

International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622
© Gynaecology Journal
www.gynaecologyjournal.com
2019; 3(4): 137-139
Received: 04-05-2019
Accepted: 06-06-2019

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To study the diagnostic role of various risks of malignancy indices (RMI 1, 2, 3, 4) in the pre-operative evaluation of adnexal masses and to compare the four Rmi with each other in terms of various statistical parameters

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DOI: <https://doi.org/10.33545/gynae.2019.v3.i4c.302>

Abstract

Background: The present study Women presenting with acute or chronic abdominal pain along with an adnexal mass in routine as well as emergency hours. 200 females meeting the inclusion criteria during the study period, 100 in premenopausal and 100 in postmenopausal group after informed consent.

Result: RMI 1 has the highest sensitivity, specificity and accuracy amongst overall population in the present study. Individual parameters including CA125 and Ultrasound findings have poor specificity and sensitivity respectively, thereby decreasing their accuracy as an individual screening tool in overall population.

In premenopausal females, the values of all the statistical parameters of these screening tools decreases as these are mainly based on serum CA125 levels, which is a marker of epithelial ovarian malignancies.

In postmenopausal females, the accuracy of all these screening tools increases due to high prevalence of epithelial ovarian cancers in postmenopausal females. RMI 1 has the highest sensitivity, while RMI 4 shares the highest specificity due to its high cut off value of 450. Overall, RMI 1 and RMI 3 have similar accuracy as a screening tool.

Conclusion: The present study also concludes that RMI scoring system has better accuracy in comparison to the individual parameters like post-menopausal status, CA125 or ultrasound score as a screening tool in cases of suspicious ovarian malignancies. RMI 1 turned up as the most accurate tool for screening purposes with a sensitivity, specificity and accuracy of 89.93%, 86.11% and 85.5% respectively when compared to the gold standard of diagnosis.

Considering the high fatality to case ratio of ovarian malignancies, RMI provides us with an opportunity of detecting ovarian malignancy at an earlier stage and thereby improving the prognosis and overall survival of patients.

Keywords: Malignancy, Adnexal Masses, RMI & Diagnostic.

Introduction

A complete history, physical examination concentrating on the presentation of patient, her symptoms at presentation, and further signs of infection or neoplasm is necessary to determine the etiology of a pelvic mass. It guides us most importantly whether the patient requires any intervention on emergency basis.^[1]

Detailed general examination and systemic examination is a must. The bimanual examination is helpful in estimating the size, location, consistency and mobility of a mass. The rectovaginal examination allows assessment of the posterior uterine surface, the uterosacral ligaments, the parametria, the pouch of Douglas and the rectum.^[2]

Risk malignancy index (RMI) is a simple scoring system based on three factors serum CA 125, USG score & menopausal status. It is very useful in predicting a malignant ovarian mass. It is also useful in differentiating malignant from benign ovarian mass.

Currently clinical examination, ultrasonographic assessment, CECT, MRI and tumor markers are routinely done at our institute to evaluate patients with ovarian masses. This study was designed to study the distribution of adnexal masses in premenopausal and post-menopausal females and to evaluate the validity of RMI scoring system as a screening tool in ovarian

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malignancies.^[3]

Material & Method

The present study entitled “To study the diagnostic role of various risks of malignancy indices (RMI 1, 2, 3, 4) in the pre-operative evaluation of adnexal masses and to compare the four RMI with each other in terms of various statistical parameters” was conducted in the Department of Obstetrics and Gynaecology, People's College of Medical Sciences & Research Centre, Bhopal during the period of 18 months from September 2016 to February 2018. This was a prospective type of cohort study. Study was done according to the regulations of the Institutional Ethics Committee.

Women presenting with acute or chronic abdominal pain along with an adnexal mass in routine as well as emergency hours. 200 females meeting the inclusion criteria during the study period, 100 in premenopausal and 100 in postmenopausal group after informed consent.

Statistical Analysis

Data was entered in Excel sheets and Statistical analysis is done

using SPSS software. Pearson Chi Square test was applied and p-value was calculated. P-value <0.05 is take statistically significant and >0.05 was taken statistically non-significant.

Inclusion criteria

1. Women presenting with acute or chronic pelvic conditions in routine as well as on emergency basis.

Exclusion criteria

1. Patients not giving consent to participate in study.
2. Patients who are cases of PID or documented ectopic pregnancies or PCOS.
3. Patients with advanced disease whom there are chances of loss of follow up.
4. Patients presenting with other co morbidities such as hypertension, diabetes or some other cancer syndrome.

Results

Table 1: Statistical parameters of serum CA125, Ultrasound, RMI 1, RMI 2, RMI 3 and RMI 4 in overall population

| Parameter | Sensitivity | Specificity | PPV | NPV | Accuracy |
|------------|-------------|-------------|-------|-------|----------|
| CA125 | 78.57 | 74.31 | 54.32 | 89.92 | 75.50 |
| Ultrasound | 57.14 | 84.72 | 59.26 | 83.56 | 77 |
| RMI 1 | 83.93 | 86.11 | 70.40 | 93.23 | 85.5 |
| RMI 2 | 82.14 | 77.77 | 58.97 | 91.80 | 79 |
| RMI 3 | 80.36 | 86.81 | 70.31 | 91.91 | 85 |
| RMI 4 | 80.36 | 85.42 | 68.18 | 91.79 | 84 |

RMI 1 has the highest sensitivity, specificity and accuracy amongst overall population in the present study. Individual parameters including CA125 and Ultrasound findings have poor

specificity and sensitivity respectively, thereby decreasing their accuracy as an individual screening tool in overall population.

Table 2: Statistical parameters of serum CA125, Ultrasound, RMI 1, RMI 2, RMI 3 and RMI 4 in premenopausal females:

| Parameter | Sensitivity | Specificity | PPV | NPV | Accuracy |
|------------|-------------|-------------|-------|-------|----------|
| CA125 | 66.67 | 71.91 | 28.57 | 92.75 | 71.15 |
| Ultrasound | 40 | 83.15 | 28.57 | 89.16 | 76.91 |
| RMI 1 | 60 | 85 | 40.91 | 92.68 | 81.73 |
| RMI 2 | 53.33 | 79.77 | 30.77 | 91.02 | 75.96 |
| RMI 3 | 46.67 | 86.52 | 36.84 | 90.59 | 80.77 |
| RMI 4 | 46.67 | 87.64 | 28.89 | 90.70 | 81.73 |

In premenopausal females, the values of all the statistical parameters of these screening tools decreases as these are mainly

based on serum CA125 levels, which is a marker of epithelial ovarian malignancies.

Table 3: Statistical parameters of serum CA125, Ultrasound, RMI 1, RMI 2, RMI 3 and RMI 4 in postmenopausal females:

| Parameter | Sensitivity | Specificity | PPV | NPV | Accuracy |
|------------|-------------|-------------|-------|-------|----------|
| CA125 | 82.93 | 78.18 | 73.91 | 86.00 | 80.21 |
| Ultrasound | 63.41 | 87.27 | 78.79 | 76.19 | 77.08 |
| RMI 1 | 92.7 | 87.3 | 84.44 | 94.11 | 89.58 |
| RMI 2 | 92.68 | 74.54 | 73.08 | 93.18 | 82.29 |
| RMI 3 | 92.68 | 87.27 | 84.44 | 94.12 | 89.58 |
| RMI 4 | 79.17 | 93.75 | 92.68 | 81.82 | 86.46 |

In postmenopausal females, the accuracy of all these screening tools increases due to high prevalence of epithelial ovarian cancers in postmenopausal females. RMI 1 has the highest sensitivity, while RMI 4 shares the highest specificity due to its high cut off value of 450. Overall, RMI 1 and RMI 3 have similar accuracy as a screening tool.

Discussion

According to one study conducted by Sinem Ertas *et al*, between

2010 and 2014, total of 408 patients with adnexal masses managed surgically. The risk of malignancy indices (RMI) 1, 2, 3 and 4 were calculated. Some 37.6 % of the cases were malignant in the postmenopausal group while 7.9 % were malignant in the premenopausal group. Pelvic pain was the most common complaint, and the majority of the cases were diagnosed at stage 3. The RMI 1, 2, 3 and 4 yielded percentage sensitivities of 76.1, 79.1, 76.1 and 76.1 and specificities of

91.5, 89.1, 90.6, 88.6, respectively. RMI 1 was the most reliable test in the general population which is consistent with the present study^[4].

According to RCOG guidelines for management of suspicious ovarian masses, after a systemic review of various studies, they have concluded that RMI 1 is the most effective for suspected ovarian masses. A recent systematic review³⁶ showed the pooled sensitivities and specificities of an RMI I score of 200 in the detection of ovarian malignancies to be:

RMI I sensitivity 78% (95% CI 71-85%), specificity 87% (95% CI 83-91%)^[5]. The results of present study are consistent with the RCOG guidelines with similar sensitivity and specificity.

The NICE guideline on ovarian cancer^[6] recommends that for women with suspected ovarian malignancy the RMI I score should be calculated and used to guide the woman's management.

The present study is also consistent with the study results of Rao-et-al, which showed sensitivity, specificity and diagnostic accuracy of 80.5%, 85.9% and 85% respectively^[7].

Conclusion

The present study also concludes that RMI scoring system has better accuracy in comparison to the individual parameters like post-menopausal status, CA125 or ultrasound score as a screening tool in cases of suspicious ovarian malignancies. RMI 1 turned up as the most accurate tool for screening purposes with a sensitivity, specificity and accuracy of 89.93%, 86.11% and 85.5% respectively when compared to the gold standard of diagnosis.

Considering the high fatality to case ratio of ovarian malignancies, RMI provides us with an opportunity of detecting ovarian malignancy at an earlier stage and thereby improving the prognosis and overall survival of patients.

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