Publisher
MEDRESEARCH
www.medresearch.in

Obs Gyne Review - Journal of Obstetric and Gynecology

2021 Volume 7 Number 6 November December

E-ISSN:2455-5444
P-ISSN:2581-4389
RNI:MPENG/2017/74037

Research Article
Ovarian tumors

A clinical study of ovarian tumors and assessment of the risk of malignancy by RMI and correlation with histopathological examination

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DOI: https://doi.org/10.17511/joog.2021.i06.03

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Introduction: Ovarian tumors (OTs) are one of the major gynaecological diseases. Risk of Malignancy Index (RMI) score is used to evaluate the OTs. A study was considered to correlate the clinical study of OTs and assessment of RMI scoring. **Materials and methods:** It was a prospective study conducted in the department of Obstetrics and Gynecology, Mamata Medical College, Khammam. Women aged > 18 years, diagnosed with OTs >6cm in size were included. Women with unilateral, unilocular, thin-walled cysts with regular borders and <6cms were not considered. Menopausal (M) score was assigned by considering the age and menstrual history. USG abdomen and pelvis with 3.5 HZ abdominal convex transducers was carried along with radiologist support to determine the tumour size. USG score was given accordingly depending upon the number of variables that were present. Histopathological diagnosis was considered as the standard for determining the diagnostic value of the RMI index. The Chi-square test was considered for categorical data. P>0.005 was taken as statistically significant. **Results:** OTs were more common between the 21 – 50 years group. The OTs were more commonly seen in parous women with para 2, para 3 and the above groups. Epithelial tumors were the highest (88.57%). The incidence of MTs was increased with the ultrasound score. **Conclusion:** Tumors occur in all age groups in multiparous women and major cases in 31 – 40 years. The RMI scoring was better in diagnosing the OTs and histopathological examination is still the gold standard.

Keywords: Ovarian tumors, Tumors, Score, Women

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How to Cite this Article

Gayatri koyya, Sowjanya Moturi, T Jaya Chandra, A clinical study of ovarian tumors and assessment of the risk of malignancy by RMI and correlation with histopathological examination. Obs Gyne Review J Obstet Gynecol. 2021;7(6):71-75.
Available From
https://obstetrics.medresearch.in/index.php/joog/article/view/149

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Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2021-12-06	2021-12-08	2021-12-15	2021-12-22	2021-12-29

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
Nil	Nil	Nil	16%	

Introduction

Ovarian tumors (OTs) are one of the major gynecological diseases. These represent the greatest clinical challenge, frequent site for primary and metastatic tumors. OTs constitute 25% of gynaecological malignancies. Worldwide, OTs are the 7 most common malignancy and 5th most common cause of carcinomas death. [1]. For better treatment, histological classification along with the staging of OTs is considered. USG findings and CA-125 levels and age when combined and correlated together has shown to be more effective in predicting the risk of malignancy when compared with individual parameters alone. [2]. The risk of Malignancy Index (RMI) score is one such scoring system. This is also used to evaluate the OTs, developed by Jacobs et al. [3]. RMI was calculated by considering menopausal score and ultrasound score. With this background, a study was considered to correlate the clinical study of OTs and assessment of RMI scoring and correlating with the histopathological examination report, with the following objectives to find the incidence and distribution of various OTs, pre-operative RMI scoring and postoperative examination of the histopathological report and calculate the diagnostic value of RMI.

Materials and methods

Settings: The study was conducted in the department of Obstetrics and Gynecology, Mamata Medical College, Khammam.

Duration and type of study: This was a prospective and observational study conducted over 24 months, from January 2012 to Dec 2014.

Sampling method: Random sampling was considered in this study.

Sample size calculation: All the eligible members who satisfy the inclusion criteria were considered in this study.

Inclusion criteria: Women aged $\geq$ 18 years, who attended the department of Obstetrics and Gynecology and were diagnosed with OTs >6cm in size were included in this research.

Exclusion criteria: Women with unilateral, unilocular, thin-walled cysts with regular borders and no solid areas and <6cms, OTs diagnosed as Para OTs, fibroids which were diagnosed intraoperatively were not considered. Those who were refused to submit the informed written consent were also not considered.

Data collection, procedure: Women who fulfilled the inclusion criteria were evaluated thoroughly regarding the history, signs and symptoms of OTs. A detailed general examination of all the systems with particular attention to pelvic assessment was done. A Menopausal (M) score was assigned taking into account the age of the patient and menstrual history. Those who were reported to be amenorrhea for >1 year and those aged >50 years, underwent hysterectomy were considered to be postmenopausal and the remaining were premenopausal, scored as 3 and 1, respectively. Routine hematological investigations such as haemoglobin, blood grouping and typing, renal parameters like blood urea, serum creatinine and random blood sugar levels, urine routine, microscopic examination and viral markers such as HIV, hepatitis were evaluated.

USG abdomen and pelvis with 3.5 HZ abdominal convex transducers was carried along with radiologist support to determine the tumour size. USG score was given accordingly depending upon the number of variables that were present. Special investigations like X-ray KUB, intravenous pyelography and CECT abdomen and pelvis were done in specific conditions, when the tumour nature is not exactly known or when there was hydronephrosis and also to rule out metastasis. Fractional curettage was done in patients presenting with postmenopausal bleeding to exclude other associated conditions.

Pre-operatively, a 5 ml peripheral venous blood sample was taken by venepuncture for serum CA-125 levels analysed by two-site sandwich unassay using direct chemiluminometric technology. The RMI score was calculated and an appropriate surgical procedure was done depending on the age, reproductive status and extent, nature of the OT. Histopathological diagnosis was considered as the standard for determining the diagnostic value of RMI index. Tumours were classified according to the WHO definitions. The malignant tumours (MTs) were staged according to the International Federation of Gynecology and Obstetrics.

Ethical consideration and permission: The study protocol was approved by the institutional

Ethics committee. An informed consent was taken from all the participants.

Statistical analysis: Statistical was done by using SPSS 24. Data were presented as mean SD and range values and number and percentages. Students's t-test was used to compare the mean values between two groups and chi-square test for categorical data. P>0.005 was considered to be statistically significant.

Results

Total 70 (100%) OTs were studied in research. Age wise, Age wise, 21.4% (15) tumors were diagnosed between 21 – 30 years, 38.6% in 31 – 40 years, 18.6% in 41 – 50 years, 10% each in 51 – 60 and <20 years groups. OTs were more common between 21 – 50 years group. Maximum number (35.7%; 25) of benign tumors (BTs) were diagnosed in 31 – 40 years group followed by 21 – 30 years group (21.4%; 15), 41 – 50 years (15.7%; 11), <20 years (10%; 7) and > 60 years (1.4%; 1). In this study, 2.85% (2) each MTs were diagnosed in 31 – 40, 41 – 50 and 51 – 60 years groups, respectively; statistically there was no significant difference (Table 1).

The OTs were more commonly seen in parous women with para 2, para 3 and the above groups, constituted 38.6% and 32.8%, respectively. In this research, 17.1% of tumours were diagnosed in nulliparous women. From these it was observed that there was no association between them (Table 2).

In this study, epithelial tumors were the highest (88.57%; 62) followed by germ cell tumors (5.71%; 4), sex cord stromal tumors (4.3%; 3) and krukenberg tumor (1.4%; 1). The mean age of BTs was 36.3 and 48 years for the MTs.

Out of the 6 MTs, 4 (5.6%) were diagnosed in those with M score 3 and 2 (2.8%) in M score with 1. Out of 64 (91.4%) BTs, the rate of diagnoses was 54 (77.1%) and 10 (14%), respectively. Statistically there was significant difference between M score and tumour (Table 3).

In this research, the incidence of MTs were increased with the ultra sound score. Whereas the BTs were decreased with the ultra sound score. The BTs were 45.7% (32), 35.7% (25) and 10% (7), respectively with the scores 0, 1 and 3. Statistically there was a significant difference (Table 4).

Table 1: Age wise distribution of study participants; n (%).

Age	BT	MT	Total
<20	7 (10)	0	7 (10)
21 – 30	15 (21.4)	0	15 (21.4)
31 – 40	25 (35.7)	2 (2.85)	27 (38.6)
41 – 50	11 (15.7)	2 (2.85)	13 (18.6)
51 – 60	5 (7.1)	2 (2.85)	7 (10)
>60	1 (1.4)	0	1 (1.4)
Total	64 (91.4)	6 (8.6)	70 (100)
Statistical analysis	Chi square: 6.546; P = 0.257.		
	Statistically no significant difference		

Maximum number of tumors were diagnosed in 31 – 40 years group.

Table 2: Distribution OTs according to parity among the study participants; n (%).

Parity	BT	MT	Total
P0	11 (15.7)	1 (1.4)	12 (17.1)
P1	7 (10)	0	7 (10)
P2	26 (37.1)	1 (1.4)	27 (38.6)
>P3	19 (27.1)	4 (5.7)	23 (32.8)
Pregnancy associated	1 (1.4)	0	1 (10)
Total	64 (91.4)	6 (8.6)	70 (100)
Statistical analysis	Chi square: 3.85; P = 0.4276.		
	Statistically no significant difference		

Maximum OTs were diagnosed among the women with P2.

Table 3: Distribution OTs according M score among the study participants; n (%).

M score	BT	MT	Total
1	54 (77.1)	2 (2.8)	56 (80)
3	10 (14)	4 (5.6)	14 (19.6)
Total	64 (91.4)	6 (8.6)	70 (100)
Statistical analysis	Chi square: 8.932; P = 0.003.		
	Statistically significant		

Maximum number of MT (4) were diagnosed in those with M score with 3.

Table 4: Distribution of OTs according to the Ultrasound score; n (%).

Score	Benign	Malignant	Total
0	32 (45.7)	0	32 (45.7)
1	25 (35.7)	0	25 (35.7)
3	7 (10)	6 (8.6)	13 (18.6)
Total	64 (91.4)	6 (8.6)	70 (100)
Statistical analysis	Chi square: 28.73; P = 0.0003.		
	Statistically significant		

In this research, the incidence of MTs was increased with the ultrasound score.

Discussion

The age of the study members was ranged between 16 – 65 years. The majority of the women with BTs was diagnosed in the 31 – 40 years group and > 35 years was the common age group for the MTs. The mean age for the participants with BTs was 36.34 years and the SD was 11.30; whereas for those diagnosed with MTs, 48 years was the mean age and 9.6 was the SD. The results in this research were comparable with the studies reported by Tahereh Ashrafgangooei et al., 37 and 50.8 years were the mean ages respectively for BT and MT. [4]. Whereas, there was some disparity in reports published by Jacobs et al. [3]. and Ulusov S et al. [5]. There was no significant difference in race and ethnicity between the two groups in the present study and all patients belonged to the rural area. Even concerning the parity also there was no significant difference in both benign and malignant groups. OTs were seen more commonly in parous women when compared with nulliparous or women with low parity. This is contrary to previous studies reported by Chakraborthy DK et al. [6]. and Whittemore AS et al. [90]. On histological examination, 91.4% had benign disease and 8.6% had malignant disease. This was comparable with published reports by Tahereh Ashrafgangooei et al. [4]. Petronella A et al. [7]. But there was a difference in the incidence of these in the other studies. The incidence was 19.85% and 9.52% by Yuen et al. [8], 31.5% and 64% by Jadhav et al. [9], BTs and MTs, respectively. But the exact reasons were not mentioned in the literature. But we may declare that technological advancement may be the cause for this. When the data was correlated with the M score, the percentage of MTs was high (66.67%) and the difference between the two groups was statistically significant in the present study. This was comparable in the data published by Andersen et al. [10]. and Moolthiya W et al. [11]; the incidence was reported to be 80.5%, and 60.8%, respectively. This indicates that the incidence of MTs increases with advanced age. The M score specificity was 84.37% which was higher in this research compared to sensitivity in the diagnosis of OTs. The specificity was reported to be 67.9% by Ulusoy S et al. [5]

There was an increase in the percentage of MTs with the increase in U score from 0 to 3 compared to BTs in the present study and the difference between the two groups was statistically significant in the present study with a value of 0.000 and the results were compared with that quoted by various authors. [8]; the percentage of MTs increased to 56.6% with a USG score of 3. When U scores were considered to differentiate BTs and MTs, the sensitivity was 50 and specificity was 89 in this study. False positives accounted in the present study were 7, of which 4 were mucinous cystadenomas, 2 ovarian fibromas and 1 serous cystadenoma (SC) with hemorrhage. SC was the most common (33.33%) MT in the present study. Jacobs et al. [3] reported 31.57% of SC. It was 40% in Andersen et al. [10] and 35.1% in Moolthiya W et al. [11]. In this research, when RMI scores were used to differentiate BT and MTs, the sensitivity was 50% and specificity was 96.87%. Specificity in this report was at par with the available reports but there was some disparity in sensitivity. The reported sensitivity was ranged between 70.65 to 89.5% and the specificity was 80.5% to 96.9%. [5, 7, 11 – 14].

Conclusion

MTs were found to be predominant OTs. The tumours occur in all age groups in multiparous women and major cases in 31 – 40 years age group. The RMI scoring was better in diagnosing the OTs and the Histopathological examination is still the gold standard.

What this study adds to the existing knowledge?

Ovarian tumors can occur in any age group and Histopathological examination is the gold standard for its diagnosis.

Author Contribution: Gayatri koyya: Literature search, Article writing, **Sowjanya Moturi**: Benchwork, Literature search, Article writing, **T Jaya Chandra**: Proofreading, Statistical analysis.

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