

# A retrospective observational study of clinicopathological spectrum of ovarian tumors

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## ABSTRACT

**Objectives:** We aim to study the clinical features and histopathological pattern of ovarian tumors in different age groups which shall add on to the current data on demography and clinical spectrum of ovarian tumors. **Methods:** The retrospective study was done over a period of 5 years (2012-2017); where we included women who underwent surgery for ovariectomy alone or along with hysterectomy. Histopathological examination of the specimens and reporting was done based on WHO classification of ovarian tumors. The data was entered in MS EXCEL spreadsheet and analysed. **Results:** Out of 172 ovarian tumors, 82.6% were benign, 12.8% were malignant. Common clinical presentation in majority of patients (48.84%) was pain in abdomen. Epithelial tumors formed the main bulk of neoplasms (61.6%). The majority of epithelial tumors were serous tumors (54.7%) followed by mucinous (41.5%). Benign tumors were more (53.52%) in the reproductive age group (21-40 years) and malignant tumors were more common in postmenopausal age group. Mature cystic teratoma was the most common type of benign tumor followed by serous cystadenoma. Serous cystadenocarcinoma was the most common type of malignant neoplasm followed by granulosa cell tumour. **Conclusion:** There is a different clinical presentation and age distribution of various histopathological types of ovarian cancers; with benign exhibiting reproductive age group and malignant exhibiting perimenopausal age group. Yet, to confirm, all the ovarian masses must be examined histopathologically for definite diagnosis and management.

**Keywords:** Ovarian tumors, clinical spectrum, histopathological, reproductive age.

Ovarian masses are commonly found neoplasms in women; these constitute some of the most challenging cases in gynecology. Most of the ovarian tumors presenting during the reproductive age group are benign; whereas, approximately 30% in the post-menopausal age group are found to be malignant.<sup>1</sup> Ovarian cancer is common cancer in women of India and presents at an advanced stage.<sup>2</sup> Asian countries have ovarian cancer rates of 2–6.5 new cases per 100,000 women per year.<sup>3</sup> It represents the sixth most common female cancer and the fourth leading cause of death

in women.<sup>4</sup>

Ovarian tumors present in a wide spectrum of histopathological patterns. In the early stages, several ovarian tumors are asymptomatic and diagnosed in the advanced state.<sup>5</sup> About 90% of the adnexal masses are detected by pelvic ultrasound (USG).<sup>6</sup> However, the definitive diagnosis of the tumor is by histopathological study.<sup>7</sup> It is essential to determine different histological patterns of ovarian tumors, which helps in the planning of diagnosis, prognosis and treatment of ovarian tumors.

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Degree of differentiation of the tumors also helps in the prediction of prognosis of the tumors. The stage and laterality of the tumor also indicate their nature.<sup>8</sup> The present study was conducted with the aim of studying the clinical features and histopathological pattern of ovarian tumors in different age groups which shall add on to the current data on demography and clinical spectrum of ovarian tumors.

**Materials and methods**

This study was done retrospectively in the department of Obstetrics and Gynecology. All the cases of ovarian tumors (on either or both sides) which were admitted in the department during the period of 5 years (2012-2017) were included in the study after an informed consent from the patients. Inclusion criteria comprised of the women who underwent surgery for ovariectomy alone or along with hysterectomy. Conservatively managed cases were excluded from the study. Data related to age; clinical symptoms; and histopathology were collected. Histopathological examination of the specimens was carried out at by the Department of Pathology of the hospital by following appropriate staining (Hematoxylin and eosin staining). The histopathological reports (HPR) were based on WHO classification of ovarian tumors (2010).

Statistical analysis: Categorical variables were presented in number and percentage (%) and continuous variables as mean ± SD and median. The data were entered in MS EXCEL spreadsheet and tables were generated.

**Results**

A total of 172 cases of ovarian tumors were included in the study. The most common clinical presentation was pain abdomen (figure 1).

We found that benign tumors (82.6%) were the most common; followed by malignant tumors (12.8%) and borderline tumors (4.6%). According to

tumours (41.5%). Serous cystadenoma (47.1%) was the most common benign epithelial tumour followed by mucinous cystadenoma( 32%). Among malignant tumours, serous cyst adenocarcinoma was the most common malignant epithelial tumour (7.5%) (table 2).

Among the germ cell tumors, mature teratoma was the commonest histopathological type as shown in table 3.

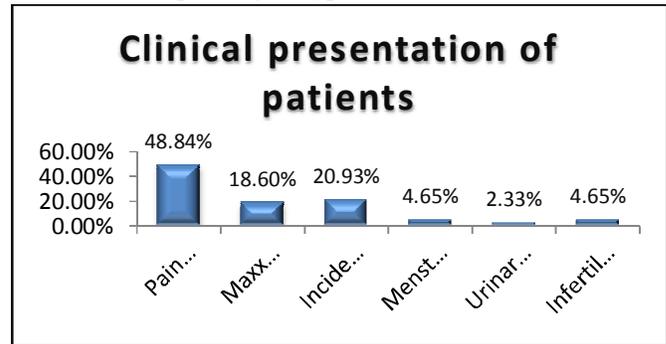


Figure 1: Clinical presentation

**Table 2: Distribution of histopathological types of surface epithelial tumours**

Types of epithelial tumour	Benign		Borderline		Malignant		Total	
	No	%	No	%	No	%	No	%
Serous	50	47.1	0	0	8	7.5	58	54.7
Mucinous	34	32	8	7.5	2	1.9	44	41.5
Endometrioid tumour	0	0	0	0	2	1.9	2	1.9
Brenner tumour	2	1.9	0	0	0	0	2	1.9
Total	86	81.1	8	7.5	12	11.3	106	100

**Table 3: Distribution of histopathological types of germ cell tumours**

Benign	No	%	Malignant	No	%	Total No	%
Mature Teratoma	52	92.8	Immature teratoma	2	3.6	54	96.4
			Dysgerminoma	2	3.6	2	3.6
Total	52	92.8		4	7.2	56	100

**Table 4: Distribution of histopathological types of sex cord tumours**

Benign	No	%	Malignant	No	%	Total No.	%
Sex cord tumor with annular tubules	2	20	Granulosa cell tumor	6	60	8	80
Fibroma	2	20				2	20
Total	4	40		6	60	10	100

Among the sex cord stromal tumors, Granulosa cell tumor was the commonest histopathological type as shown in table 4. Age of the patients ranged from 11 years to 71 years, median age being 50 years. Both benign and malignant ovarian tumours were found in all age groups. Overall, ovarian tumour was most prevalent in the age group of 21- 40 years. Incidence of malignant ovarian was most frequent in 51-60 years age group. The age distribution of ovarian tumors has been shown in table 5.

**Discussion**

Ovarian neoplasm is considered to be the most fascinating tumor of women with respect to clinical

**Table 1: Histological categories of ovarian tumors**

Histological types of tumours	Benign		Borderline		Malignant		Total	
	No	%	No	%	No	%	No	%
Surface epithelial tumours	86	60.6	8	4.6	12	54.5	106	61.6
Germ cell tumours	52	36.6	0	0	4	18.2	56	32.6
Sex cord stromal tumours	4	2.8	0	0	6	27.3	10	5.8
Total	142	82.6	8	4.6	22	12.8	172	100

histology, Surface epithelial tumour was the commonest type of tumour (60.6%) followed by germ cell tumour (36.6%) (table 1). Out of 106 epithelial tumours, 86 (81.1%) were benign, 8(7.5%) were borderline and 12(11.3%) were malignant. Among surface epithelial tumours, serous tumours were more common (54.7%) than mucinous

behavior, malignant potentiality, and histogenesis. Mostly, ovarian neoplasms cannot be detected early in their development. Thus, these account for a disproportionate number of fatal cancers and are responsible for about 50% of deaths from carcinoma of female genital tract.<sup>9</sup> The histomorphological classification of ovarian tumors forms an important part in the evaluation of the neoplasms.<sup>10</sup>

**Table 5: Ovarian tumors and age distribution**

Age groups (years)	Benign (n=142)		Borderline (n=8)		Malignant (n=22)		Total (n=172)	
	No	%	No	%	No	%	No	%
11-20	8	5.6	0	0	4	18.2	12	7.1
21-30	40	28.2	2	25	2	9.1	44	25.6
31-40	36	25.4	2	25	2	9.1	40	23.2
41-50	34	23.9	0	0	4	18.2	38	22
51-60	14	9.9	4	50	8	36.3	26	15.1
61-70	8	5.6	0	0	2	9.1	10	5.8
71-80	2	1.4	0	0	0	0	2	1.2
Total	142	100	8	100	22	100	172	100

The ovarian tumor is diagnosed as benign, borderline or malignant depending on the presence of predominant cell type, pattern of growth, amount of fibrous stroma and cellular atypia with invasiveness. In the index study, out of 172 ovarian tumors, 82.6% were benign (n = 142), 12.8% (n = 22) were malignant, and 4.6% (n = 8) were borderline malignant tumors. In the study by Wills V et al. out of 140 ovarian lesions, 96.4% were benign, 2.8% malignant, and 0.7% were borderline malignant tumor.<sup>11</sup> Sheikh S et al. reported that out of the 193 cases, 80.3% were benign, 15.5% cases were malignant, and 4.1% were borderline.<sup>12</sup> In a similar study by Yogambal M et al. total numbers of ovarian tumors studied were 402; out of which 78.6% were benign; 20.65% were malignant and 0.75% were borderline.<sup>8</sup> Gupta N et al. found that benign tumors constituted 71.9% in each prospective as well as retrospective study, borderline tumors constituted 4.4% and 4.1%, and malignant tumors constituted 23.7% and 22.9% of tumors respectively.<sup>13</sup>

The clinical presentation of the ovarian tumors remains variable. Some of the ovarian tumors can be incidentally diagnosed on USG, while others may present with acute abdominal pain. Common clinical presentation in majority of patients (48.84%) in this study was pain in abdomen. A good number of ovarian masses were diagnosed incidentally (20.93%) during histopathological examination of hysterectomy and salpingo-oophorectomy specimens. Mass abdomen was noted in 18.60% patients followed by menstrual abnormalities (in 4.65%), infertility (4.65%), and urinary symptoms (2.33%). Findings similar to our study were reported by Yogambal M et al. where the commonest presenting symptom was pain abdomen 66.92% followed by mass abdomen 28.11%.<sup>8</sup> Wills V et al. reported that

menstrual complaints was the most common clinical presentation of patients (in 27.55% patients). Twenty-six percent of ovarian masses were diagnosed incidentally.<sup>11</sup> Menstrual complaints followed by abdominal pain were noted by Kanthikar SN et al. in their studies. The exact nature of all ovarian tumor cannot be confirmed preoperatively just by clinical examination.<sup>14</sup>

In present study, the tumors were studied in the age group from 11 to 71 years (median age 50 years); where maximum number of cases (25.6%) was seen in child bearing age group of 21-30 years, followed by 23.2% in 31-40 years. Benign tumors were more in the reproductive age group of 21-30 years (28.2%) followed by 25.4% in 31-40 years. The malignant neoplasms, (36.3%), in present study, were seen more commonly in the age group of 51-60 years. Borderline tumors were present in majority (50%) in 51-60 years age group.

Our findings are in accordance with the study of Sheikh S et al. where maximum number of cases (43.5%) was seen in the child bearing age group of 21-30 years, and 30-40 years, 22.3%. Benign tumors were also predominantly present in 21-30 years age group.<sup>12</sup> The malignant neoplasms (46.6%) were present commonly in the age group of 40-60 years. Majority (50.0%) of the borderline tumors were present in 21-30 years.

Wills V et al. found that maximum number of benign ovarian tumors was in the 21-40 year age group and a similar number in the 41-60 year age group. All the malignant tumors (100%) were in the 41-60 year age group. The single borderline tumor was present in the younger group (21-40 years).<sup>11</sup> Sharadha SO et al. also noted maximum number of neoplasms (89.9%) in the reproductive age group which was comparable to that reported by Ashraf A et al.<sup>15, 16</sup>

In present study, 27.3% of malignant ovarian neoplasms were found in younger age group (<30 years). Murthy NS et al also found a fair percentage (26.7%) of malignant neoplasms especially surface epithelial adenocarcinomas in younger age groups.<sup>17</sup> This can be attributed to the possible effects of environmental and life style changes adopted by younger population

For diagnosis, microscopic appearance of the tumor is a must for finding the histopathological pattern on which further management is decided. The grading of tumor type also has its importance in further management.<sup>18</sup> Ovarian tumors show histological heterogeneity. The WHO classification of ovarian tumors is based on the tissue of origin— (1) epithelial, (2) germ cell tumors, and (3) sex cord

stromal tumors. It is globally seen that, surface epithelial tumors are the most common ones.<sup>19</sup> Of the three main groups, epithelial tumors are the most common with serous and mucinous cystadenomas being the commonest epithelial tumors. The single most common ovarian tumor is a germ cell tumor, the benign cystic teratoma, and all other types of germ cell tumors, including malignant germ cell tumors, are rare. Sex cord– stromal tumors are less frequently observed group of ovarian tumors. Of these tumors fibromas, thecomas and granulosa cell are significant. Other sex cord–stromal tumors are rare.<sup>10</sup>

This study also is in favor of that observation. Epithelial tumors formed 61.6% (n = 106) the main bulk of neoplasms observed in the study followed by germ cell tumors (32.6%) and sex cord stromal tumors in 5.8% (n = 10). Most of the surface epithelial tumors (60.6%) and germ cell tumors (36.6%) were benign, and majority of sex cord stromal tumors were malignant. Similar results were reported by Sheikh S et al. who noted that the surface epithelial tumors were most common accounting for 54.8% cases followed by germ cell tumors 31.1% cases, sex cord stromal tumors in 3.1%, and metastasis in 2 cases. Majority of surface epithelial tumors and germ cell tumors were benign, and most of sex cord stromal tumors were borderline.<sup>12</sup>

The majority of epithelial tumors were serous tumors (54.7%) followed by mucinous (41.5%) and endometrioid tumor and Brenner tumor (2 cases each). Majority of the serous tumors (47.1%) and mucinous (32%) were benign. All endometrioid tumors and Brenner tumors were malignant.

In study by Wills V et al. most of epithelial tumors were serous tumors (46.4%) and mucinous and germ cell tumors (23.2% each). Most of the serous tumors were benign; only mucinous tumor was borderline tumor. Among the germ cell tumors, all were benign cystic teratomas.<sup>11</sup> Sheikh S et al. and Bukhari U et al. also reported similar results with majority being serous tumors followed by mucinous tumors. Most of serous and mucinous tumors were benign.<sup>12, 20</sup>

Among germ cell tumors, majority were teratoma (96.4%) and 2 cases of dysgerminoma were present. All mature teratoma were benign and 2 cases each of immature teratoma and dysgerminoma were malignant. Wills V et al. reported that among the germ cell tumors, all were benign cystic teratomas with one having a predominance of thyroid tissue (struma ovary).<sup>11</sup> Mature cystic teratoma (30.6%, benign) and 1 case of dysgerminoma (0.5%, malignant) were the only Germ cell tumors observed in series by Sheikh S et al.<sup>12</sup>

Among 10 sex cord tumors, 6 were granulosa cell tumor and 2 each were sex cord tumor with annular tubules and fibroma. All sex cord tumor with annular tubules and fibroma were benign and granulosa cell tumors were malignant. Wills V et al. reported only 3 cases of sex cord tumors, among which 2 were fibroma and 1 was granulosa cell tumor.<sup>11</sup> In study by Sheikh S et al. 6 cases of sex cord tumors were noted; out of which fibroma and fibrothecoma were present in 1 case each (benign) and granulosa cell tumor and Sertoli cell tumor were present in 2 cases each (malignant).<sup>12</sup>

The present study found that mature cystic teratoma was the most common type of benign tumor (30.2%) followed by serous cystadenoma (29.1%) and mucinous cystadenoma (19.7%) (table 5) A retrospective study by Ahmad et al. showed benign cystic teratoma to be the commonest benign tumor.<sup>21</sup> Sheikh et al found mature cystic teratoma was the commonest benign tumor in their study followed by serous cystadenoma.<sup>12</sup> In many Nepalese Studies, mature cystic teratoma was the commonest benign ovarian tumour.<sup>22, 23</sup> However, a study by Thanikasalam has shown serous cystadenoma to be the commonest neoplasm in Indian population while mature cystic teratoma to be commonest among Malayas and Chinese.<sup>24</sup> In a study by Yogambal M et al the most common benign tumor was serous cystadenoma followed by mature cystic teratoma.<sup>8</sup> Some studies from the subcontinent have shown serous cystadenoma to be the most common benign neoplasm.<sup>13, 20</sup>

Serous cystadenocarcinoma was the most common type of malignant neoplasm followed by granulosa cell tumor in present study (table 5). In a study by Yogambal M et al. Common malignant ovarian tumors were serous cystadenocarcinoma carcinoma and mucinous cystadenocarcinoma.<sup>8</sup> Serous cystadenocarcinoma was found as the most common malignant neoplasm in a study by Pachori G et al.<sup>25</sup>

In this study, benign tumors were more (53.52%) in the reproductive age group (21-40 years) followed by perimenopausal group (41-60 years). Serous cystadenoma and Mucinous cystadenoma were present mostly in the patients of 31-50 years, while most of the benign teratomas were seen in 21-30 years age group. Brenner tumor was present in 2 patients of 61-70 years; fibroma in 2 patients of 21-30 years and 2 cases of sex cord tumor with annular tubules was noted in 2 patients of 11-20 years.

In study by Wills V et al. benign tumors were more in the reproductive age group (21-40 years). A similar number of

benign tumors were also seen in the perimenopausal group (41-60 years). All 4 patients diagnosed with malignant ovarian tumors were in the older group (41-60 years).<sup>11</sup> The single borderline tumor was present in the younger group (21-40 years). Sheikh S et al. reported similar findings with most of benign tumors in reproductive age group. Most of the benign neoplasms were seen in third and fourth decade with mean age of 32.75 years. Manivasakam J et al. observed an equal distribution of benign ovarian tumors in the reproductive and perimenopausal age groups.<sup>26</sup> Malignant neoplasms were expectedly seen with advancing age, peaking in 5th and 6th decade of life as seen in another study.<sup>12</sup> Murthy S et al. also reported similar findings.<sup>17</sup>

### Conclusion

Most common clinical presentation of ovarian tumors is pain in the abdomen. Benign ovarian neoplasms are seen in both reproductive and perimenopausal age groups; whereas malignant tumors were seen only in the postmenopausal group. Surface epithelial tumor was the most frequently occurring group of tumors. Among surface epithelial tumors, serous tumors, then mucinous and germ cell tumors were commonly found. The occurrence of malignant epithelial tumors in younger age groups was also noted warranting caution to diagnose and manage ovarian masses in young population. Future larger population-based studies are needed to ascertain the etiological factors and changing age trend in the malignant ovarian tumors.

**Conflict of interest:** None. **Disclaimer:** Nil.

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