Journal of Medicine in Scientific Research

Manuscript 1024

Subject Area: Pathology

HISTOMORPHOLOGICAL SPECTRUM OF OVARIAN NEOPLASMS IN A TERTIARY CARE CENTRE

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ORIGINAL STUDY

Histomorphological spectrum of ovarian neoplasms in a tertiary care centre

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Abstract

Introduction: **Ovary is the second most common site of gynaecological malignancies in India and therefore ovarian tumours need to be studied under the microscope for accurate diagnosis and management.**

Aim: **This study aims to study the spectrum of ovarian tumours and calculate their incidence and age-distribution.**

Materials and methods: **This study was conducted in the Department of Pathology, Sri Muthukumaran Medical College, Hospital & Research Institute, Chennai, during the year 2022.**

Results: **Among a total of 68 ovarian neoplasms studied, benign tumours (61.7%) were more common and most of the patients were in the fourth decade of life. The commonest histomorphological category observed was Surface Epithelial Tumours (69.1%), followed by Germ Cell Tumours (17.6%).**

Conclusion: **Ovarian Neoplasms have a wide range of histomorphological features and therefore histopathology is vital in enabling the clinicians in early diagnosis and treatment.**

Keywords: Germ cell tumours, Histopathology, Ovarian neoplasm, Surface epithelial tumours

1. Introduction

Ovaries are paired pelvic organs located on either side of uterus close to the lateral pelvic wall behind the broad ligament and anterior to the rectum [1].

Under the influence of hormones ovaries can undergo various changes throughout life. Ovarian tumours are heterogeneous group of neoplasms than can originate from any of the three cell types in the normal ovary: the multipotent surface (coelomic) epithelium, the sex cord stromal cells and the totipotent germ cells [2]. Surface Epithelial Tumours form the majority of ovarian neoplasms (almost 90%). Germ cell and sex cord stromal cell tumours are comparatively less common, accounting for 20–30% of ovarian tumours. Ovarian neoplasms form the fifth most prevalent malignancy overall and the second most common gynaecological malignancy accounting for 3% of all malignant neoplasms [3]. The incidence is 25% among the gynaecology malignancies [4]. The important risk factors for ovarian neoplasm include nulliparity, high socioeconomic status, environmental and genetic factors. Owing to vague symptoms and late clinical presentation, ovarian neoplasms are usually detected at the later stage of the disease and hence known as silent killer [5].

This study was done to assess the frequency of ovarian neoplasms and classify the histomorphological pattern as per current WHO classification and analyse the age-wise distribution.

2. Material & methods

Study design—Prospective, observational.

Study Place—The study was conducted in the Department of Pathology in Sri Muthukumaran Medical College Hospital & Research Institute, a tertiary care hospital in Mangadu.

Study Period—The study duration was 1 year from January 2022–December 2022.

Sample size—The sample size was 68.

Inclusion Criteria: All histopathologically-proven ovarian neoplasms of all age groups.

Received 9 March 2023; revised 24 April 2023; accepted 27 August 2023.
Available online 2 December 2023

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https://doi.org/10.59299/2537-0928.1024

Exclusion Criteria: All Normal ovary, Non neoplastic ovarian lesions, post-chemotherapy ovaries and autolyzed specimens were excluded.

The present study was a prospective observational study conducted in the Department of Pathology in a tertiary care hospital in Mangadu.

Relevant clinical data with age were noted from the histopathological requisition form. All the received ovarian specimens were fixed in 10% neutral buffered formalin. A thorough gross examination was done according to the standard protocol with meticulous examination for cysts, type of cystic fluid, any solid area, papillary projections, hemorrhage and necrosis. Tissue processing was done as per standard procedure and paraffin-embedded blocks were made. Tissue sections were stained by hematoxylin and eosin followed by microscopic examination. The Ovarian neoplastic lesions were classified according to the recent WHO classification of ovarian tumors.

3. Results

In our present study we had analysed a total of 68 ovarian neoplasm cases which included specimens received as solitary ovarian mass, unilateral or bilateral cystectomies or as part of hysterectomies with bilateral salpingo-oophorectomies over a period of one year. Among the neoplastic ovarian lesions, 42 (61.7%) cases were benign, 02 (2.9%) cases were borderline and 24 (35.3%) cases being malignant (Fig. 1).

3.1. Age-wise distribution of ovarian neoplasms

The most common age-group of all ovarian neoplasms was the fourth decade, followed by the third decade.

Surface Epithelial Tumours had a peak incidence in the age-group of 31–40, while Germ Cell Tumours were more common in the younger age-group. Metastatic Tumours were commoner in older age-group Fig. 2, Table 1.

Among the 68 ovarian neoplasms, Surface Epithelial Tumours were the most common category, comprising 69.1% (47 cases) followed by Germ Cell Tumours (17.6%, 12 cases), Sex Cord Stromal Tumours (9%, 06 cases) and Metastatic Tumours (1.4%, 1 case).

3.2. Distribution of surface epithelial tumours

Among the 47 Surface Epithelial Tumours, 32 cases (68%) were Serous, followed by Mucinous (23.4%, 11 cases), Benign Brenner Tumour (6.3%, 3 cases) and 1 case of Clear Cell Carcinoma (2.3%).

Serous neoplasms were further classified into Benign (19 cases), Borderline (1) and Malignant (12). Mucinous neoplasms were classified into Benign (9), Borderline (1) and Malignant (1) Figs. 3 and 4.

3.3. Distribution of germ cell tumours

Among the 12 Germ Cell Tumours, we encountered 9 teratomas (75%), of which 6 were mature cystic teratomas, 2 were Immature Teratomas and 1 was a Monodermal Teratoma (Struma Ovarii). There were 2 (16.7%) cases of Dysgerminoma and 1 (8.3%) Yolk Sac Tumour in this period Fig. 5.

3.4. Distribution of sex cord stromal tumours

Of the 6 Sex Cord Stromal Tumours, 4 cases (66.7%) were Granulosa Cell Tumours and the remaining 2 (33.3%) were Fibroma Fig. 6.

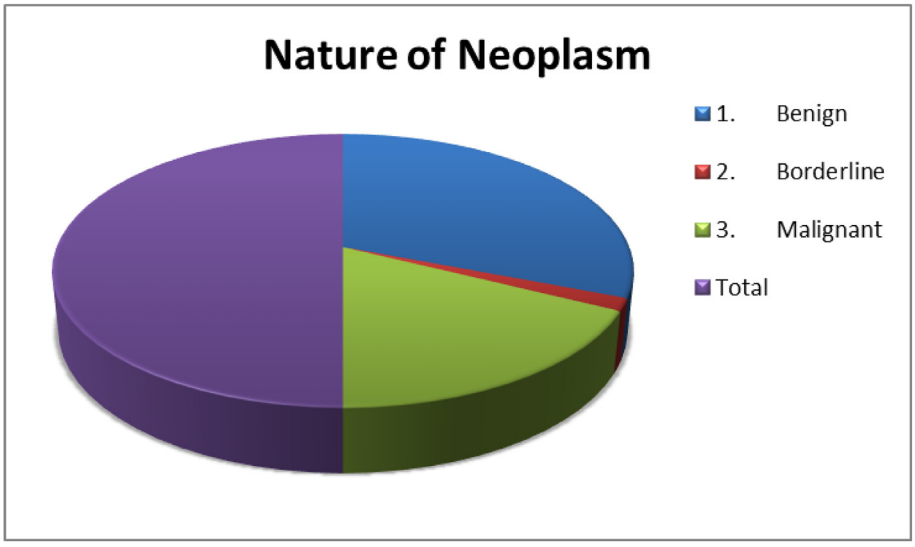

Fig. 1. Nature of neoplasm.

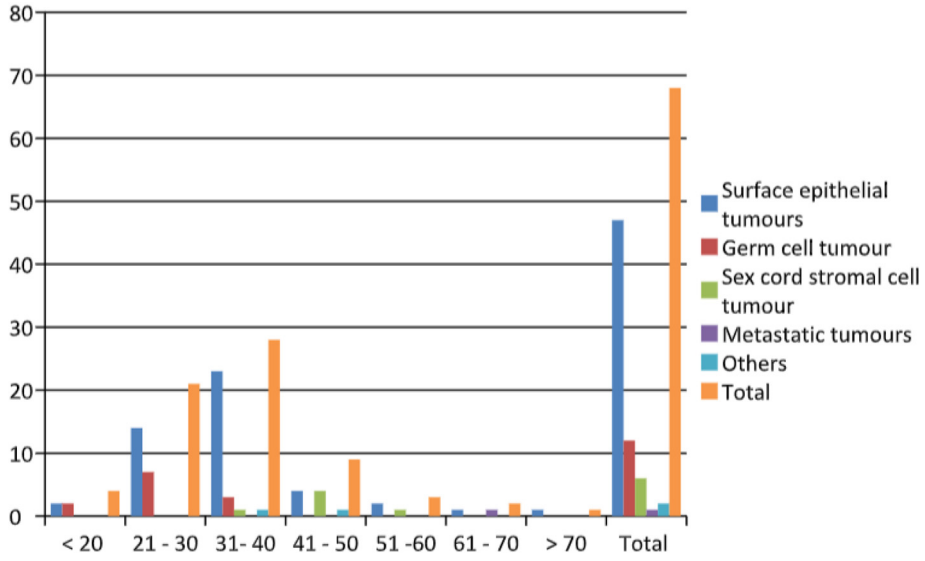

Fig. 2. Age-wise distribution of Ovarian neoplasms.

3.5. Distribution of miscellaneous tumours

We also encountered one ovarian haemangioma, one leiomyoma and one case of metastatic carcinoma of gastrointestinal origin, to ovary Fig. 7.

Table 1. Histomorphological spectrum of Ovarian neoplasm of our present study.

Tumour	Nature	Cases	Percentage
Surface epithelial tumours		47	69.1%
A. Serous		32 (68%)	
Serous cystadenoma	Benign	17	
Serous cystadenofibroma	Benign	02	
Serous borderline tumour	Borderline	01	
Serous carcinoma	Malignant	12	
B. Mucinous		11 (23.4%)	
Mucinous cystadenoma	Benign	09	
Mucinous borderline tumour	Borderline	01	
Mucinous carcinoma	Malignant	01	
C. Clear cell tumours		01 (2.1%)	
Clear cell carcinoma	Malignant	01	
D. Brenner Tumour NOS	Benign	03 (6.3%)	
Germ cell tumour		12	17.6%
A. Mature cystic Teratoma	Benign	06	
B. Immature teratoma	Malignant	02	
C. Monodermal teratoma (Struma ovarii)	Benign	01	
D. Dysgerminoma	Malignant	02	
E. Yolk sac tumour	Malignant	01	
Sex cord stromal tumour		06	9%
A. Granulosa cell tumour	Malignant	04	
B. Fibroma	Benign	02	
Others		03	4.3%
A. Ovarian Leiomyoma	Benign	01	
B. Ovarian Hemangioma	Benign	01	
C. Metastatic tumour	Malignant	01	

4. Discussion

In our current study, ovarian specimens were studied extensively and histomorphological classification of neoplasms was done according to WHO Classification of Ovarian Neoplasms.

Most of the tumours were benign (61.7%) followed by malignant (35.3%) and borderline tumours (2.9%) (Fig. 1, Table 2).

The most common age-group of all ovarian neoplasms was the fourth decade in this study. Surface Epithelial Tumours (69.1%) was the most common category, followed by Germ Cell Tumours (17.6%), Sex Cord Stromal Tumours (9%) and others (4.3%) which included Ovarian Leiomyoma, Ovarian Haemangioma and Metastatic Tumour [9].

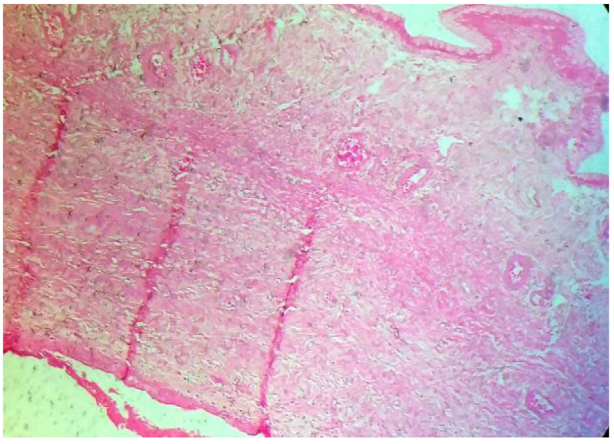

Fig. 3. Mucinous Cystadenoma of ovary, showing a cyst lined by single layer of bland mucinous epithelium (H&E, 10x).

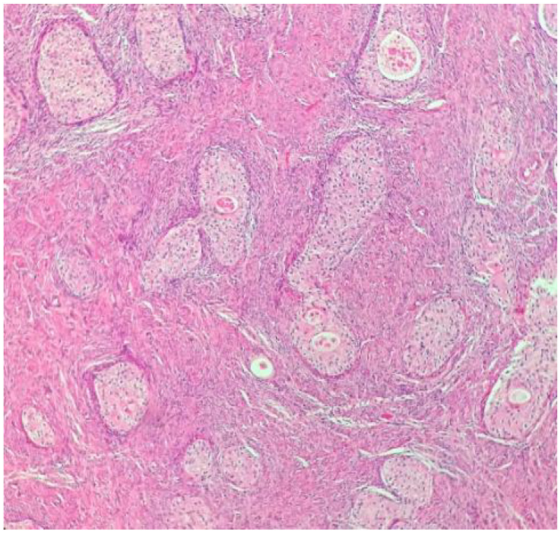

Fig. 4. Benign Brenner Tumour of Ovary showing smooth-bordered nests of transitional epithelium (H&E, 10x).

Serous Tumours were the most commonly diagnosed Surface Epithelial Tumours, similar to the studies done by Hathila et al., Kanasagara and Sampurna et al. [6,8,10]. Benign Serous tumours were the leading diagnosis, followed by malignant and borderline serous tumours. This report was consistent with studies done by Hathila et al., Kanasagara et al. and Sampurna et al. [6,8,10]. Our study reports included malignant epithelial tumours among which Serous Carcinomas were the most common followed by one case each of Mucinous Carcinoma and Clear Cell Carcinoma, correlating with result of study done by Batool et al. [7] (Tables 3 and 4).

Germ Cell Tumours ranked as the second most common Ovarian Tumour in our study forming 17.6% of cases, in similarity with the study done by Hathila et al. and Batool et al. [6,7]. Teratoma was the leading cause of Germ Cell Tumours in our study, in similarity with the study done by Sampurna et al. [10]. Mature Cystic Teratoma was the predominant diagnosis (7 cases) followed by Immature Teratoma of Grade I and II (2 cases), similar to the results of study done by Batool et al. [7]. One case of Struma Ovarii was diagnosed in a 36-year old multiparous woman. The next most common germ cell tumour reported in our study was Dysgerminoma (16.7%) followed by Yolk Sac Tumour (8.3%), similar to the study done by Batool et al. [7]. The malignant germ cell tumours encountered in our study were Immature Teratoma (2 cases), Dysgerminoma (2 cases) and Yolk Sac Tumour (1 case).

Around 9% of Sex Cord Stromal Tumours were reported in our study, correlating with the study of Hathila et al. [6]. The diagnosis of pure sex cord tumours were higher than that of pure stromal tumours. In this study, compared to the study done by Batool et al., Granulosa Cell Tumours were the most common diagnosis, followed by Fibroma. We reported 4 cases of Malignant Adult Granulosa Cell Tumour. Among Pure Stromal Tumours, only Fibroma (2 cases) was reported in our study, in contrast to the study done by Batool et al., where Fibroma was the predominant type [7].

Our study also reported ovarian neoplasms that originated from smooth muscle and blood vessels apart from the three cell-types in the normal ovary. They were placed under the category of 'Others' (4.3%). Two benign cases reported under this category included Ovarian Leiomyoma (1) and Ovarian Haemangioma (1). One case of malignant tumour

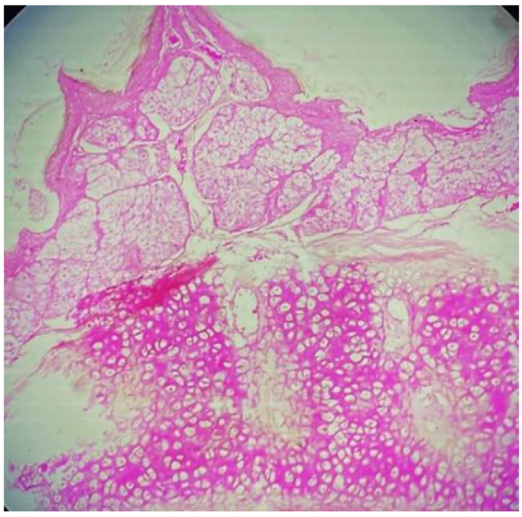

Fig. 5. Mature Cystic Teratoma of Ovary showing stratified squamous epithelium with underlying sebaceous glands and cartilage. (H&E, 4x).

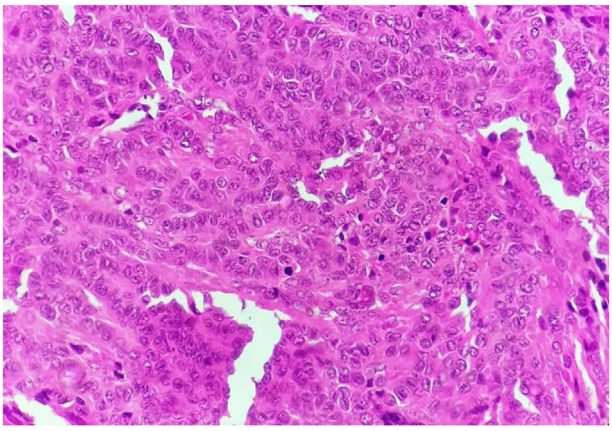

Fig. 6. Adult Granulosa Cell Tumour displaying sheets and trabeculae of cuboidal to polygonal cells with grooved nuclei and occasional mitosis. (H&E, 40x).

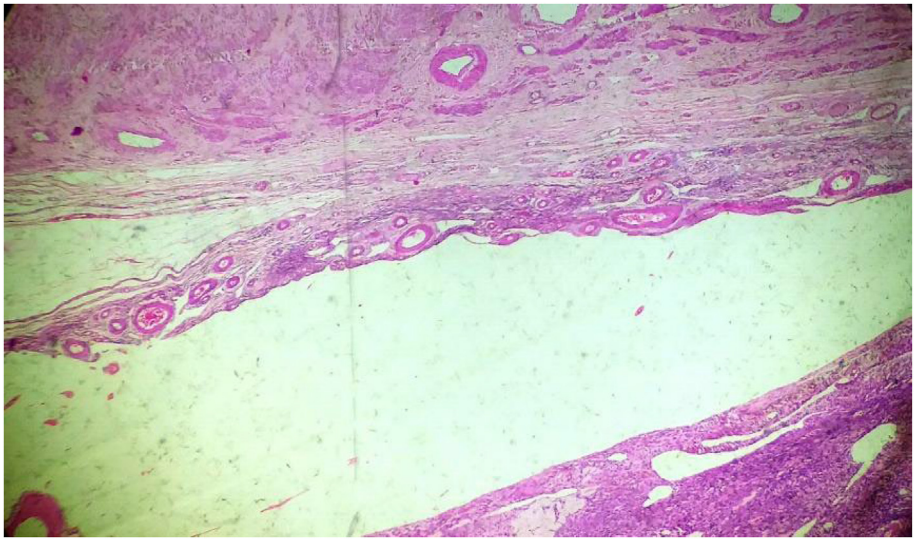

Fig. 7. Ovarian Leiomyoma: Smooth muscle bundles (top) abutting ovarian stroma at the tumour interface. (H&E, 4x).

Table 2. Nature of neoplasm.

S. No.	Study	Benign	Borderline	Malignant
1.	Present	61.8%	2.9%	35.3%
2.	Hathila et al. [6]	62.3%	4.4%	33.3%
3.	Batool et al. [7]	79%	4.5%	15.8%
4.	Sharma et al.	86.6%	3.6%	9.8%
5.	Kanasagara et al. [8]	86.0%	9.5%	4.5%

Table 3. Comparative analysis of histomorphological pattern.

S. No.	Study	Surface Epithelial Tumours	Germ Cell Tumours	Sex Cord Stromal Tumours	Others
1.	Present	69.1%	17.6%	9.0%	4.3%
2.	Hathila et al. [6]	76.7%	13.3%	10.0%	–
3.	Batool et al. [7]	63.0%	29.5%	6.9%	0.6%
4.	Sampurna et al. [10]	79.5%	13.5%	5.0%	2.0%
5.	Kanasagara et al. [8]	61.9%	33.3%	4.8%	–
6.	Gupta et al.	48.8%	23.9%	8.3%	19%

Table 4. Comparative analysis of surface epithelial tumours.

S. No.	Study	Serous	Mucinous	Brenner	Clear Cell
1.	Present	68.0%	23.4%	6.3%	2.3%
2.	Hathila et al. [6]	66.0%	30.2%	–	–
3.	Batool et al. [7]	60.2%	34.0%	2.4%	2.4%
4.	Sampurna et al. [10]	43.5%	30.0%	2.5%	–

reported included metastasis to ovary, where the patient had a primary tumour in the gastrointestinal tract. This correlated with the study by Sampurna et al. [10].

4.1. Conclusion

Our present study was undertaken to analyse various ovarian neoplastic lesions with agewise distribution.

Our study brings to limelight a wide histomorphological spectrum of ovarian neoplasms with benign tumours being the most common lesions and with majority of cases presenting in the 4th decade. Overall Surface Epithelial Tumours accounted for the major bulk followed by Germ Cell Tumours.

Due to diversity of ovarian neoplasms, extensive sampling especially from solid areas with histopathological analysis still remains gold standard method for diagnosis. As malignant ovarian neoplasms carry high mortality with poor prognosis, early diagnosis with proper histomorphological categorization aids in timely and proper management of patients.

Conflicts of interest

None declared.

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