ROLE OF COMPUTED TOMOGRAPHIC EVALUATION IN DIAGNOSIS OF OVARIAN TUMOURS AND ITS HISTOPATHOLOGICAL CORRELATION

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ABSTRACT

BACKGROUND
Ovarian cancer is one of the leading causes of death, 5th among the other causes of cancer related in women. Accurate diagnosis and staging helps in tailoring the management and also reducing the unnecessary burden of surgeries.

Aim- To assess the accuracy of CT evaluation in diagnosis of ovarian tumours and their differentiation into benign and malignant categories.

MATERIALS AND METHODS
Seventy-nine patients who were clinically diagnosed as adnexal mass and were suggested CECT examination for the same were evaluated in Department of Radiodiagnosis during March 2015 to September 2016. The results of CECT were correlated with post-surgical HPR diagnosis.

RESULTS
CECT was proved to have 87.1% sensitivity and 92.5% specificity in distinguishing benign and malignant tumours. Premenopausal age group had higher incidence of benign pathology, whereas postmenopausal group had higher incidence of malignant pathology.

CONCLUSION
CECT evaluation can be a choice of investigation in initial evaluation of ovarian tumours due to its diagnostic accuracy and easy availability.

KEYWORDS
Ovarian Tumours, CECT Evaluation.


BACKGROUND
Malignancies of the female reproductive system are among serious causes of mortality and morbidity, and adnexal cancers are in fifth place among the tumours with the highest mortality in the female population.1

For gynaecologic surgeries, ovarian mass is one of the leading indications, which in turn is influenced by the histopathological evidence of benignity/malignancy.2

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USG has limited role in disseminated malignant ovarian tumour to further know the exact extent of disease. So to assess the nature of lesion and staging of the tumour, CECT evaluation is currently the investigation of choice.3

Computed tomography helps to know the regional and distant spread of the lesion as well as other pelvic and abdominal organs can be well assessed for pathology, especially gastrointestinal and genitourinary organs.1

One of the important prognostic factor in the epithelial ovarian cancer is degree of peritoneal disease, which in turn predict the outcome.4 Also MDCT has been proven excellent in delineating the peritoneal disease.5

Aim of the Study
To evaluate the role of computed tomography in the evaluation of ovarian tumours and its accuracy in distinguishing malignant tumours from benign by correlating with histopathological diagnosis.
Study Design | Descriptive diagnostic study
---|---
Study Setting | Patients presenting in gynaecology OPD, IMCH of Government Medical College, Kozhikode with clinical diagnosis of ovarian mass
Study Period | March 2015 to September 2016
Study Method | CECT study of abdomen and pelvis
Sample Size | 79 patients satisfying the inclusion criteria were included in the study
Inclusion Criteria | Patients with ovarian tumour planning to undergo surgery
Exclusion Criteria | Secondary metastatised ovarian masses Patients with renal disease or abnormal RFTs All patients with known history of allergy to contrast dyes and iodinated contrast agents
CECT Protocol and Imaging | Plain and contrast sections of abdomen and pelvis with use of 50 mL of non-ionic contrast medium were taken with additional 1000 mL oral contrast to opacify the bowel loops. Section thickness of 5 mm for axial images within craniocaudal direction from the level of the xiphisternum to pubic symphysis and reconstruction of images with section thickness of 2 – 3 mm
Statistical Analysis | Using SPSS statistical software P value < 0.05 taken as statistically significant

Ethics
The study was approved by the Institutional Research Committee and Ethics Committee of Government Medical College, Kozhikode, Kerala, India.

MATERIALS AND METHODS
From March 2015 to September 2016, 79 patients who presented with primary diagnosis of adnexal mass in Gynaecology Department on either clinical or USG basis were included in this study, who further underwent surgical resection and histopathologic examination. Sample size was calculated by statistical method based on experience of previous reference studies, which showed sensitivity and specificity of CT diagnosis being 80% - 90% and 90% - 95% respectively in evaluating ovarian tumours. This study was approved by Ethics Committee of Govt. Medical College, Kozhikode.

Statistics
Validity parameters used-
- Sensitivity - Ability of the test to detect true disease. It is the proportion of diseased patients who are reported as test positive. It is thus the True Positive rate.
- Sensitivity - [(True positive/True positive + False Negative)] x 100.
- Specificity - Ability of the test to correctly detect disease free individuals, i.e. it is the True Negative rate.
- Specificity - [(True negative/True negative + False positive)] x 100.
- Positive predictive value - Indicates the probability that a patient with a positive result in fact has disease.
- Positive predictive value = [(True positive/True positive + False Positive)] x 100.
- Negative predictive Value - Indicates the probability that a patient with a negative result does not have the disease in question.
- Negative predictive value = [(True negative/True negative + False negative)] x 100.

RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
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<td>40</td>
<td>50.6</td>
</tr>
<tr>
<td>Malignant</td>
<td>36</td>
<td>45.6</td>
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<td>3</td>
<td>3.8</td>
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<td>Total</td>
<td>79</td>
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Table 2. Final HPR Diagnosis of Tumours

![Figure 1. CT Diagnosis versus HPR Diagnosis](image1)

Table 1. CT Diagnosis of Tumours

<table>
<thead>
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<tr>
<td>Malignant</td>
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<td>48.1</td>
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<tr>
<td>Borderline</td>
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![Figure 2. Distribution of Histological Subtypes of Benign Tumours](image2)
Figure 3. Distribution of Histological Subtypes of Malignant Tumours

Figure 4. Association of Ascites with Tumours

Table 1. Tumour Grade according to PCE Value

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<th>Tumour Grade</th>
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<tr>
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<tr>
<td></td>
<td>&gt; 60 HU</td>
<td>18</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>61</td>
</tr>
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<td></td>
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<td>79</td>
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Table 2. Peritoneal Deposits

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<th>Total</th>
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<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Borderline</td>
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<td>0</td>
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</tr>
<tr>
<td>Malignant</td>
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<td>19</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>19</td>
<td>79</td>
</tr>
</tbody>
</table>

Table 4. HPR Diagnosis versus Peritoneal Deposits

Table 5. Validity Parameters using CECT Abdomen to Diagnose Ovarian Tumours

CASE 1

78-Year-Old Patient with Benign Ovarian Tumour shows a Simple Unilocular Cystic Lesion involving Right Ovary. No E/O Septations/Solid Areas. HPR S/O Serous Cystadenoma

CASE 2

57-Year-Old Patient showing a Multiloculated Cystic Lesion with Septal Thickness < 3 mm in Thickness. HPR S/O Mucinous Cystadenoma.

CASE 3

45-Year-Old with a Multiloculated Cystic Tumour with Septal Thickness > 3 mm in Thickness, Ascites and Omental Caking. S/O Malignant Tumour. HPR- Mucinous Cystadenocarcinoma.
CASE 4

**Histologically Proven High-Grade Serous Carcinoma with Contrast Enhancement > 60 HU**

**DISCUSSION**

During the one and a half year study period of this study, 79 patients who had presented with adnexal masses in Gynaecology OPD and had undergone the surgery for the same were evaluated.  

CECT scan of abdomen and pelvis of these patients was undertaken in Department of Radiodiagnosis. CECT evaluation was correlated with post-surgical HPR diagnosis, and was found to be fairly accurate in distinguishing malignant from benign tumours. Out of 79 cases, 3 false positive and 5 false negative cases were seen.  

Criteria used for malignant tumour were size of tumour > 10 cms, increased n. of loculi, thickness of septations > 3 mm, papillary and solid projections within tumour > 3 mm in height, association of ascites, peritoneal deposits and omental caking.

The histological grade of tumour was evaluated against the post contrast enhancement, which correlated with the findings of study, i.e. tumours of higher grade had significantly higher post contrast enhancement compared to lower grade tumours.

Majority of the patients with ovarian masses were asymptomatic in nature or had vague abdominal symptoms.

Serous varieties were the commonest tumours in both malignant and benign categories with 2nd most common being mucinous tumours. Incidence of malignancy was more with increase in age.

CECT can be used as investigation of choice for evaluation of ovarian masses due to its easy availability and comparable accuracy with other modalities.

CECT study in evaluation of ovarian tumours offers fairly good accuracy about the nature of tumour with sensitivity and specificity of 87.1% and 92.5% respectively.

CECT was also excellent in depicting the spread of tumour in case of advanced stages.

According to our study, the CECT evaluation of ovarian tumours showed sensitivity and specificity of 87.18% and 92.5% respectively, whereas positive predictive values and negative predictive values were 91.8% and 88.1%. These values were comparable with the previously done studies for evaluation of role of CT in ovarian masses.

In a study performed by Fatemeh Gatreh-Samani et al, sensitivity and specificity were 92.8% and 88.0% respectively, whereas PPV and NPV of 95.5% and 81.4% was reported which was comparable with our studies.

Also another similar study performed with 16-slice CT by Tsili et al reported the sensitivity and specificity of CECT in differentiating malignant adnexal masses, 90% and 89.1% respectively. There was accurate differentiation of malignant tumours in 36 out of 38 cases with the help of morphological features such as enhancing solid areas, number of loculi, ascites, peritoneal deposits and larger size of lesions.

Out of 79 studied patients 40 patients had tumours of benign aetiology, 36 with malignancy and 3 were borderline tumours. Majority of patients were either asymptomatic or had vague complaints.

Two most common benign groups in routine practice, i.e. serous and mucinous cystadenomas were also found to be common in our study. Serous cystadenoma being first and mucinous cystadenoma being second most common benign tumour. Other tumours of benign aetiology were fibromas and germ cell tumours comprising equal varieties.

In malignant group, serous cystadenocarcinoma and serous adenocarcinomas were most common, constituting 67% of group, whereas mucinous cystadenocarcinoma was second most common group. There was significant association of ascites, peritoneal deposits and bilateral tumour involvement with the malignant tumours. Also bilaterality of tumour was more commonly seen in malignant cases in our study.

Another specific feature which was evaluated in this study was post contrast enhancement of tumour versus grade of tumour. The neovascularisation being more aggressive with tumours of higher grade, degree of post contrast enhancement was more with malignant tumours of more aggressive nature. In our study, all tumours with histological advanced grades such as serous adenocarcinomas had higher post contrast advancement, i.e. > 60 HU.

However, there was no previous study done regarding degree of enhancement and tumour grade using the post contrast enhancement value, so comparison was not possible. The clinical studies performed to evaluate this feature were done using MRI study.

Advantage of CECT in advanced disease was to evaluate the difficult areas of spread of tumour, such as subdiaphragmatic, paracolic gutters, etc.

Also, it helped in differentiating the bowel loops from peritoneal deposits by oral contrast administration. Easy availability, shorter scan time and accurate differentiation between benign versus malignant tumours were advantages offered by CECT scan.

**CONCLUSION**

CECT evaluation can be a choice of investigation in initial evaluation of ovarian tumours due to its diagnostic accuracy and easy availability.

**REFERENCES**


