 (5.76%).In germ cell category 3 (15.76%) mature teratomas. Out of 52 cases 7 (13.46%) cases were unsatisfactory in FNAC, but were diagnosed in histopathology. Among these 7 cases 2 (3.84%) were benign serous cystadenoma, 1 (1.92%) was mucinous cystadenoma, 1 (1.92%)

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

was low grade serous carcinoma, 2 (3.84%) were mucinous cystadenocarcinoma and 1 (1.92%) was krukenberg tumor.

Conclusion: FNAC seems to be a relatively safe and simple test and cost effective procedure where most ovarian malignancies either present late in their course or no screening method is available. It also enables a fairly satisfactory classification of ovarian tumors and may be useful in deciding management guidelines prior to any surgical intervention.

Key words : FNAC,Ovariantumors,Histology

INTRODUCTION:

Cytology has been underutilized as a modality for the diagnosis of ovarian tumors with the advent of imaging techniques like ultrasonography (USG) and computed topography (CT) scan in detecting the ovarian lesions and omental or peritoneal deposits. Guided fine needle aspiration cytology (FNAC) has assumed a definite role in diagnosis and management .There is clear association between the stages and prognosis of ovarian malignant tumors. Since two third of epithelial ovarian cancer cases present at advanced stages and have a low 5 years survival rate. Early evaluation of ovarian lesions is very important.[1,2].Those women diagnosed with disease confined to ovary often requires less aggressive surgical intervention, may not require chemotherapy and have overall survival rate of approximately 90% [1].In patient with solid ovarian lesions preoperative aspiration cytology may provide important informative as to the type of tumor and whether it is benign or malignant thus aiding the clinician in selecting the appropriate mode of therapy [3].Kellgren and Angstorm [3] pointed out that a preoperative cytology assessment allows individualisation of treatment, particularly the preoperative irradiation of anaplastic carcinoma .Although ,infrequently used ,fine needle aspiration cytology (FNAC)is safe and quite useful Investigation in diagnosis as well as classifying ovarian lesions. We attempt to diagnose and classify ovarian lesions and subsequent correlation with histopathology was done.

MATERIAL AND METHODS:

This was a retrospective study conducted in tertiary care centre .Patient presenting with ovarian masses diagnosed clinically by abdominal examination and by USG from the period of January 2015 to December 2019 were included in this study. FNAC under USG guidance was performed through the abdominal route for all benign and advanced malignant neoplasms .Informed consent was obtained from the patient, mentioning the procedure and further complications.The ovarian lesions were aspirated using a 10ml syringe fitted with a 22 gauge long needle. Air dried smears were prepared and stained with Leishman stain and wet fixed smears stain with H&E(Hematoxylin and eosin) stain.In cases where cyst fluid obtained the sample was centrifuged and smears were prepared from the sediment was stained by the similar methods.Patient suspected to be of malignant lesion based on the menopausal age and ultrasound findings were subjected to CA 125 estimation.It was correlated with the malignant surface epithelial tumors which was markedly

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

elevated.Surgery was performed in all cases.The resected ovarian lesions were routinely processed and the tumors were classified histologically as per the guidelines established by World Health Organisation(WHO) Classification. Detailed clinical,serological,and radiological data was obtained from the records available in the department of pathology.

RESULTS :

During the 5 year period total cases of 52 ovarian mass lesions were included in the study.16(30.7%) were malignant lesions diagnosed both in cytology and histology. Out of 16cases 12 (23.02%)cases were malignant surface epithelial tumours. Among the malignant surface epithelial tumours 6 (11.5%) were low grade serous carcinoms,3 (5.76%) were high grade serous carcinomas (Figure 1, Figure 2) and 3 (5.76%) were mucinous carcinomas (Figure 3, Figure 4). Cytologically low grade serous carcinomas are well correlated with histological diagnosis (Table 1). But three cases of high grade serous carcinomas are diagnosed as mucimous carcinoma in cytology. Three cases of histologically diagnosed mucinous carcinomas are well correlated with cytological diagnosis. Out of 16malignant tumours 4 (7.68%) were germ cell tumours. In the germ cell tumours 3 (5.76%) were dysgerminomas (Figure 5, Figure 6) and 1 (1.92%) was yolk sac tumor and well correlated with cytological diagnosis.In present study out of 52 cases 29 (55.76%) were benign tumours had both cytological and histopathological correlation (Table 2). In 29 cases 26 (50%) were surface epithelial tumours. Among the surface epithelial tumours 15 cases were cytologically diagnosed as benign serous cystadenomas (Figure 7) . But in histological diagnosis 13 (25%) were benign serous cystadenoma and 2 (3.84%) were borderline serous tumour. In the mucinous category cytologically 12 cases were diagnosed as mucinous cytadenomas. But histologically 8 (15.38%) were benign mucinous cystadenoma and 3 (5.76%) were borderline mucinous tumour. The second benign group included in our study were Germ cell tumors. All 3 (5.76%) are mature teratomas in both cytological and histological diagnosis. Out of 52 cases 7 (13.46%) were inconclusive in cytology and diagnosed in histopathology. Among 7 unsatisfactory lesions low grade serous carcinoma was 1 (1.92%), mucinous cystadenocarcinoma were2 (3.84%), krukenberg tumour was 1 (1.92%) in number. Out of 7 unsatisfactory cases 4 were malignant and 3 were benign lesions (Table 3). Among the benign lesions serous cystadenomas were 2(3.84%) and mucinous cystadenoma was 1 (1.92%). The age group varied from 9-72 years. The frequent of ovarian lesions was highest in the 5th and 6th decade of life. The germ cell tumours were highest in 2nd and 3rd decade of life. The surface epithelial malignant tumours were highest in 5th and 6th decade of life. The surface epithelial benign tumour was highest in 4th and 5th decade of life. Right ovary was frequently involved. Bilateral involved was observed in 8 cases. Among the 8 cases 3 were malignant serous carcinoma and 5 were benign serous cystadenomas. The most common presenting feature was abdominal mass, lower abdominal pain,menorrhagia and weight loss. Ultrasonographic evaluation of the 52 ovarian masses revealed 8 solid lesions, and 18 cystic lesions. Aspirate was adequate in 45 out of 52 cases. Aspirates were considered as adequate if the cellular elements were sufficient for underling diagnosis. The total of 45 malignant and benign cases which were adequate for giving a conclusive diagnosis on the needle aspiration are studied(table 1, table 2). When characteristic Cytomorphological findings were appreciated the specific diagnosis was

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

offered in cytology correlated with histopathology. Out of 52 cases the majority were surface epithelial tumors of serous and mucinous variety. In serous tumors we received straw colour fluid. Smears prepared from the centrifuged deposit show few papillary structures with bland nuclei and cyst macrophages. In mucinous tumors we observed mucin like material and small clusters of columnar cells with basal placed nuclei. Aspirated from benign cystic teratoma showed sheets of mature squamous epithelial cells against a dirty background. Two serous cystadenoma and one mucinous cystadenoma FNAC was unsatisfactory, diagnosed in histopathology. In malignant surface epithelial tumors we received ascitic fluid in 4 cases. Smears prepared from centrifuged deposit show pleomorphic epithelial cells arranged in papillary configuration with marked cellular atypia both in cytology and histology. Psammoma bodies were observed in two cases. Among the malignant mucinous tumors in FNAC we observed mucin like material along with sheets of columnar epithelial cells with basally placed nuclei. one serous cystadenoma and two mucinous cyst adenocarcinoma were diagnosed in histology. In FNAC samples were unsatisfactory. In germ cell tumors like dysgerminoma, FNAC showed pleomorphic epithelial cells arranged in sheets admixed with reactive lymphocytes. The cells showed highly fragile cytoplasm, large nuclei and prominent nucleoli and these lesions were correlated well in histology. In yolk sac tumors FNAC showed papillary configuration and cells are large and pleomorphic and correlated with histology.In krukenberg tumor FNAC showed very scanty cells and diagnosed in histology.

Table 1: Comparative correlation of cytological and histological diagnosis of malignant ovarian tumours (n =16) (30.7%).

	Cytological diagnosis	Histopathological diagnosis	Total number of cases
Surface epithelial tumors			12 (23.02%)
	a)Serous carcinoma	Low grade serous carcinoma	6 (11.5%)
	b)Mucinous carcinoma	High grade serous carcinoma	3 (5.76%)
		Mucinous carcinoma	3(5.76%)
Primitive germ cell tumour			4 (7.68%)
	a)Dysgerminoma	Dysgerminoma	03 (5.76%)
	b)Yolk sac tumor	Yolk sac tumor	01(1.92%)

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

Table 2: Comparative correlation of cytological and histological diagnosis of benign ovarian tumours(n=29) (55.76%).

	Cytological diagnosis	Histopathological diagnosis	Total number of cases
Surface epithelial tumors			26 (50%)
	a)Benign serous cystadenoma	Benign serous cystadenoma	13 (25%)
		Borderline serous tumor	02 (3.84%)
	b) Benign mucinous cystadenoma	Benign mucinous cyst adenoma	08 (15.38%)
		Borderline mucinous carcinoma	03 (5.76%)
Germ cell tumor of ovary			
	Benign cystic teratoma	Mature teratoma	03 (5.76%)

Table 3: Ovarian tumours inconclusive or unsatisfactory for evaluation (n=7) (13.46%)

Type of Ovarian tumour	No of cases
Benign serous cystadenoma	02 (3.84%)
Mucinous cystadenoma	01 (1.92%)
Low grade Serous cystadenocarcinoma	01 (1.92%)
Mucinous Cyst adenocarcinoma	02 (3.84%)
Krukenberg tumor	01 (1.92%)

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

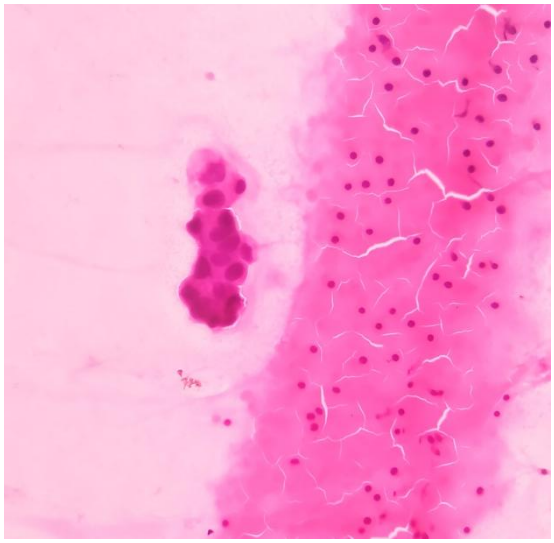

Fig 1 : FNAC of High grade serous carcinoma showing papillary aggregates of pleomorphic epithelial cells (400 x)

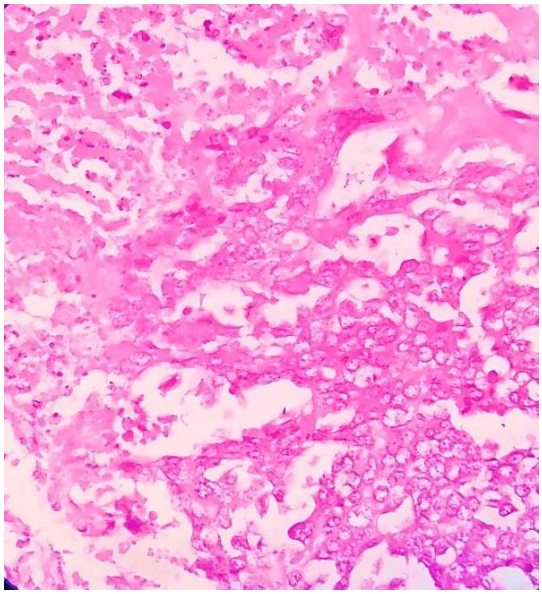

Fig 2 : Histopathology of High grade Serous carcinoma with pleomorphic cells arranged in papillary configurations and necrosis (400 x)

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

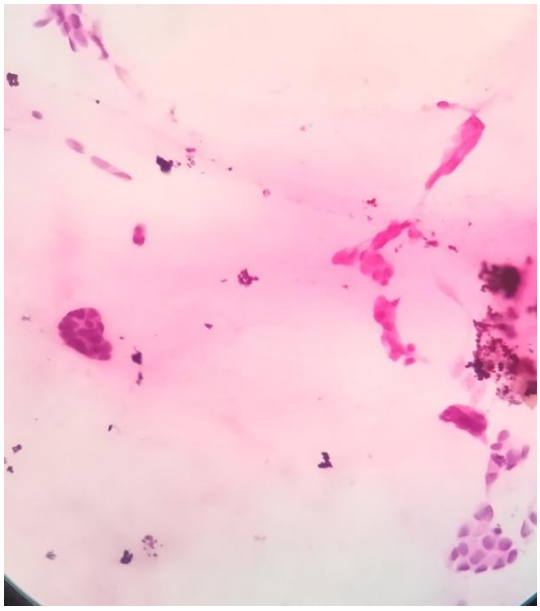

Fig 3 : Mucinous adeno Carcinoma, FNAC showing epithelial aggregates with moderate atypia and mucinous background (400 x)

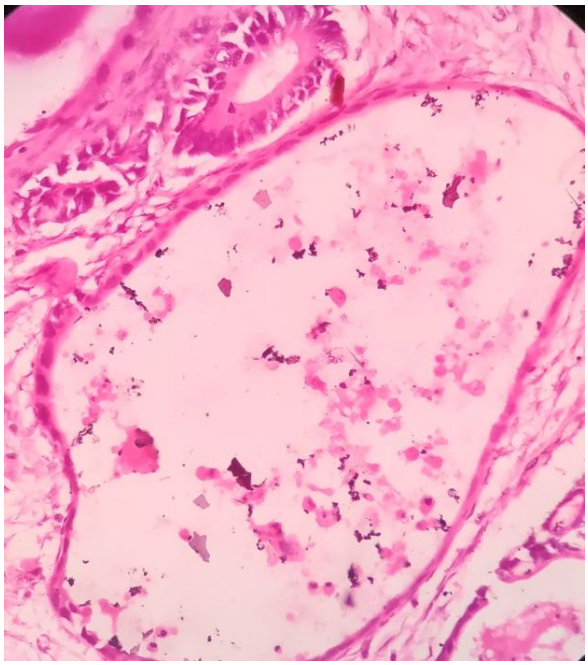

Fig 4 : Mucinous Carcinoma, Showing epithelial cells arranged in glands against mucinous background. H & E – 400 x

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

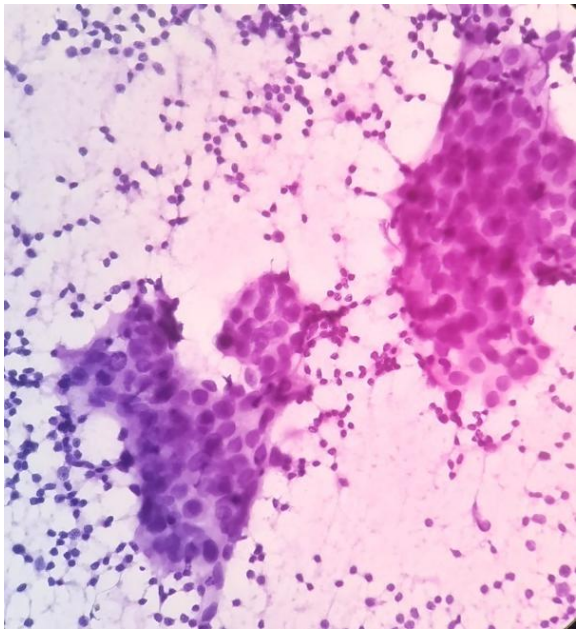

Fig 5 :Dysgerminoma, FNAC showing epithelial cells arranged in sheets admixed with lymphocytes (400 x)

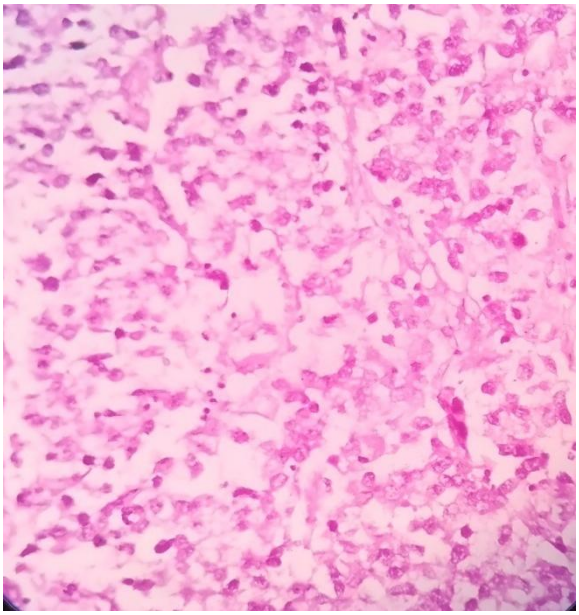

Fig 6 : Dysgerminoma, Epithelial cells arranged in sheets showing prominent nucleoli admixed with lymphocytes(H & E – 400 x)

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

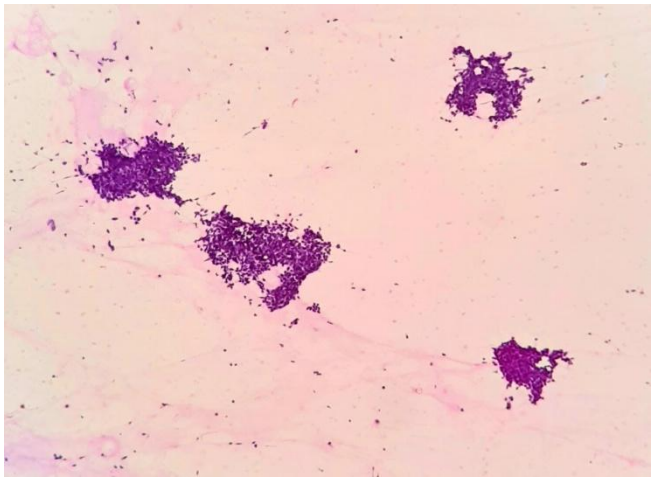

Fig 7: Benign serous cystadenoma
(FNAC showing papillary aggregates of epithelial cells) – 100 x

DISCUSSION:

Patients with ovarian masses particularly those having malignant lesions present with advanced disease. There are conflicting data regarding diagnostic accuracy and safety of FNAC [4-6] Aspiration cytology has been widely used method for diagnosis of solid and cystic masses of the ovary. Developing radiologic guidance techniques has also contributed to the highest accuracy of FNAC in the recent years [7].This technique is used in other fields of medicine and of proven value in disease of breast ,thyroid and lung [8]. Advancement of the radiological guidance technique was contributed to the higher accuracy of FNAC in recent years.[7].Owing to the complexity and wide spectrum of diagnosis, cytological analysis of ovarian lesion is a difficult issue. However differentiation into benign and malignant is possible by the careful evaluation of the cytoarchitecture and background features. [7].The adequacy rate achieved in the present series was 98%,Madji et al [9] and Dey et al [10] Commented on adequacy rate in the aspirate from whole female genital tract in their studies 98.5% and 98.7% respectively. In these reports, ovarian cancer was accurately identified in approximately 85-95% cases.

Ganjei [11] also commented that FNAC cytology has been shown to be highly accurate in diagnosing malignant Gynecological tumors and the overall accuracy was 94.5% in the differentiation between benign and malignant tumors.

In our study cytologically even low grade serous carcinomas are well correlated with histological diagnosis. Three cases of high grade serous carcinomas are diagnosed as mucimous carcinoma in cytology but we were able to diagnose malignant nature of the lesion. Three cases of histologically diagnosed mucinous carcinomas are well correlated with cytological diagnosis. In the germ cell tumours 3 (5.76%) were dysgerminomas and 1 (1.92%) was yolk sac tumor and well correlated with cytological diagnosis.

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

Ganjei [11] also concluded that the aspirated material may not only be used for diagnosis and classification of ovarian neoplasms but may also be used for DNA analysis and detecting prognostic markers, thus providing information regarding the biological behaviour of tumors.

Asotra et al [12] reported a case of postmenopausal women with ovarian metastasis diagnosed by cytology ,6 years late the case has been operated for infiltrating duct cell carcinoma of breast on the basis of cytological features, it could not be categorized under any of the primary tumors of the ovary. A diagnosis of metastatic adenocarcinoma was given which is confirmed on histopathological examination.

The ovarian involvement was observed in autopsy in 10 % of cases of breast cancer. The metastasis are bilateral in approximately 80% of cases and in approximately in two third of all cases ,autopsy and surgery combined [13] lobular carcinomas, including those of signet ring cell type, spread to the ovary more frequently than those of ductal type [12]. The most common sites of origin of metastatic ovarian tumors include gastrointestinal tract (stomach, colon, pancreas and appendix). The gross and microscopic features suggest the metastatic nature of the ovarian neoplasm. These include bilateral presence of multiple nodules of tumor,involvement of the surface and superficial cortex of the ovary,smaller tumor size and histological feature, that are incompatible with a primary ovarian tumor[14].

In our study one case of krukenberg tumors was reported.

Uguz et al [7] studied FNAC of ovarian of ovarian lesions and recommended that all available clinical, radiological and available data accurate diagnosis of ovarian lesions was possible. In study conducted by Athanassiadou and Grapse et al [15] borderline tumors were reported. It was not possible to separate borderline ovarian lesions from cystadenocarcinomas by FNAC itself.[16]

In our study two benign serous cystadenoma in cytology turned into borderline serous tumors and three benign mucinous cystadenomas in FNAC turned to borderline mucinous tumor in histology.

One of the major objections for the use of FNAC in cystic ovarian tumors the highest percentage of inadequate sample [17]. Most of the times aspirate may represent the peritoneal rather than cystic fluid. We found that aspirate from the benign tumors was hypo cellular. The cell yield for malignant ovarian tumors was more for CT guided aspiration.

Mccluggage et al [18] performed immunocytological marker Inhibit to differentiate a functional ovarian cyst from that of neoplastic epithelial lined cyst.

Petu et al [19] did comparison of tumor marker like CA125 lipid associated sialic acid (LSA) and NB/70K in monitoring ovarian cancer. It was found in their study CA125 showed highest sensitivity as well as specificity. In our study CA125 levels are elevated in serous carcinomas.

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

Grandos et al [20] extensively studied in aspiration cytology of ovarian tumors and turned that definite diagnosis was possible in FNAC in combination with ultrasound examination and serology markers

Bland et al [21] did research work in women with advanced epithelial malignancy treated with initial chemotherapy and found that the patient had Minimal bowel mesentry disease and liver involvement. The FNAC can classify most of the ovarian lesions, but differentiation between Endometroid carcinoma, Serous carcinomas and Serous borderline tumors can be problematic. Although it is difficult to categorise a granulosa cell tumor as juvenile and adult type-only a few isolated case studies are available describing the features of juvenile granulosa cell tumor [22,23]. Three dimensional clusters, rosettes, call exnerbodies ,papilla,nuclear grooves and vacuolated cytoplasm, suggest Adult Granulosa cell tumor. Presence of monolayer sheets, nuclear pleomorphism, mitotic activity, call exnerbodies, few nuclear grooves and abundant vacuoles in the cytoplasm suggest Juvenile granulosa tumor.

Uguz et al suggested that clinical, radiological ,laboratory and cytological correlation is very important for accurate diagnosis.[7]

In the present study no significant complications was observed. The peritoneal seedling can be prevented by using thin bore needle and avoiding multiple aspirations. Image guided FNAC is a safe,rapid,easy and reliable diagnostic modality in the diagnosis and management of ovarian neoplasms. It can be used for preoperative diagnosing ovarian neoplasms and also to plan further management. It is very helpful in young females where reproductive ability of the patient need to be preserved. The classification of ovarian tumors also achieved in the present study.

SUMMARY:

Fine needle aspiration cytology of the ovarian lesions through image guidance is quick, easy, accurate and cost effective modality for preoperative diagnosis of malignant as well as benign ovarian masses with minimal morbidity. This method also enables a satisfactory classification of ovarian tumors and these by facilitates the choice of appropriate therapy. It can help in the early preoperative diagnosis of ovarian neoplasm and help the clinician to plan further management.it is especially useful in cases where reproductive ability of the patient need to be preserved. Dissemination and seedling of malignant cells during the procedure is not supported by adequate and conclusive literature. This procedure may help in avoiding unnecessary surgery or Laparoscopy and making decision regarding Neo adjuvant chemotherapy ;hence it might be indispensible in this part of world where most of the ovarian malignancies either present late in their future as such no screening method is available.Thus the FNAC has significant role in the diagnosis of ovarian lesions must be employed less hesitancy

Reference :

1. Fishman DA, Bozorgi K. The scientific basis of early detection of epithelial ovarian cancer: The National Ovarian Cancer Early Detection Programme (NOCEDP) Cancer Treat Res. 2002;107:3–28.
2. Young JG, Perez CA, Hoskins WJ. Cancer of the ovary. In: Devita VT, Hellman S, Rosenberg SA, editors. Cancer: Principles and practice of oncology. Philadelphia: Lippincott; 1993. pp. 1226–3.

ISSN- 2394-5125 VOL 7, ISSUE 08, 2020

3. Angstrom T Kjellgram O, Bergman F. The Cytologic diagnosis of ovarian tumors by means of aspiration biopsy. Actacytol .1972;16:336-41
4. Moran O, Menczer J, Ben-Baruch G, Lipitz S, Goor E. Cytologic examination of ovarian cyst fluid for the distinction between benign and malignant tumors. *Obstet Gynecol.* 1993; **82**: 444- 446
5. Dordoni D, Zaglio S, Zucca S, Favalli G. The role of sonographically guided aspiration in the clinical management of ovarian cysts. *J Ultrasound Med.* 1993; **12**: 27- 31
6. Papathanasiou K, Giannoulis C, Dovas D, Tolikas A, Tantanasis T, Tzafettas JM. Fine needle aspiration cytology of the ovary: is it reliable? *ClinExpObstet Gynecol.* 2004; **31**: 191- 193
7. Uguz A, Ersoz C, Bolat F, Gokdemir A, Ali Vardar MA. Fine needle aspiration cytology of ovarian lesions. ActaCytol. 2005;49:144–8.
8. Hajdev S ,Melamed M , Limitations of aspiration cytology in the diagnosis of Primary neoplasms. Actacytol 1984 ;28 : 337-45
9. Nadji M, Greening SE, Sevin BU, Averette HE, Nordqvist SR, Ng AB. Fine needle aspiration cytology in gynecologic oncology. II. Morphologic aspects. ActaCytol. 1979;23:380–8.
10. Dey P,Dhar KK , Nijhawan R , Karmakar T and Khajuria A. Fine needle aspiration biopsy is gynaecological malignancies : recurrent and metastatic lesion Actacytol 1994 ;38: 698-701
11. Ganjei P. Fine needle aspiration cytology of the ovary. Clin lab med 1995; 15 :705-26
12. Asotra S, Sharma J, Sharma N. Metastatic ovarian tumor. J Cytol. 2009;26:144–5.
13. Kiyokawa T, Young RH, Scully RE. Krukenberg tumors of the ovary: A clinicopathologic analysis of 120 cases with emphasis on their variable pathologic manifestations. Am J SurgPathol. 2006;30:277–99
14. Antila R, Jalkanen J, Heikinheimo O. Comparison of secondary and primary ovarian malignancies reveals differences in their pre- and perioperative characteristics. GynecolOncol. 2006;101:97–101
15. Athanassiadou P, Grapsa D. Fine needle aspiration of borderline ovarian lesions: Is it useful? ActaCytol. 2005;49:278–85
16. Orell SR, Sterett GF, Whitaker D. Fine-needle aspiration cytology. 4th ed. New York: Churchill Livingstone; 2005. Male and female genital organs; pp. 381–8.
17. Kini SR. Color atlas of differential diagnosis in exfoliative and aspiration cytopathology. 1st ed. Baltimore: Williams and Wilkins; 1999. pp. 423–6.
18. McCluggage WG, Patterson A, White J, Anderson NH. Immuno cytochemical staning of ovarian cyst aspirates with monoclonal antibody against inhibin. Cytopathology. 1998;9:336–42.
19. Petru E, Sevin BU, Averette HE, Koechli OP, Perras JP, Hilsenbeck S. Comparison of three tumor markers-CA-125, lipid-associated sialic acid (LSA), and NB/70K-in monitoring ovarian cancer. GynecolOncol. 1990;32:181–6.
20. Granados R. Aspiration cytology of ovarian tumors. CurrOpinObstet Gynecol. 1995;7:43–8.
21. Bland AE, Everette EN, Pastore LM, Anderson WA, Taylor PT., Jr Predictors of suboptimal surgical cytoreduction in women with advanced epithelial ovarian cancer treated with initial chemotherapy. Int J Gynecol Cancer. 2008;18:629–36
22. Lala ,BoutosEP,Nayar R , Defrias DV. Cytological features of granulosa cell tumor in fluids and fine needle aspiration specimen Acta cytol2004;48:315-20
23. Stamp GWH and KrauSZT . Fine needle aspiration cytology of a recurrent Juvenile granulosa cell tumor.Actacytol 1988;35:533-39.