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**Original Research Article** 

# Retrospective Analysis of the Ovarian Dermoids Via Radiographic Evaluation: A Clinical Study

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**Conflict of interest: Nil** 

#### Abstract:

**Background:** Most common ovarian neoplasms seen are the Ovarian Dermoids which constitute nearly 15-20% of total ovarian neoplasms. Ovarian dermoid is usually seen in females of the reproductive age group, especially in the  $2^{nd}$  and  $3^{rd}$  decade of their life. Ovarian dermoid are slow-growing tumors comprising of various elements from multiple germ cell layers. Ovarian dermoid is usually diagnosed using USG (ultrasonography) and better assessment is done using MRI and CT.

**Aim:** The present study was conducted to radiographically evaluate the ovarian tumors with the imaging data from different radiological modalities.

**Materials and methods:** Ovarian dermoid cases were diagnosed with either MRI, CT, or USG. Imaging data were assessed by a minimum of two radiologists experts in the field. The collected data were subjected to statistical evaluation for results formulation.

**Results:** Right side ovarian dermoids were seen in 62.5% (n=20) study subjects, left side was seen in 25% (n=8) study subjects, and bilateral ovarian dermoids were seen in 12.5% (n=4) study subjects. The lesion size was 6-10cm in majority of study subjects, in 65.62% (n=21) subjects followed by 0-5cm in 15.62% (n=5) study subjects, and 11-15cm in 12.5% (n=4) study subjects. The lesion size of 15-20cm and 21-25cm was seen in 3.12% (n=1) study subject. Ultrasonography was done in 40.62% (n=13) study subjects, CT was done in 15.62% (n=5) study subjects, and MRI was done in 12.5% (n=4) study subjects. Ultrasonography with computed tomography was done in 25% (n=8) study subjects, ultrasonography with MRI (magnetic resonance imaging) was done in 3.12% (n=1) study subject, and CT with MRI was also done in 3.12% (n=1) study subject respectively.

**Conclusion:** The present study concludes that ultrasonography can readily detect ovarian dermoid, whereas, the cases with complications should further be assessed on MRI or CT. **Keywords:** CT, MRI, Ovarian Dermoid, Radiological evaluation, USG

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#### Introduction

The most common ovarian neoplasms seen are the Ovarian Dermoids which constitute nearly 15-20% of total ovarian neoplasms. These dermoids are comprised of a minimum of two or three welldifferentiated tissue types of germinal cells of endoderm, mesoderm, or ectoderm. Ovarian dermoids nearly always have mature tissues of ectodermal origin including brain, skin, and others, in nearly 90% of cases, ovarian dermoids have mesodermal tissues like cartilage, bone, fat, and muscles, and also mostly have endodermal tissues like thyroid tissue, bronchial epithelium, gastrointestinal mucinous epithelium, and others.<sup>1</sup>

There are three main types of Ovarian dermoids namely Monodermalteratoma, immature teratoma, and mature cystic teratoma. Nearly 60% of ovarian neoplasms are constituted by Dermoid cyst or mature cystic teratomas and are usually seen in females of the reproductive age group. It is usually unilateral with bilateral dermoids seen in small proportions. Subjects having mature cystic teratomas are usually asymptomatic. However, symptomatic subjects complain of irregular menses and lower abdominal pain. Ovarian dermoids are slow-growing tumors and are treated surgically only when they have associated complications or are of more than 6cm dimension.<sup>2</sup>

Rarely seen ovarian neoplasms, seen in less than 1% cases are immature teratomas and usually affect subjects of younger age. Immature teratomas are usually large and nearly half of the subjects have raised levels of serum alfa protein. Immature teratomas are usually malignant with >30% of cases turning to malignancy on follow-up. On the other hand, Monodermoidteratomas are rare entities and contain carcinoid tumors, neural tumors, or strumaovarii. On complications, ovarian dermoids are presented as malignant degeneration, ovarian vein thrombophlebitis, torsion, or rupture.<sup>3</sup>

On the radiographic assessment of the ovarian dermoids, ultrasound (USG) is usually used as a screening tool, whereas, for further assessment, CT (computed tomography) is used as it is more sensitive. In certain conditions, such as pregnancy, MRI (magnetic resonance imaging) can be used and findings can be compared to CT and USG. In ultrasonography calcified materials, rokitanksy protuberances or echogenic sebaceous material are seen as classical findings, whereas, diagnostic finding on CT scanning is fat detection of density <20HU. Other common findings seen on CT scans are palm trees like protrusions and fat-fluid lines with gravitydependent layering. On MRI, sebaceous material is seen on T1 W images like suppressed and hyperintense on FAT SAT imaging. However, hemorrhagic contents of the cyst are not suppressed.<sup>4</sup> The present retrospective clinical study was conducted to radiographically evaluate the ovarian tumors with the imaging data from different radiological modalities.

## Materials and Methods

The present retrospective clinical study was conducted to evaluate the ovarian tumors with the imaging data from different radiological modalities. The study population was comprised of the subjects visiting the Department of Obstetrics and Gynaecology of for the ovarian dermoids. After explaining the detailed study design, informed consent was taken from all the study subjects.

The study included 32 female subjects who had confirmed diagnosis of ovarian dermoids within the age range of 20-40 years and the mean age of  $32.2\pm4.36$  years. The inclusion criteria for the study were females with a confirmed diagnosis of ovarian dermoids, within the age group of 21-40 years, and complete medical and radiographic records. The exclusion criteria for the study were subjects with incomplete medical and radiographic data, lactating females, and subjects who were not willing to participate in the study.

After the final inclusion of the study subjects, radiographic and medical data were extracted from the previous medical records of the Department of Obstetrics and Gynaecology and Department of Radiodiagnosis. The data of subjects with ovarian dermoids was taken from CT (Figure A), MRI (Figure B) and USG (Figure C) data. In some subjects, the addition of two or more modalities was seen. For USG, MRI, and CT same machines were used for all the subjects with identical parameters by a single expert in the field. All the scans were evaluated by the two experienced radiologists. In some cases, histocytopathologic findings were available and were correlated and compared to the radiographic findings.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at p<0.05.

### Results

The present retrospective clinical study was conducted to radiographically evaluate the ovarian tumors with the imaging data from different radiological modalities. The study included 32 female subjects who had confirmed diagnosis of ovarian dermoids within the age range of 20-40 years and the mean age of  $32.2\pm4.36$  years. The demographic characteristics of the study subjects are listed in Table 1. The majority of study subjects, 84.37% (n=27) subjects were in the age of 21-30 years and 15.62% (n=5) subjects were in the age of 31-40 years. The most common presenting symptom by the study subjects was lower abdominal pain and swelling in 43.75% (n=14) study subjects followed by asymptomatic subjects in 25% (n=8) study subjects, ovarian torsion in 15.62% (n=5) study subjects, menstrual irregularities in 9.37% (n=3) study subjects, and the least common presenting symptom was infertility as reported by 6.25% (n=2) study subjects as shown in Table 1.

For the radiographical evaluation of the study subjects using different modalities for ovarian dermoids, it was seen that ultrasonography was done in 40.62% (n=13) study subjects, CT was done in 15.62% (n=5) study subjects, and MRI was done in 12.5% (n=4) study subjects. Ultrasonography with computed tomography was done in 25% (n=8) study subjects, ultrasonography with MRI (magnetic resonance imaging) was done in 3.12% (n=1) study subjects, and CT with MRI was also done in 3.12% (n=1) study subjects respectively. A combination of all three modalities of ultrasonography computed tomography, and magnetic resonance imaging was done in no study subject as depicted in Table 2.

On assessing the various factors related to the ovarian dermoids in the study subjects, it was seen that for the laterality, right side ovarian dermoids were seen in 62.5%(n=20) study subjects, left side was seen in 25% (n=8) study subjects, and bilateral ovarian dermoids were seen in 12.5% (n=4) study subjects. The lesion size was 6-10cm in majority of study subjects, in 65.62%(n=21) subjects followed by 0-5cm in 15.62% (n=5) study subjects, and 11-15cm in 12.5% (n=4) study subjects. The lesion size of 15-20cm and 21-25cm was seen in 3.12% (n=1) of study subjects each as shown in Table 3.

Characteristics	Percentage (%)	Number (n=32)
Mean age (years)	32.2±4.36	
Age range (years)	20-40	
21-30	84.37	27
31-40	15.62	5
Presenting symptoms		
Infertility	6.25	2
Menstrual irregularities	9.37	3
Ovarian Torsion	15.62	5
Asymptomatic	25	8
Lower abdominal pain and swelling	43.75	14

 Table 1: Demographic and disease characteristics of the study subjects

Radiographic evaluation	Percentage (%)	Number (n=32)
USG	40.62	13
СТ	15.62	5
MRI	12.5	4
USG with CT	25	8
USG with MRI	3.12	1
CT with MRI	3.12	1
USG, CT, and MRI	0	0

Table 2: Radiographic evaluation using different modalities in the study subjects

#### Table 3: Factors of ovarian dermoids in the study subjects

Study factors	Percentage (%)	Number (n=32)
Laterality		
Right	62.5	20
Left	25	8
Bilateral	12.5	4
Lesion size (cm)		
0-5	15.62	5
6-10	65.62	21
11-15	12.5	4
15-20	3.12	1
21-25	3.12	1



A: Axial CT view

B: Sagittal view of MRI [arrow]



C: USG showing Dermoid cyst [circle]

### Discussion

The present retrospective clinical study was conducted to radiographically evaluate the ovarian tumors with the imaging data from different radiological modalities. The study included 32 female subjects who had confirmed diagnosis of ovarian dermoids within the age range of 20-40 years and the mean age of 32.2±4.36 years. The majority of study subjects, 84.37% (n=27) subjects were in the age of 21-30 years and 15.62% (n=5) subjects were in the age of 31-40 years. The most common presenting symptom by the study subjects was lower abdominal pain and swelling in 43.75% (n=14)study subjects followed by asymptomatic subjects in 25% (n=8) study subjects, ovarian torsion in 15.62% (n=5) study subjects, menstrual irregularities in 9.37% (n=3) study subjects, and the least presenting symptom was common infertility as reported by 6.25% (n=2) study subjects. These demographics were comparable to the studies of Albayram F et al<sup>5</sup> in 2001 and Outwater EK et al<sup>6</sup> in 2001 where authors assessed subjects with demographics comparable to the present study.

Concerning the radiographical evaluation of the study subjects using different modalities for ovarian dermoids, it was seen that ultrasonography was done in 40.62% (n=13) study subjects, CT was done in 15.62% (n=5) study subjects, and MRI was done in 12.5% (n=4) study subjects. Ultrasonography with computed tomography was done in 25% (n=8) study ultrasonography with subjects, MRI (magnetic resonance imaging) was done in 3.12% (n=1) study subjects, and CT with MRI was also done in 3.12% (n=1) study subjects respectively. A combination of all three modalities of ultrasonography computed tomography, and magnetic resonance imaging was done in no study subject. These results were consistent with the findings of Ding D et al<sup>7</sup> in 2005 and Hoo W et  $al^8$  in 2010 where authors reported similar radiographic diagnosis of ovarian dermoids as in the present study.

For the assessment of the various factors related to the ovarian dermoids in the study subjects, it was seen that for the laterality, right side ovarian dermoids were seen in 62.5% (n=20) study subjects, left side was seen in 25% (n=8) study subjects, and bilateral ovarian dermoids were seen in 12.5% (n=4) study subjects. The lesion size was 6-10cm in majority of study subjects, in 65.62% (n=21) subjects followed by 0-5cm in 15.62% (n=5) study subjects, and 11-15cm in 12.5% (n=4) study subjects. The lesion size of 15-20cm and 21-25cm was seen in 3.12% (n=1) study subject each. These results were in agreement with the studies of Laberge PY et al<sup>9</sup> in 2006 and Zupi E et  $al^{10}$  in 2003 where authors reported comparable associated factors to the ovarian dermoids as the present study in their studies.

### Conclusion

Within its limitations, the present study concludes that ultrasonography can readily detect ovarian dermoids, whereas, the cases with complications should further be assessed on MRI or CT. The present study had a few limitations including small sample size, shorter monitoring period, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

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