

Evaluation of Alcazar Scoring System to Differentiate Between Benign and Malignant Ovarian Masses- A Nepalese Perspective

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ABSTRACT:

Introduction: Ovarian cancer is the fifth most common cancer in Nepalese females and the tenth overall, accounting for 5% of the total new cases of cancer in females in 2020. Ultrasonography (USG) remains the primary tool for diagnosis and characterization of ovarian masses in which many grey-scale and Doppler characteristics are evaluated. Various scoring systems have been described incorporating different USG parameters to differentiate benign and malignant nature of the ovarian masses. Alcazar scoring system includes both grey-scale as well as Doppler characteristics of the ovarian masses and is one of the more widely used systems worldwide. **Methods:** This was an observational cross-sectional study based on 52 consecutive patients who were clinically suspected to have ovarian mass and referred for USG evaluation and who subsequently underwent surgery. **Results:** As confirmed by histopathology, 37 cases were benign and 15 were malignant masses. Alcazar system of scoring identified 34 out of 37 benign cases and 15 out of 15 malignant cases with sensitivity and specificity for diagnosing malignant cases of 83.3% and 91.1% respectively. **Conclusion:** Alcazar system of scoring is a highly effective tool to differentiate between benign and malignant ovarian masses and can be of great help in diagnosis, characterization and effective preoperative planning.

Keywords: Alcazar scoring system, Doppler, Histopathology, Ovarian mass

INTRODUCTION:

Ovarian cancer ranks fifth in cancer among Nepalese females and tenth overall. It accounted for 5% of total new cases of cancer in females in 2020.[1] Worldwide it ranks fifth in cancer deaths in females[2]. Ultrasonography (USG) remains the primary tool for diagnosis and characterization of ovarian masses in which many grey-scale and Doppler characteristics are evaluated. The grey-scale characteristics correlate with gross morphology of the mass. The color Doppler in combination with spectral Doppler evaluates the

qualitative and quantitative blood flow measurements of the masses and thus increases the overall sensitivity. There is a substantial overlap of morphological features between the benign and malignant ovarian masses and as such no single parameter can be deterministic. Hence, various scoring systems have been described incorporating different USG parameters to differentiate between benign and malignant nature of the ovarian masses. Among them are the Alcazar scoring system[3], De Priest Scoring system[4], Sassone scoring system[5] and Ferrazzi scoring system[6] commonly used in clinical practice. Alcazar scoring system includes both grey-scale as well as Doppler characteristics of the ovarian masses and is one of the more widely used systems worldwide. This study was done to evaluate the Alcazar scoring system in a tertiary care center in Nepal.

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METHODS:

This was an observational cross-sectional study based on 52 consecutive patients who underwent USG

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evaluation between September 2019 to August 2020 in the USG unit of the department of Radiodiagnosis and Imaging in Lumbini Medical College and Teaching Hospital (LMCTH). All the patients who were clinically suspected to have ovarian mass and referred for USG evaluation and who subsequently underwent surgery were included in the study after ethical approval from the Institutional Review Committee (IRC-LMC 01-F/021). The cases where histopathology was not available were excluded from the study. All the patients were examined by transabdominal sonography (TAS) in supine position wherein whole of the abdomen and pelvis was scanned using Acuson NX3 USG machine (Siemens, Germany). Any ovarian masses were identified and evaluated using both grey-scale and Doppler flow imaging. Transvaginal scanning (TVS) was done in cases where TAS was doubtful or suboptimal as it is proven to have a higher sensitivity[7]. The grey scale parameters included size of the mass, echogenicity, presence or absence of solid components, thick papillary projections (>3 mm), and

septation and its thickness. The Doppler parameters evaluated were presence or absence of blood flow, location of flow (central or peripheral), peak systolic velocity (PSV, considered high flow when >10cm/sec), resistive index (RI, considered low when <0.45). When more than one vessel was noted, the highest PSV and lowest RI were considered. The data were entered and analyzed using Statistical Package for Social Sciences (SPSS™) software version 20. The data thus obtained were used to calculate the individual score of each patient according to Alcazar scoring system (Table 1) which was then compared with the histopathological diagnosis to evaluate its diagnostic efficacy in terms of sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). The descriptive results were presented in terms of mean, standard deviation, frequency and percentage. Chi Square test was used for inferential statistics. A p-value <0.05 was considered statistically significant.

Table 1. Alcazar Scoring System

Score	Thick papillary projections	Solid areas or purely solid echogenicity	Blood flow location	Velocimetry
0	Absent	Absent	Absent or peripheral	Other
2	Present	-	-	High velocity or low resistance
4	-	Present	Central	-

Benign: Score <6; Malignant: Score ≥6

RESULTS:

A total of 52 cases were evaluated during the study period out of which 37 cases were benign masses and 15 were malignant masses confirmed by histopathology considered as the gold standard. The age of the patients ranged from 19 to 78 years with a mean age of 40.56 (\pm 14.9) years. Alcazar system of

scoring identified 34 out of 37 benign cases and 15 out of 15 malignant cases as shown in Table 2.

The sensitivity and specificity for diagnosing malignant cases were 83.3% and 91.1% respectively. Moreover the PPV and NPV for malignant masses were 83.3% and 100% respectively as shown in Table 3.

Table 2. Socio-demographic and behavioral characteristics of the study population (n=243)

Alcazar Score	Histopathology		Total
	Benign	Malignant	
0-5 (benign)	34 (34/37=91.9%)	0 (0%)	34 (65.4%)
≥6 (malignant)	3 (3/37=8.1%)	15 (15/15=100%)	18 (34.6%)
Total	37	15	52 (100%)

Table 3: Efficacy of Alcazar system in diagnosing malignant cases

Statistical parameters	Percentage
Sensitivity	83.3%
Specificity	91.1%
Positive Predictive Value (PPV)	83.3%
Negative Predictive Value (NPV)	100%

DISCUSSION:

Many different scoring systems have been formulated in an attempt to differentiate benign and malignant ovarian masses like DePriest scoring system, Sassone scoring system and Ferrazzi scoring system. These scoring systems however consider only the

grey-scale parameters. Alcazar scoring system on the other hand uses both the grey-scale as well as the Doppler flow parameters and thus has been found to have better results in different studies. Our study found a high sensitivity and specificity of Alcazar scoring system in diagnosing malignant ovarian masses and this finding was similar to studies done by Desai et al.[8], Sahu M et al.[9] and Chaudhari et al.[10].

We found that there was a statistically significant correlation between thick papillary projections and malignancy of the ovarian mass ($p=0.03$). This observation is similar to the studies done by Alcazar et al.[3] and Chaudhari et al.[10] Serous cystadenoma, dermoid and hemorrhagic cysts are the few benign masses which showed papillary projections. Although papillary projections are considered typical of the epithelial stromal tumors of the ovary, clots and other amorphous material can easily mimic them. In a study by Hassen et al.[11], it was found that vascularity within the papillary projections was significant for malignancy and calcification within the papilla was suggestive of benign nature. However, Alcazar system considers size of the papilla and not the vascularity.

We also observed a statistically significant correlation between solid components of the tumor mass with its malignant nature ($p<0.05$) as was reported by Chaudhari et al.[10] and Sahu M et al.[9] Some benign masses such as dermoid cysts

and chocolate cysts can present with solid areas and increased echogenicity which may result into false positive cases. Similarly central blood flow and high velocity/low flow were also noted to be statistically significant (<0.05) individual predictors of the malignant nature of the masses. These findings were similar to those of Alcazar et al.[3], Sahu M et al.[9] and Desai et al.[8]

The major limitation of our study was its small sample size. Therefore further studies with larger sample size would be desirable. A more elaborate study comparing different scoring systems would be more conclusive.

CONCLUSION:

Alcazar system of scoring is a highly effective tool to differentiate between benign and malignant ovarian masses. Because of its simplicity and easy availability with no associated radiological hazards, this system can be of great help in diagnosis, characterization and effective preoperative planning for ovarian masses.

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Conflict of interest:

None Declared.

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