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Pathology of tubo-ovarian lesions in a tertiary care hospital

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Abstract
Introduction: An adnexal mass (mass arising from ovary, fallopian tube or the surrounding connective tissue) is a common clinical presentation. Differential diagnosis of adnexal mass can vary from simple cyst to life threatening ectopic pregnancies to ovarian malignancy. Ovarian malignancies have very few and non-specific symptoms, so they are diagnosed at a very late stage leading to a very poor prognosis.
Material and Method: The study was conducted on adnexal masses during the period of January 2022 to July 2023, with a total of 183 cases in the Department of Pathology.
Results: Tubal ectopic pregnancy is the most common lesion comprising of 113(61.7%) cases of total 183 case studies. Majority of the ectopic pregnancies including the ruptured ectopic pregnancy were found in the age group of 21-40 years. The maximum number of benign tumors were seen in the age group of 21-40 years, whereas maximum number of malignant tumors were seen in > 41 years of age.
Conclusion: Tubo-ovarian lesions manifest with a wide variety of clinical and pathological features. Histopathological examination is the gold standard for the diagnosis of these lesions. Use of immunohistochemistry (IHC) and cytogenetic study can be very helpful for improving the diagnostic accuracy.

Keywords: Adnexal mass, tubal ectopic pregnancy, cystadenoma, ovarian malignancy, histopathological

Introduction
An adnexal mass (mass arising from ovary, fallopian tube or the surrounding connective tissue) is a common clinical presentation [1]. Differential diagnosis of an adnexal mass is complex and can vary from functional cyst to life threatening ectopic pregnancies to ovarian malignancy [1].
Ectopic pregnancy occurs due to implantation of the developing blastocyst at an extrauterine site. More than 95% of ectopic gestations occur in the fallopian tube, with the vast majority involving the ampulla (70%), followed by the isthmus (12%), fimbriated end (11.1%), and interstitial portion (2.4%). Abdominal pain, amenorrhea, and vaginal bleeding are classic symptoms of ectopic pregnancy.
Ovarian cancer remains the leading cause of cancer among females and constitutes about 30% of all cancers of female genital tract [2]. In India ovarian cancer has emerged as the third common malignancy among females with an incidence varying from 5.4-8 per 100000 population [3]. Since ovarian malignancies have very few and non-specific symptoms they are mostly diagnosed at a very late stage leading to a very poor prognosis in most cases.[4] Early detection of ovarian malignancy is of paramount importance as it would lead to better prognosis [4].

Non-neoplastic Lesions of the Ovary classification [7]
- Inflammatory disorders: Infectious and Non infectious
- Non inflammatory disorders: Cystic and Non cystic
- Pregnancy related disorders

Neoplastic Lesions of the Ovary (WHO Classification of tumors of the ovary[5])
Surface Epithelial Tumors
- Serous tumors
- Mucinous tumors

- Clear cell tumors
- Transitional cell tumors
- Squamous cell tumors
- Mixed epithelial tumors
- Undifferentiated carcinoma
- Small cell carcinoma, pulmonary type
- Neuroendocrine carcinoma of small cell type

Sex cord- Stromal tumors
- Granulosa -stromal cell tumors
- Granulosa cell tumor group
- Tumors in thecoma-fibroma group
- Sertoli-stromal cell tumors
- Sex cord-stromal tumors of mixed or unclassified cell types
- Gynandroblastoma
- Steroid cell tumors

Germ Cell tumors
Primitive germ cell tumors
- Dysgerminoma
- Yolk cell tumor
- Embryonal carcinoma
- Polyembryoma
- Non-gestational choriocarcinoma
- Mixed germ cell tumors

Biphasic or Triphasic Teratomas
- Immature
- Mature
- Monodermal teratomas

Germ cell sex cord-stromal tumors
- Gonadoblastoma
- Mixed germ cell sex cord stromal tumor of non-gonadoblastoma type

Tumors of rete ovarii
- Small cell carcinomas, hypercalcemic type
- Gestational choriocarcinoma
- Soft tissue tumors not specific to ovary

Materials and Methods
The study was conducted on adnexal masses during the period of January 2022 to July 2023, with a total of 183 cases. Specimens were received in the department of Pathology. Gross examination was done and the tissue was preserved in 10% formalin.
After fixation of the tissue for 24- 48 hours, it is processed and sectioned for microscopy.
Slides are stained for Hematoxylin and Eosin stain. Histo-pathological examination was used to classify the lesions and correlate with the clinical and radiological findings.

Results
A total of 183 cases of tubo-ovarian lesions were studied.

Table 1: Age wise distribution of patients in the study group

Age wise distribution	Number of patients	Percentage
< 20years	15	8.1%
21-40years	140	76.5%
41-60years	21	11.4%
> 60years	07	3.8%

In our study 76.5% of the patients were in their reproductive age group i.e. in 21-40 years. The second most common age group affected was 41-60 years, comprising of 11.4%.
The youngest patient in our study was 13 years of age and the oldest was 70 years of age.

Table 2: Correlation of age with histo-pathological lesion of adnexal mass

Age group	Ectopic gestation	Non-neoplastic	Inflammatory	Benign	Malignant
< 20 years	09	01	00	05	00
21-40 years	103	04	01	29	03
41-60 years	01	03	01	11	05
> 60 years	00	03	00	02	02
Total	113	11	02	47	10
%	61.7%	6%	1%	25.6%	5.4%

In present study we found that 61.7% of adnexal masses were due to ectopic gestation, occurring in the age group of 21-40 years of age.
Benign lesions were found to be the second most common cause of adnexal masses. The incidence of malignancy increased with increasing age.

Table 3: Histopathological categorization of adnexal mass

Histology of adnexal mass	Cases	%
Ectopic Pregnancy	113	61.7%
Tubo-ovarian abscess	02	1%
Torsion of ovary	07	3.8%
Endometriosis	04	2.1%
Surface epithelial tumors	36	19.6%
Sex cord stromal tumors	05	2.7%
Germ cell tumor	16	8.7%

In our study 34.8% of cases of adnexal masses had an ovarian origin, 61.7% cases were of tubal origin and 3.1% cases had combined pathology i.e. due to tubo-ovarian abscess and endometriosis.

Table 4: Categorization of ovarian neoplasm according to histopathology

Surface Epithelial Tumors (36)	Serous Tumors (21)	Benign (17)
		Malignant (04)
	Mucinous tumors (12)	Benign (11)
		Malignant(01)
	Endometriod Tumors (01)	Malignant (01)
	Mixed Epithelial Tumors (02)	Benign (02)
Sex Cord Stromal Tumors (05)	Granulosa cell tumor	Malignant (04)
	Thecoma-fibroma	Benign (01)
Germ cell Tumors(16)	Mature Teratoma	Benign (15)
	Monodermal Teratoma	Benign (01)

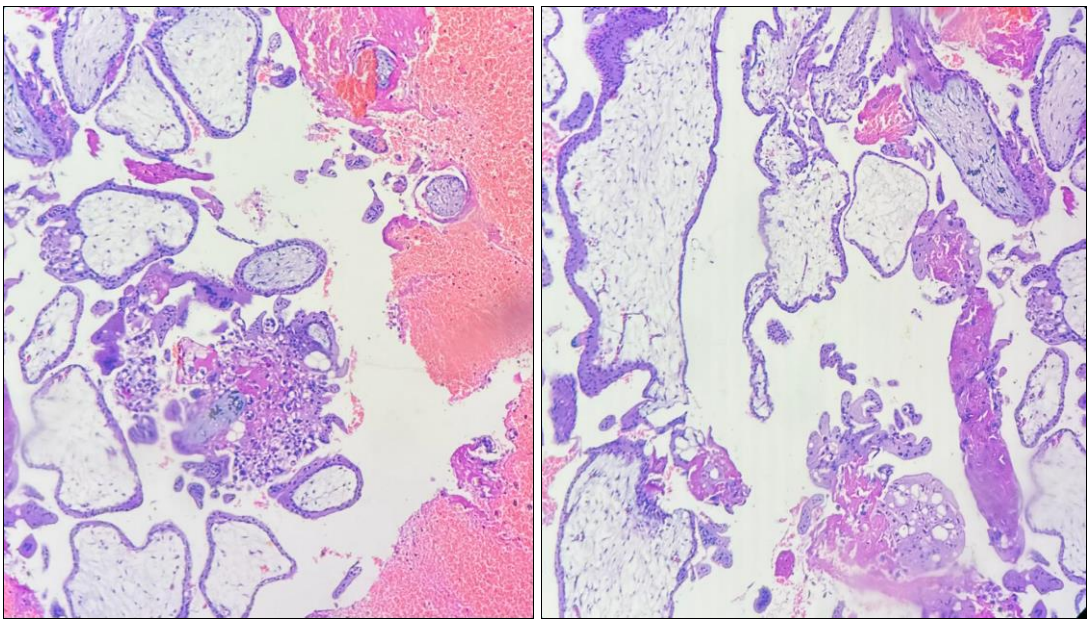

Fig 1: Tubal ectopic pregnancy (H&E, a. 4X, b. 10X)

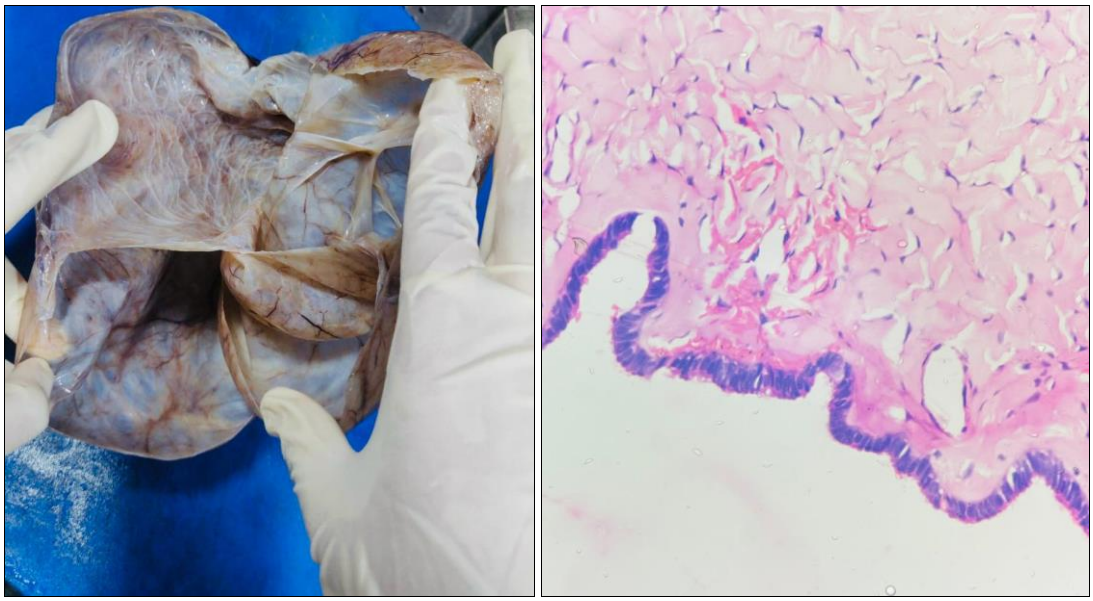

Fig 2: Serous cystadenoma (a. Gross) (b. H&E, 10X)

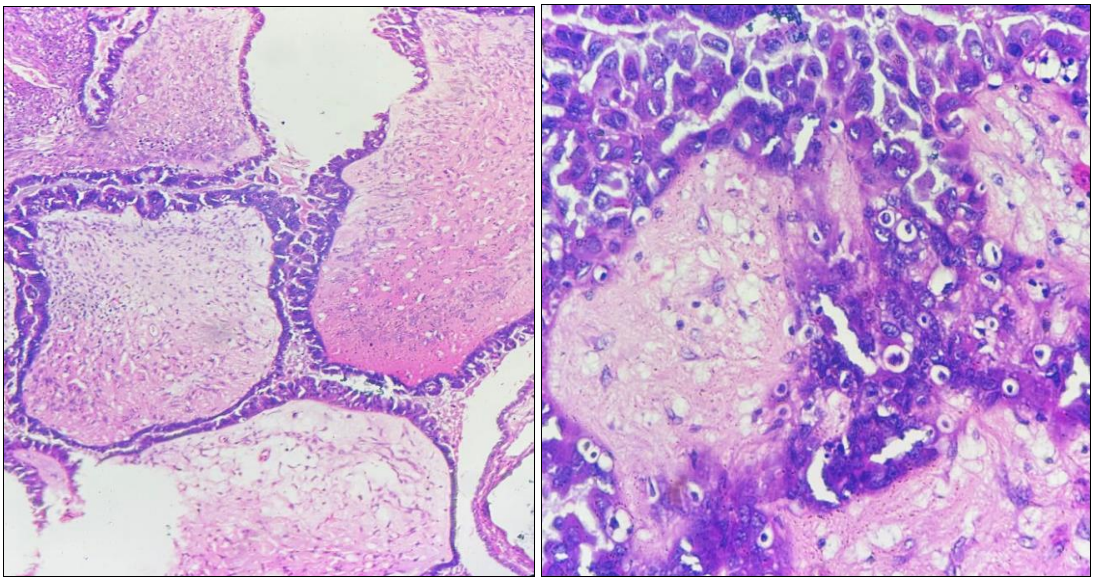

Fig 3: Serous cystadenocarcinoma (H&E) (a.10X, b.40X)

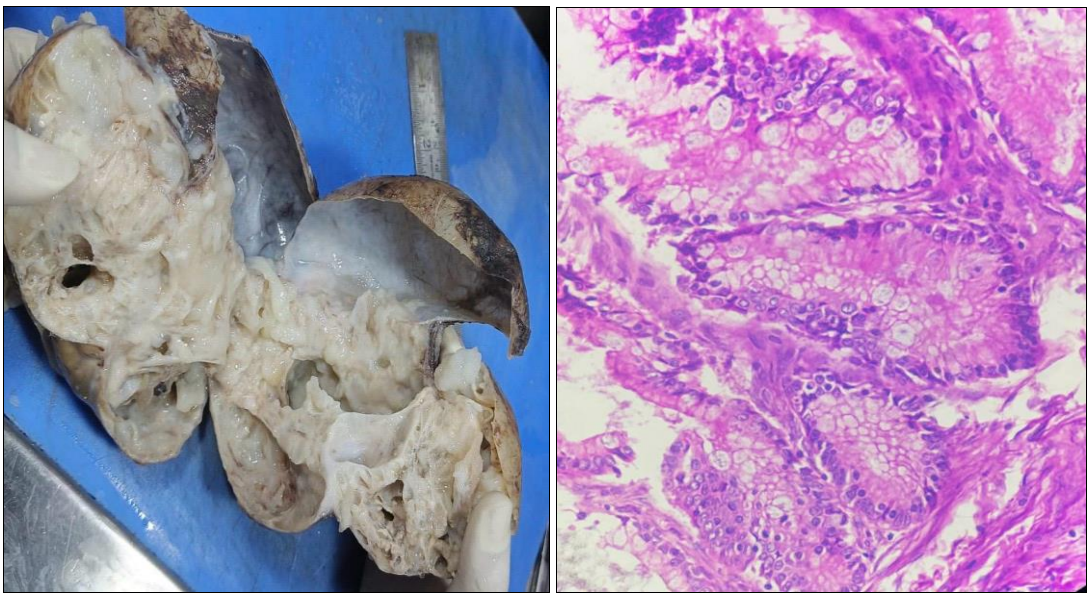

Fig 4: Mucinous carcinoma (a. Gross) (b. H&E,

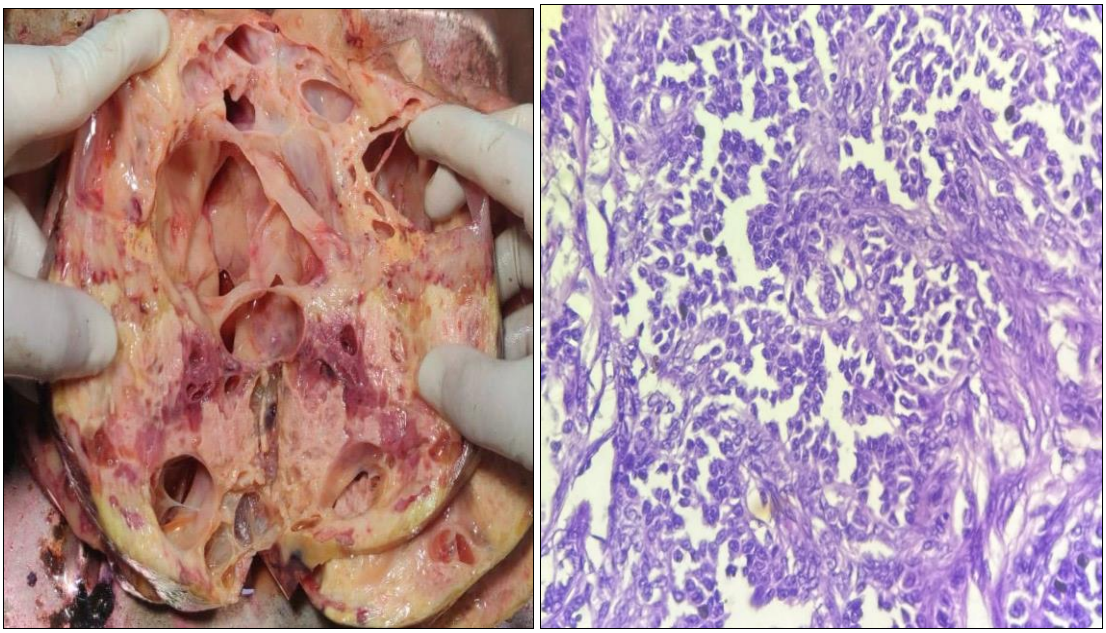

Fig 5: Granulosa cell tumor (a. Gross)(b. H&E, 40X)

Fig 6: Mature Teratoma (a. Gross) (b. H&E, 10X)

Fig 7: Thecoma-fibroma (Gross)

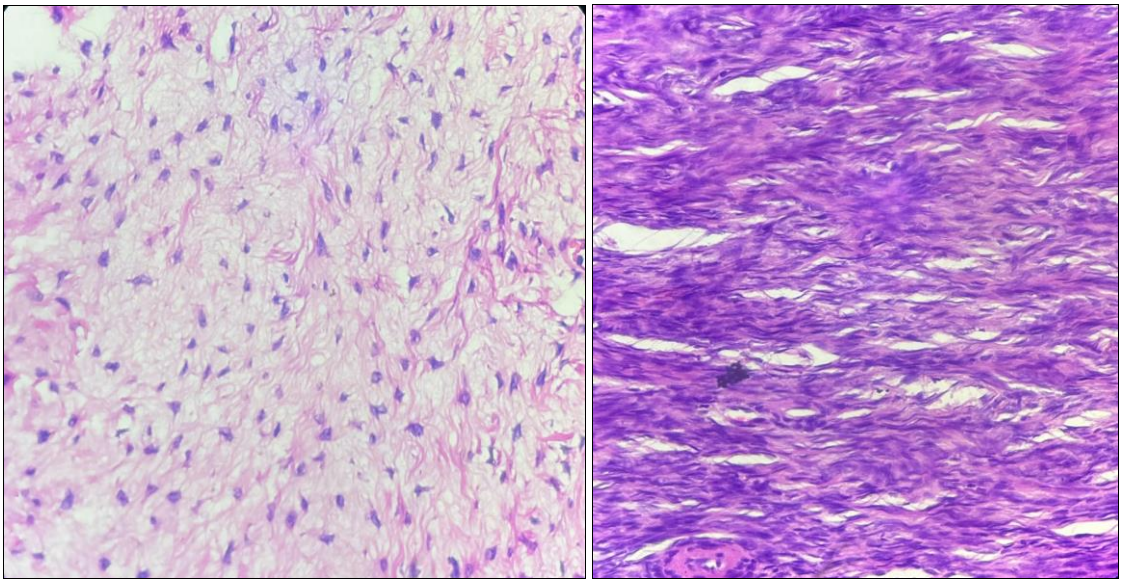

Fig 8: Thecoma-fibroma (a. Thecoma component, H&E, 40X)(b. Fibroma component, H&E, 40X)

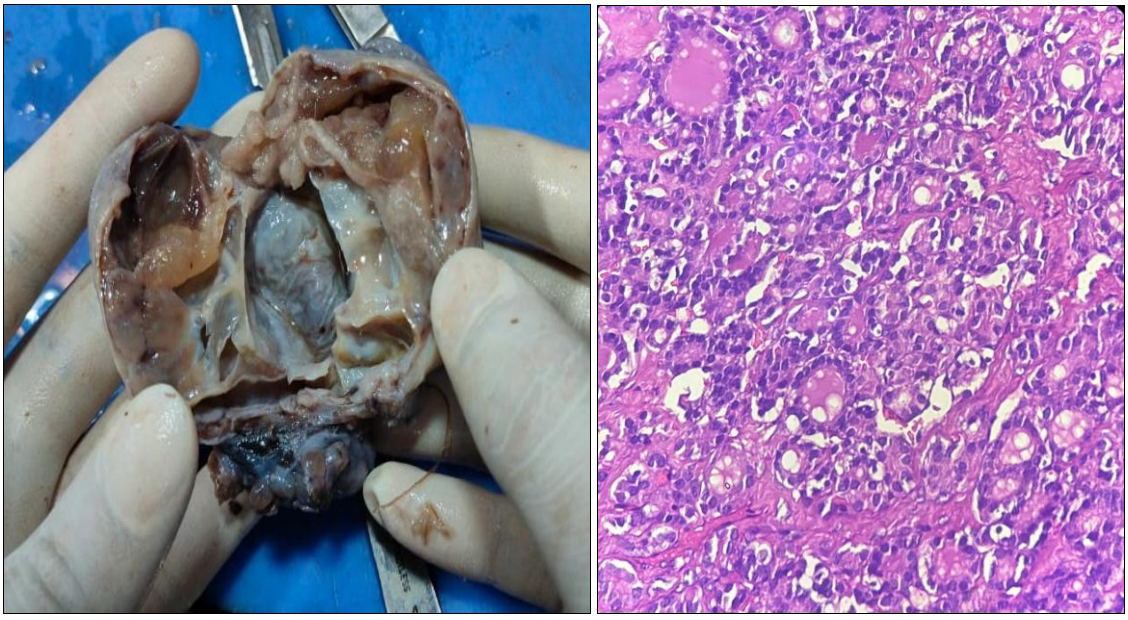

Fig 9: Struma Ovarii (a. Gross) (b. H&E, 40X)

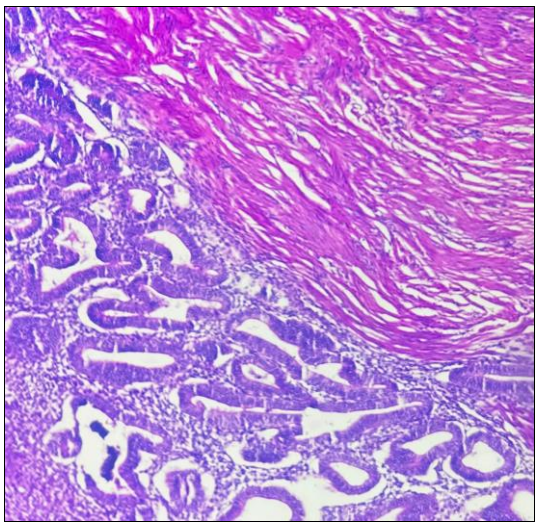

Fig 10: Endometriosis of ovary (H&E, 40X)

Discussion

Adnexal mass is a common gynecological problem with prevalence of 0.17% to 5.9% in asymptomatic females and 7.1% to 12% in symptomatic females [6]. In the reproductive age group ectopic pregnancy, benign lesions, inflammatory conditions and endometriosis are common whereas malignancy is rare [4]. Tubo-ovarian abscess is usually a consequence of pelvic inflammatory disease (PID) and most commonly seen in sexually active women of reproductive age [8].

Rate of tubal pregnancy

The rate of tubal pregnancy is 61.7% in the present study which is in close accordance to Sunita *et al*. whose study shows 53.7% [4]. There is a marked variation from Anika *et al*. which shows 21.3% of tubal pregnancy [5].

Frequency of age distribution in tubal lesion

In the present study, majority of the ectopic pregnancies were found in the reproductive age group of 21-40 years which resembles closely to the study conducted by Sunita *et al*. [4] and Anika *et al*. [5].

Table 5: Frequency of benign and malignant tumors of ovary

Author and year of study	Benign	Borderline	Malignant
Sunita *et al*. (2021) [4]	74%	6.5%	19.5%
Anika *et al*. (2018) [5]	80.4%	-	19.6%
Present study	25.6%	-	5.4%

Table 6: Comparison of histological types of ovarian neoplasms

Authors and year of study	Surface epithelial- stromal tumors	Sex cord stromal tumors	Germ cell tumors	Metastatic tumors
Sunita *et al*. (2021) [4]	50%	3.6%	12.7%	3.6%
Anika *et al*. (2018) [5]	58.5%	9.7%	29.2%	2.45
Present study	19.6%	2.7%	8.7%	-

Frequency of subtype of ovarian neoplasm

In the present study, among the total 57 neoplastic cases, benign tumors, serous cyst adenomas (17) were the most common followed by mature cystic teratoma (15). Amongst the malignant tumors, granulosa cell tumor (4) and serous cyst adenocarcinoma (4) were the most common type. These results were in close relation to Anika *et al.*

Conclusion

Tubal ectopic pregnancies are one of the major causes of adnexal masses. The primary cause of ectopic pregnancy is distortion of the normal tubal anatomy by infection (Tuberculosis is the most common cause in India), inflammation, endometriosis, surgery, congenital anomaly or neoplasm. Other risk factors contributing to ectopic pregancy include prior ectopic pregnancy, intrauterine device use, infertility, multiple sexual partners, smoking and increasing age.

Tubo-ovarian lesions manifest with a wide variety of clinical and pathological features [5].

Histopathological examination is the gold standard for the diagnosis of these lesions, but accurate clinical and radiological examination aid in better grading and staging of the diagnosis [5]. Use of immunohistochemistry (IHC) and cytogenetic study can be very helpful for improving the diagnostic accuracy.

Conflict of Interest

Not available

Financial Support

Not available

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