Computed tomographic characterization of adnexal masses

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ABSTRACT

Aims: To evaluate the computed tomographic scan features of benign and malignant adnexal masses.

Methods: Retrospective descriptive study of CT scan features of adnexal masses were evaluated at Department of Radiology of Nobel Medical College from April to September 2020. Initial ultrasound or clinical diagnoses of adnexal masses were referred for the CT scan. Incidental adnexal findings on abdominal-pelvic CT scan performed for other diagnosis were also included.Descriptive parameters were calculated.

Results: Total 46 cases were studied where mean age was 41.3 years with range 10-74 years. Most common age group with adnexal masses were in between 30 and 50 years (56.6%); 86% had benign features and rest were associated with either ascites (66%) or peritoneal deposits (13%). Complex cysts (60%) was the most common consistency with simple cyst (26%) followed by solid (6%). Amongst the benign neoplastic lesions most of them were dermoid cysts (35%).

Conclusions: CT scan can be used as a supplementary diagnostic tool for cystic and solid componentcharacterization of adnexal masses and help in evaluation of the nature and extent of disease.

Keywords: adnexal mass, computed tomography, simple cyst, complex cyst

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INTRODUCTION

An adnexal mass usually involves the ovary or fallopian tube.Adnexal masses are common in general population. It was reported that a pelvic mass will occur in about 20% of women at some time in their lives.[1]

The adnexal mass can be solid, cystic or both and it can be benign or malignant. The benign masses outnumber malignant ones with incidence of benign lesions maybe as high as 20% that includes lesions proven to be benign and that resolve spontaneously on follow up examination.[2-4] In postmenopausal high risk screening the prevalence of ovarian cancer was approximately 0.1%, and prevalence of histopathology proven benign masses ranged from 0.8-1.8%.[5-7]

Adnexal masses both, painful and asymptomatic are generally encountered in clinical practice. Ultrasound is usually the initial imaging tool of investigation.[8] Ultrasonography has sensitivity of 88% to 98% and specificity of 89% to 96%for identifying ovarian malignancy.[9-11]

When conventional ultrasound reveals complex morphology then other diagnostic tools can be used such as color Doppler, serum CA 125 levels, nuclear magnetic resonance imaging, and diagnostic laparoscopy in some cases.[12] Sensitivity and specificity of MRI for malignancy were 98% and 93%, respectively.[13] Once ultrasound suggests malignancy the next diagnostic tool is CT scan or MRI as a further tool to define the disease.[14]Accuracy of CT in predicting ovarian malignancy has been shown to be 90-95.5% where as its specificity is 88.7-93.7%.[15-16]

The sensitivity, specificity, and accuracy of combined application of ultrasound and CT in detecting pelvic mass were 89%, 94.7%, and 91.7%.[17]

CT is generally not intended for primary pelvic

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evaluation in women. However, due to wide spread use of abdominal-pelvic CT for various other indications there has been incidental detection of lesions as well.

METHODS

This was a retrospective hospital basedcross-sectional study conducted from April to September 2020 in the Department of Radiology in Nobel Medical College and Teaching Hospital, Biratnagar, Nepal.CT scans of 46 patients having both non-contrast images followed by contrast study of abdomenfrom diaphragm up to the symphysis pubis done in Nobel Medical College were included in this study.

Most of the cases were of patients with ultrasonographically detected adnexal masses referred from Obstetrics and Gynaecology department and evaluated by CT in the Department of Radiology. Some of the casesin this study also included incidental findings on CT scan of abdomino-pelvic region done for various indications other than adnexal masses.

RESULTS

A total of 46 cases were studied for CT findings of adnexal masses.The mean age in this study was 41.3±16.43 years (range 10-74). The frequency of adnexal masses was found to be most common at 30-39 years and 40-49 years age group. [Table-1]

Table-1: Age distribution of adnexal masses (N=46)

Age in years	Frequency	Percentage
<20	2	4.3
20-29	8	17.4
30-39	13	28.3
40-49	13	28.3
50-59	1	2.2
60-69	4	8.7
≥ 70	5	10.9

Dermoid cyst (35%) was found mostly in the younger age including the youngest case in this study. [Image-1]

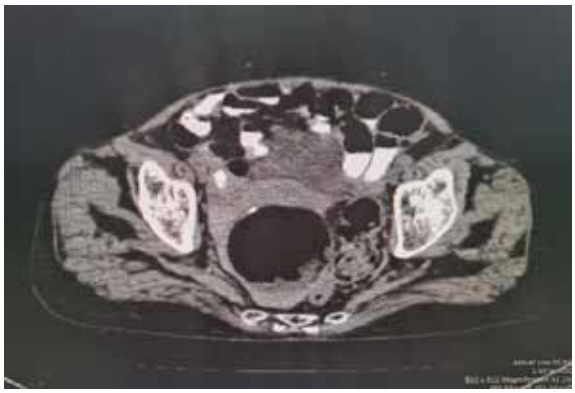

Image-1:CT image of right adenxal mass with fat (white arrow) and soft tissue (black arrow) components diagnosed as dermoid.

Most of the CT scan features of adnexal masses were benign (86%) compared to (13%) with malignant features. Most of the malignant mass was solid with necrosis and some of the lesions presenting as complex cysts whereas most benign lesions presented as simple or complex cysts.Malignant masses were associated with ascites (66%) and peritoneal deposits (33%).Most of the adnexal masses were unilateral 89% (n=41) with no significant difference in right (21) and left ovary (20).Of the complex cysts most common lesion was dermoid cysts 35% (n=10) followed by cystadenoma 28% (n=8). There were seven incidentalfindings as adnexal masses diagnosed on CT scan namely three follicular cysts, two simple cysts and two dermoid cysts.[Table-2]

Table-2: CT features with distribution according to location

CT features	Unilateral	Bilateral	Total
Complex cyst	26	2	28 (61%)
Simple cyst	10	2	12 (26%)
Solid	5	1	6 (13%)

Ascites was also noted in four benign condition associated with inflammatory conditions (oophoritis and infected dermoid cyst) and simple benign cysts. Almost all of the malignant masses were at and above 40 years of age.[Image-2]

Image-2: CT image of large multiloculated cystic lesion-cystadenoma (2a) and solid mass with necrosis (black arrow) and associated ascites (white arrow) diagnosed as malignant condition (2b)

DISCUSSION

Adnexal masses are common findings in population. Most of the lesions that are suspected clinically are investigated with ultrasonography as the mainstay tool with MRI and CT scan as modality for additional information whilst some of the lesions are diagnosed incidentally when investigations like ultrasonography, CT, MRI are done for various other reasons.

Most pelvic masses are benign conditions while others may be malignant. Ovarian cancer (1.9 per 100,000 populations) is the fourth most common cancer in females in Nepal.[18]

In this study most of the lesions were found to be benign 86% and only 13% were found to be malignant. Similar findings were also observed by KC et al,[19] Radhamani et al[20] and Tamrakar et al.[21]

Malignant lesions were seen in women of age 40 years and above where as benign ovarian lesions were more common in premenopausal women. Incidence of ovarian cancer was found in postmenopausal agegroup which is comparable to other studies of Mondal et al[22] and Mubrak et al.[23]

The age incidence of adnexal mass was found to be more common in age group 30-40 and 40-50 years. Similar age incidence was also found in ovarian lesions study by Maharjanet al.[24]

Only 10% of adnexal masses were found to be bilateral. The finding is comparable to study of Pradhaet al[25] and Ranabhat et al.[26] There was no significant difference in prevalence of masses in right or left ovary in this study. However, higher prevalence of masses in the right ovary compared to left ovary was found in a study by Bagdeet al[27]and higher prevalence was found in the left ovary by Kaldha et al.[28]

Adnexal abnormalities in pediatric patient though not common are not rare. In this study single case of dermoid cyst was found in pediatric group. Benign teratomas comprised of 67% of pediatric ovarian neoplasms as noted by Outwater EK et al[29] and Smorgick N et al.[30]

Almost all of the malignant masses were solid with necrosis and one complex cyst was described to be malignant. Ascites was the most common associated findings with these lesions followed by peritoneal deposits. This is comparable with the study by Pandaet al.[31]

In this study complex, simple and solid cysts were 61%, 26% and 13% respectively. Modesitt et al have noted that the risk of a unilocular ovarian cyst less than 10 cm being malignant is less than 0.1%.[32]

Dermoid cysts (35%) were the most common complex lesions that were characterized as benign neoplastic lesion followed by cystadenoma (28%). This finding was comparable to study by Singhet al.[33]

The lesions that had benign features were most commonly described as complex cyst or solid-cysticin consistency. However Khalda et al[28] have noted that cystic consistency was the most common benign adnexal masses in their study. This could be because in this study dermoid cyst was the most common benign lesion having fat, soft tissue, fluid and calcifications.

It should also be noted that 15 % of the total cases were incidental findings with follicular cyst as the

most common findings. The finding is comparable to findings of Smith-Bindman et al where this was a frequently encountered incidental and normal findings on pelvic imaging.[34]

Limitations of this study were lack of histopathological correlation as well as small sample size.

CONCLUSIONS

CT scan can aid in cystic and solid component characterization based on different densities. It can also play a role in assessing extent of the disease and help in planning for treatment.

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