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.

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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 metastasised 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

	Frequency	Percent
Benign	40	50.6
Malignant	38	48.1
Borderline	1	1.3
Total	**79**	**100**

Table 1. CT Diagnosis of Tumours

	Frequency	Percent
Benign	40	50.6
Malignant	36	45.6
Borderline	3	3.8
Total	**79**	**100.0**

Table 2. Final HPR Diagnosis of Tumours

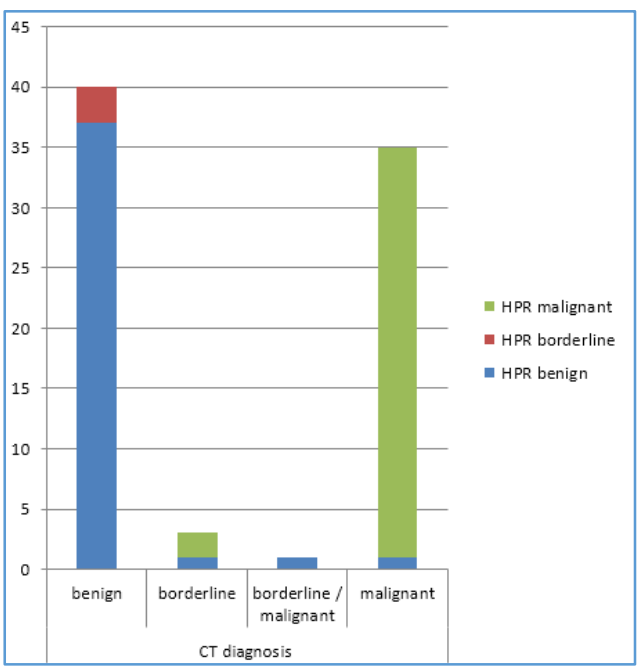


Figure 1. CT Diagnosis versus HPR Diagnosis

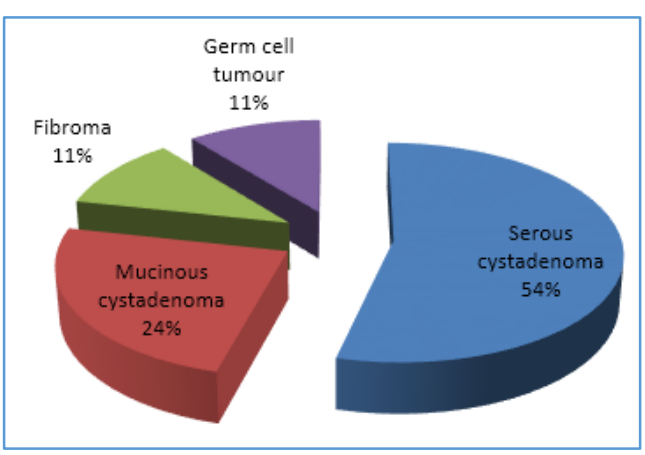


Figure 2. Distribution of Histological Subtypes of Benign Tumours

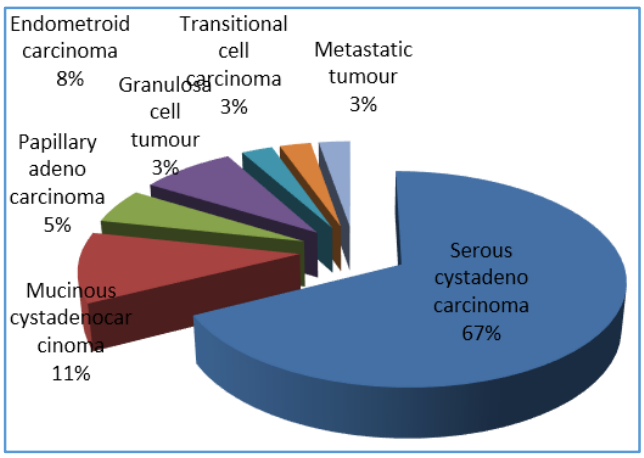


Figure 3. Distribution of Histological Subtypes of Malignant Tumours

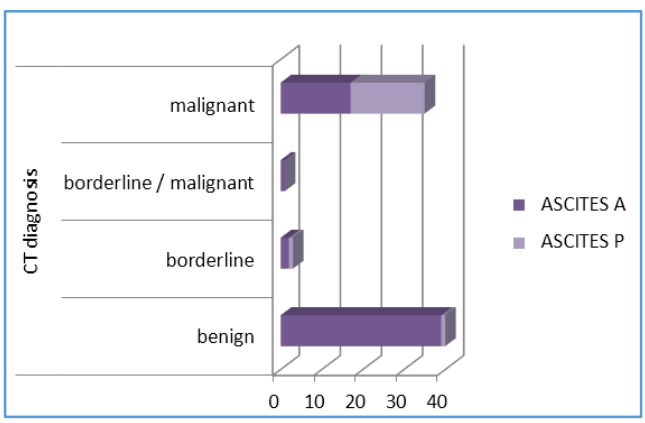


Figure 4. Association of Ascites with Tumours

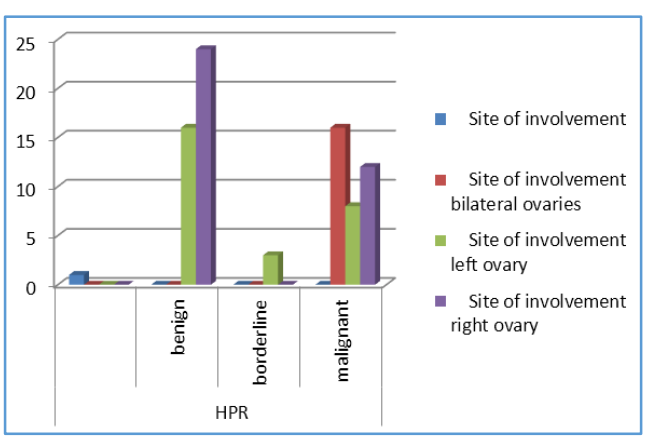


Figure 5. % of Bilateral Involvement according to Tumour Type

		Tumour Grade		Total
		High	Low	
PCE Value	< 60 HU	0	61	61
	> 60 HU	18	0	18
Total		**18**	**61**	**79**

Table 3. Post Contrast Enhancement Value versus Tumour Grade

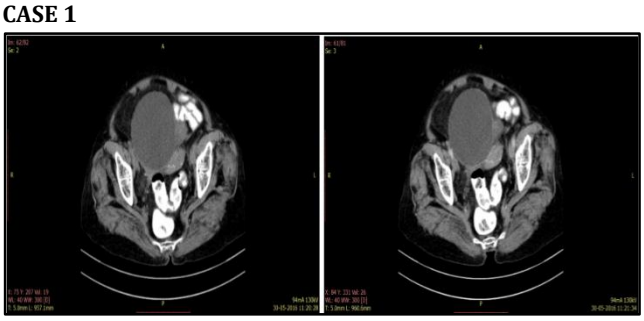
		Peritoneal Deposits		Total
		No	Yes	
HPR	Benign	40	0	40
	Borderline	3	0	3
	Malignant	17	19	36
Total		**60**	**19**	**79**

Table 4. HPR Diagnosis versus Peritoneal Deposits

Validity Parameters	Values
Sensitivity	87.1%
Specificity	92.5%
Positive predictive value	91.8%
Negative predictive value	88.1%

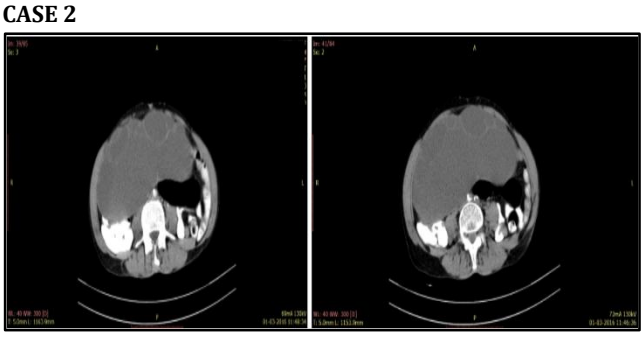
Table 5. Validity Parameters using CECT Abdomen to Diagnose Ovarian Tumours

CASE 1



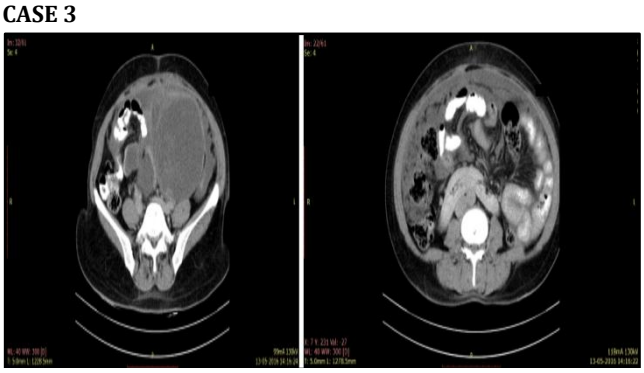
78-Year-Old Patient with Benign Ovarian Tumour shows a Simple Unilocular Cystic Lesion involving Right Ovary. No E/O Septations/Solid Areas. HPR S/O Serous Cystadenoma

CASE 2



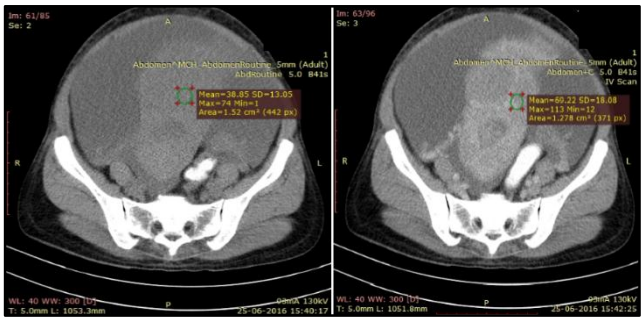
57-Year-Old Patient showing a Multiloculated Cystic Lesion with Septal Thickness < 3 mm in Thickness. HPR S/O Mucinous Cystadenoma.

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 no. 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,[1] 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.[6]

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

[1] Gatreh-Samani F, Tarzamni MK, Olad-Sahebmadarek E, et at. Accuracy of 64-multidetector computed tomography in diagnosis of adnexal tumors. J Ovarian Res 2011;4(1):15.

[2] Lalwani N, Shanbhogue AK, Vikram R, et al. Current update on borderline ovarian neoplasms. AJR Am J Roentgenol 2010;194(2):330-6.

[3] Jung SE, Lee JM, Rha SE, et al. CT and MR imaging of ovarian tumors with emphasis on differential diagnosis. Radiographics 2002;22(6):1305-25.
[4] Ferrandina G, Sallustio G, Fagotti A, et al. Role of CT scan-based and clinical evaluation in the preoperative prediction of optimal cytoreduction in advanced ovarian cancer: a prospective trial. Br J Cancer 2009;101(7):1066-73.
[5] Iyer VR, Lee SI. MRI, CT, and PET/CT for ovarian cancer detection and adnexal lesion characterization. AJR Am J Roentgenol 2010;194(2):311-21.
[6] Tsili AC, Tsampoulas C, Argyropoulou M, et al. Comparative evaluation of multidetector CT and MR imaging in the differentiation of adnexal masses. Eur Radiol 2008;18(5):1049-57.