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Radiology

An Identification of Suspicious Ovarian Masses Using USG & CT Techniques: A Study in a Tertiary Care Hospital, Jamalpur, Bangladesh

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Abstract **Original Research Article**

Radiological checking for pelvic masses in women are very conflicting in different age groups. A pelvic mass may have gynaecologic origin or arise from urinary tract or intestines and since pelvic and ovarian masses with benign or malignant types might occur with different percentages at different ages. The importance of primary diagnosis and choosing proper surgical procedure is highly emphasized. The present study was conducted in several private clinics in Jamalpur District, Bangladesh during the period from June 2018 to May 2019. Sixty (60) patients of Histopathology confirmed cases of malignancies of nose and Para nasal sinuses are studied with regard to their clinical presentation, radiology, histopathology and treatment protocols. All the selected patients were subjected to detailed history, physical examination, ultrasonography and CT scan. Patients with ovarian masses and scheduled for surgery were included in this study, and patients with ovarian masses managed conservatively were excluded. Detailed history of allergy and renal function tests were taken before doing CT scan. USG should continue to be the primary radiological modality in evaluation of ovarian masses even today when cross sectional imaging has largely taken over gynecological imaging. We found 58.33% in premenopausal stage and 41.66 in postmenopausal stage. In pre-menopausal stage, 41.66% were benign and 16.66% were malignant and in post-menopausal stage 23.33% were malignant and 18.33% were benign. We found CT scan comparatively better to detect ovarian masses. In CT, sensitivity and specificity were 97% and 92% in benign group and 84% and 89% were malignant group. On the other hand in USG, sensitivity and specificity were 86% and 62% in benign group and 62% and 89% were in malignant group. However, if a lesion remains indeterminate on USG or is suspicious for malignant potential, CT is advised as the second radiological modality pertaining to its high sensitivity for evaluating malignant lesion and associated features of metastasis and local disease extent.

Keywords: USG, CT techniques, ovarian masses.

INTRODUCTION

In 2012, new cases occurred in approximately 239,000 women. In 2015 it was present in 1.2 million women and resulted in 1, 61,100 deaths worldwide [1]. Among women it is the seventh-most common cancer and the eighth-most common cause of death from cancer. The typical age of diagnosis is 63. Death from ovarian cancer is more common in North America and Europe than in Africa and Asia [2]. Early signs and symptoms of ovarian cancer may be absent or subtle. In most cases, symptoms exist for several months before being recognized and diagnosed. Symptoms can be misdiagnosed as irritable bowel syndrome. The early stages of ovarian cancer tend to be painless. Symptoms can vary based on the subtype. Low malignant potential (LMP) tumors, also known as borderline tumors, do not cause an increase in CA125 levels and are not identifiable with an ultrasound. The typical symptoms of an LMP tumor can include abdominal distension or pelvic pain. Particularly large masses tend to be benign or borderline [3].

Suspicious Ovary Masses
Source: Google

The most typical symptoms of ovarian cancer include bloating, abdominal or pelvic pain or discomfort, back pain, irregular menstruation or postmenopausal vaginal bleeding, pain or bleeding after or during sexual intercourse, loss of appetite, fatigue, diarrhea, indigestion, heartburn, constipation, nausea, feeling full, and possibly urinary symptoms (including frequent urination and urgent urination) [4]. Use of fertility medication may contribute to borderline ovarian tumor formation, but the link between the two is disputed and difficult to study. Fertility drugs may be associated with a higher risk of borderline tumors. Those who have been treated for infertility but remain nulliparous are at higher risk for epithelial ovarian cancer; however, those who are successfully treated for infertility and subsequently give birth are at no higher risk. This may be due to shedding of precancerous cells during pregnancy but the cause remains unclear. The risk factor may instead be infertility itself, not the treatment [5]. Hormonal conditions such as polycystic ovary syndrome and endometriosis are associated with ovarian cancer, but the link is not completely confirmed. Postmenopausal Hormone Replacement Therapy (HRT) with estrogen likely increases the risk of ovarian cancer. The association has not been confirmed in a large-scale study, but notable studies including the Million Women Study have supported this link. Postmenopausal HRT with combined estrogen and progesterone may increase contemporaneous risk if used for over 5 years, but this risk returns to normal after cessation of therapy. Estrogen HRT with or without progestin's increases the risk of endometriosis and serous tumors but lowers the risk of mucinous tumors. Higher doses of estrogen increase this risk. Endometriosis is another risk factor for ovarian cancer, as is pain with menstruation. Endometriosis is associated with clear-cell and endometriosis subtypes, low-grade serous tumors, stage I and II tumors, grade 1 tumors, and lower mortality [5]. Before menopause, obesity can increase a person's risk of ovarian cancer, but this risk is not present after menopause. This risk is also relevant in those who are both obese and have never used HRT. A similar association with ovarian cancer appears in taller people [6]. Ovarian cancer forms when errors in normal ovarian cell growth occur. Usually, when cells grow old or get damaged, they die, and new cells take their place. Cancer starts when new cells form unneeded, and old or damaged cells do not die as they should. The buildup of extra cells often forms a mass of tissue called a growth or tumor. These abnormal cancer cells have many genetic abnormalities that cause them to grow excessively. When an ovary releases an egg, the egg follicle bursts open and becomes the corpus luteum. This structure needs to be repaired by dividing cells in the ovary. Continuous ovulation for a long time means more repair of the ovary by dividing cells, which can acquire mutations in each division [7]. Ovarian cancer's early stages (I/II) are difficult to diagnose because most symptoms are nonspecific and thus of little use in diagnosis; as a result, it is rarely diagnosed until it spreads and advances to later stages (III/IV). Additionally, symptoms of ovarian cancer may appear similar to irritable bowel syndrome. In patients in whom pregnancy is a possibility, BHCG level can be measured during the diagnosis process. Serum alpha-fetoprotein, neuron-specific enolase, and lactate dehydrogenase can be measured in young girls and adolescents with suspected ovarian tumors as younger patients are more likely to have malignant germ cell tumors [8]. A physical examination, including a pelvic examination, and a pelvic ultrasound (transvaginal or otherwise) are both essential for diagnosis: physical examination may reveal increased abdominal girth and/or ascites (fluid within the abdominal cavity), while pelvic examination may reveal an ovarian or abdominal mass. An adnexal mass is a significant finding that often indicates ovarian cancer, especially if it is fixed, nodular, irregular, solid, and/or bilateral. 13–21% of adnexal masses are caused by malignancy; however,

there are other benign causes of adnexal masses, including ovarian follicular cyst, leiomyoma, endometriosis, ectopic pregnancy, hydrosalpinx, tub ovarian abscess, ovarian torsion, dermoid cyst, cyst adenoma (serous or mucinous), diverticular or appendicular abscess, nerve sheath tumor, pelvic kidney, ureteral or bladder diverticulum, benign cystic mesothelioma of the peritoneum, peritoneal tuberculosis, or par ovarian cyst. Those with a genetic predisposition may benefit from screening. This high risk group has benefited with earlier detection [9]. Ovarian cancer has low prevalence, even in the high-risk group of women from the ages of 50 to 60 (about one in 2000), and screening of women with average risk is more likely to give ambiguous results than detect a problem which requires treatment. Because ambiguous results are more likely than detection of a treatable problem, and because the usual response to ambiguous results is invasive interventions, in women of average risk, the potential harms of having screening without an indication outweigh the potential benefits. The purpose of screening is to diagnose ovarian cancer at an early stage, when it is more likely to be treated successfully [10]. Screening with trans-vaginal ultrasound, pelvic examination, and CA-125 levels can be used instead of preventive surgery in women who have BRCA1 or BRCA2 mutations. This strategy has shown some success [11]. Hence based on above findings the present study was planned to evaluate the clinical assessment of suspicious ovarian masses by using USG & CT techniques.

OBJECTIVES

- **General Objectives:** To assess suspicious ovarian masses using USG & CT Techniques.
- **Specific Objective:** To identify type of masses in women in Bangladesh.

METHODOLOGY

The present study was conducted in several private clinics in Jamalpur District, Bangladesh during the period from June 2018 to May 2019. Sixty (60) patients of Histopathology confirmed cases of malignancies of nose and Para nasal sinuses are studied with regard to their clinical presentation, radiology, histopathology and treatment protocols. With regard to their clinical presentation, radiology, histopathology and treatment protocols. All the selected patients were subjected to detailed history, physical examination, ultrasonography and CT scan. Patients with ovarian masses and scheduled for surgery were included in this study, and patients with ovarian masses managed conservatively were excluded. Detailed history of allergy and renal function tests were taken before doing CT scan and if there was history of allergy then non-ionic contrast was used. All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study. Following was the inclusion and exclusion criteria for the present study.

Inclusion Criteria

- Only those patients willing to participate in the study were included.
- Patients referred to the radiology department for ovarian lesions investigation, and found to have positive findings, were included in this study.
- All accidentally diagnosed cases of ovarian lesions were also be included in this study.

Exclusion Criteria: Patients presenting to radiology department not willing for examination or written consent, were excluded from this study.

RESULTS

Ultimate diagnosis of an ovarian mass is a common problem in the gynecologic practice. The main clinical problem with this disease is the asymptomatic and undetectable nature of the cancer in the earliest stages. Determination of a degree of suspicion for malignancy in an adnexal mass is the most significant step after identification of the mass. Among sixty (60) study participants, we found 58.33% in premenopausal stage and 41.66 in postmenopausal stage. In pre-menopausal stage, 41.66% were benign and 16.66% were malignant and in post-menopausal stage 23.33% were malignant and 18.33% were benign. We found CT scan comparatively better to detect ovarian masses. In CT, sensitivity and specificity were 97% and 92% in benign group and 84% and 89% were malignant group. On the other hand in USG, sensitivity and specificity were 86% and 62% in benign group and 62% and 89% were in malignant group.

DISCUSSION

The accuracy of any diagnostic test is of great concern to the gynecologists in making the serious decision either to perform radical surgery or conservative surgery owing to the presence of growing number of conservative therapies and laparoscopic surgical techniques for ovarian tumors [12]. Therefore, radiological evaluation is pivotal in characterization of an ovarian mass suggesting the probable etiology of the mass and distinguishing between benign and malignant masses [13]. The results of radiologic assessments helps decide the surgeon about whether the therapeutic approach needs to be surgical or conservative [14]. Transabdominal Ultrasonography remains the study of choice in initial assessment of suspected ovarian masses because it is relatively inexpensive, noninvasive, and widely available. Excellent results of US for recognition of adnexal masses have been confirmed in several studies, which have demonstrated that 60% to 97% of ovarian masses may be visualized sonographically, and 93% to 97% of ovarian masses may be characterized by sonographic morphology [15].

Table-1: Type of Masses in the study participants (n=60)

	Pre-menopausal N	%	Post-menopausal N	%
Malignant	10	16.66	14	23.33
Benign	25	41.66	11	18.33
Total	35	58.33	25	41.66

Table-2: Sensitivity and Specificity of USG and CT (n=60)

	USG Study		CT Study	
	Benign	Malignant	Benign	Malignant
Sensitivity	86%	62%	97%	84%
Specificity	62%	89%	92%	89%
Positive Predictive Value	87%	61%	96%	76%
Negative Predictive value	62%	85%	93%	95%

CT is most useful for evaluating the extent of disease in the abdomen and pelvis. In some studies, CT has demonstrated reasonable accuracy in determining which patients may have tumor implants that can be optimally surgically debulked (ie, all tumor nodules greater than 2 cm can be removed) [16, 17]. Examined the accuracy of grey scale ultrasound in delineating a malignant ovarian mass based on size and appearance. In that study fixed septa, tumor size exceeding 5cm, and multiloculations were considered warning for ovarian malignancy. The sensitivity of CT scan for all ovarian cancer detection was greater than that of TAUS 83% vs. 67%, but TAUS was more specific. Both methods were equally efficacious in detecting and staging advanced ovarian cancer cases. Over all CT did not offer significant additional features and did not result in a change in management plan in any of the patients reviewed. Both methods were almost equally efficacious in detecting ovarian cancer cases [18]. Clinical evaluation with regards to site (unilateral or bilateral), fixity, consistency, presence of nodules in douglas pouch and presence of as cites increase the suspicious of malignancy to certain extent but if combined with other tools as tumor markers and two dimensional ultrasounds, the sensitivity for malignancy increases [19].

Among women with ovarian disorders, CT has been used primarily in patients with ovarian malignancies, either to assess disease extent prior to surgery or as a substitute for second look laparotomy. And moreover, simple ovarian cysts are better evaluated by ultrasound. Jeong *et al*., showed that morphological characteristics associated with strong probability of malignancy were the presence of solid component (63%), papillary projection (92%), and free fluid in peritoneal cavity (56%) [20]. Ultrasound and computed tomography plays an important role in the diagnosis, preoperative staging, and evaluation of tumor recurrence of ovarian carcinoma. Ovarian carcinoma has characteristic tumor appearances and modes of tumor spread within the peritoneal cavity. By recognizing these features, the radiologist can assist the clinicians in treatment planning. As benign ovarian tumors greatly outnumber the malignant ones determination of a degree of suspicion for malignancy is critical and is largely based on imaging modalities. Unfortunately, graded compression Ultrasonography is operator-dependent and requires a high level of skill and expertise. A radiologist showed comparative diagnostic values of grey-scale US study also indicated that these patient-related factors limited versus CT scan in the primary management of the diagnostic capability of Ultrasonography. Gynecological pelvic mass with emphasis on ovarian cancer. Some studies reported that CT is an accurate way of detection and staging.

LIMITATIONS OF THE STUDY

This study was conducted in one districts with small sample size, which may not reflect the scenarios of the whole country.

CONCLUSION AND RECOMMENDATION

USG is to be the primary radiological modality in evaluation of ovarian. A lesion remains indeterminate on USG or is suspicious for malignant potential. CT is advised as the second radiological modality with high sensitivity for evaluating malignant lesion and associated features of metastasis and local disease extent.

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