

# International Ovarian Tumour Analysis (IOTA) Simple Ultrasound Rules and Risk of Malignancy Index in differentiating benign from malignant ovarian masses

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## BACKGROUND

- The seventh most common cancer diagnosis and eighth most common cause of oncological mortality in women across the globe has been known to be Ovarian cancers, they present at advanced stages and with vague symptoms, therefore high clinical suspicion and good diagnostic workup is the need of the hour.
- No single test for differentiating malignant from non malignant is conclusive.
- In the present study, comparison between two diagnostic algorithms, IOTA and RMI has been attempted.
- IOTA Simple Ultrasound Rules are derived using morphologic endpoints by B mode transvaginal imaging and endpoints of vascularity and blood flow by colour Doppler imaging followed by obtaining a standardized set of terms and definitions ( M rules and B rules).

M-rules	B-rules
M1: Irregular solid tumor	B1: Unilocular
M2: Presence of ascites	B2: Presence of solid component where the largest solid component has a largest diameter <7 mm
M3: At least four papillary structures	B3: Presence of acoustic shadows
M4: Irregular multilocular solid tumor with largest diameter ≥100mm	B4: Smooth multilocular tumor with largest diameter <100mm
M5: Very strong blood flow	B5: No blood flow

- RMI uses a combination of radiological, clinical and biochemical parameters which makes it simple yet practical.  $RMI = \text{product of U, M and absolute value of CA-125.}$

USG Score (U)	0 or 1	1
	≥ 2	4
Menopause (M)	Premenopausal	1
	Postmenopausal	4
CA-125		

Our hospital being a tertiary care centre of South Gujarat caters to a vast majority of ovarian cancer patients, therefore, early diagnosis and prompt treatment will lead to better patient survival and prognosis.

## OBJECTIVE

- Present study aims to determine the sensitivity and specificity of International Ovarian Tumor Analysis (IOTA) Simple Ultrasound Rules and Risk of Malignancy Index (RMI) in differentiating benign from malignant ovarian masses with respect to its different histopathological varieties.

## MATERIAL AND METHODS

Patients evaluated for ovarian masses at a tertiary care centre between June 2019 and February 2020 were prospectively assessed for eligibility

### INCLUSION CRITERIA:

- ≥ 5cm Ovarian tumours
- Age groups: Reproductive and menopausal

### EXCLUSION CRITERIA:

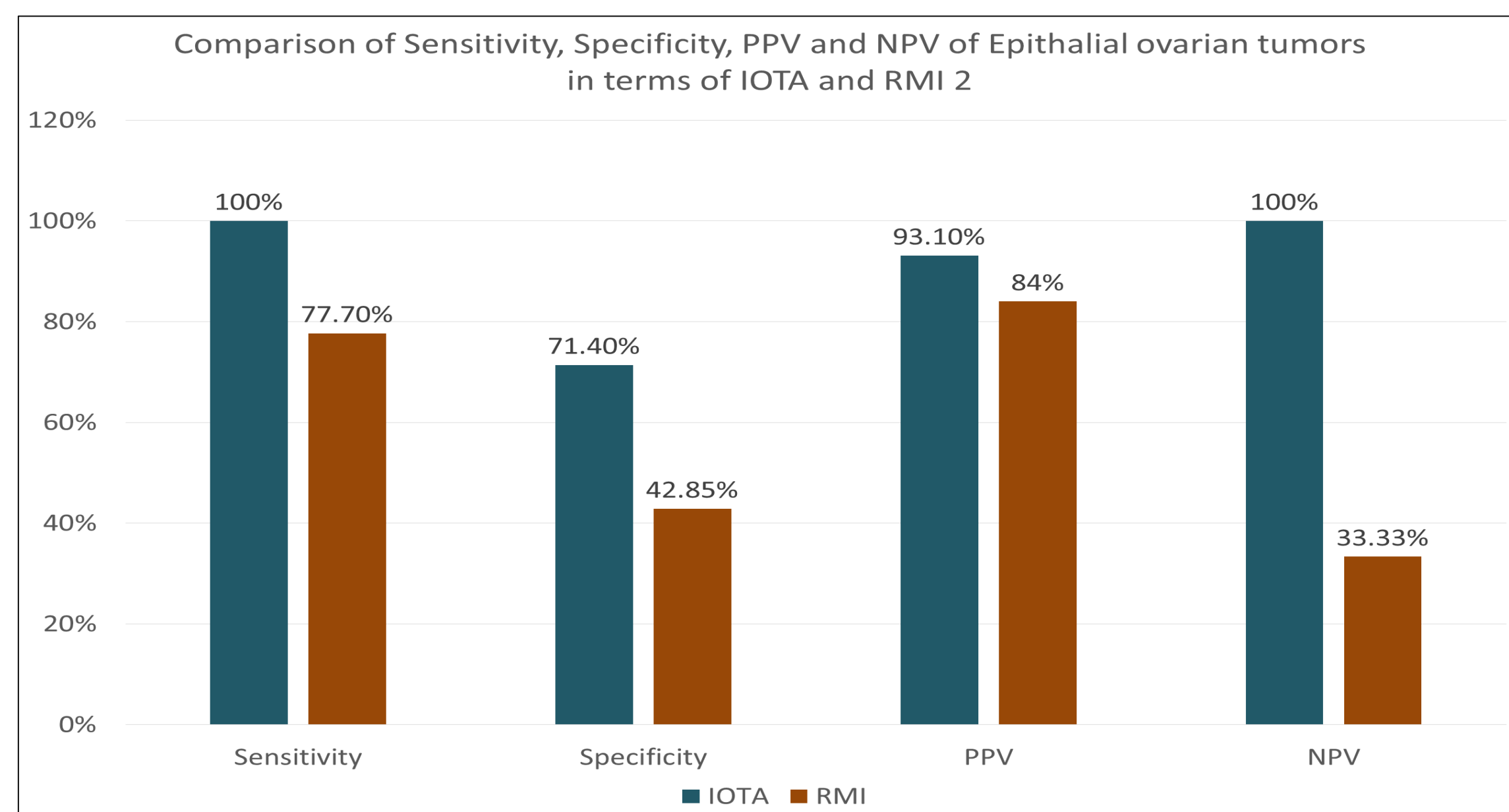
- < 5cm Ovarian tumours
- Pregnant patients
- Unwilling for surgery or chemotherapy at our institute

- History and Data recorded using standardised pretested proforma.
- Detailed examination and blood investigations including CA-125 done.
- USG done by gynaecologists, and tumours were assessed using both IOTA and RMI scoring scales.
- Treatment was continued as per departmental protocols

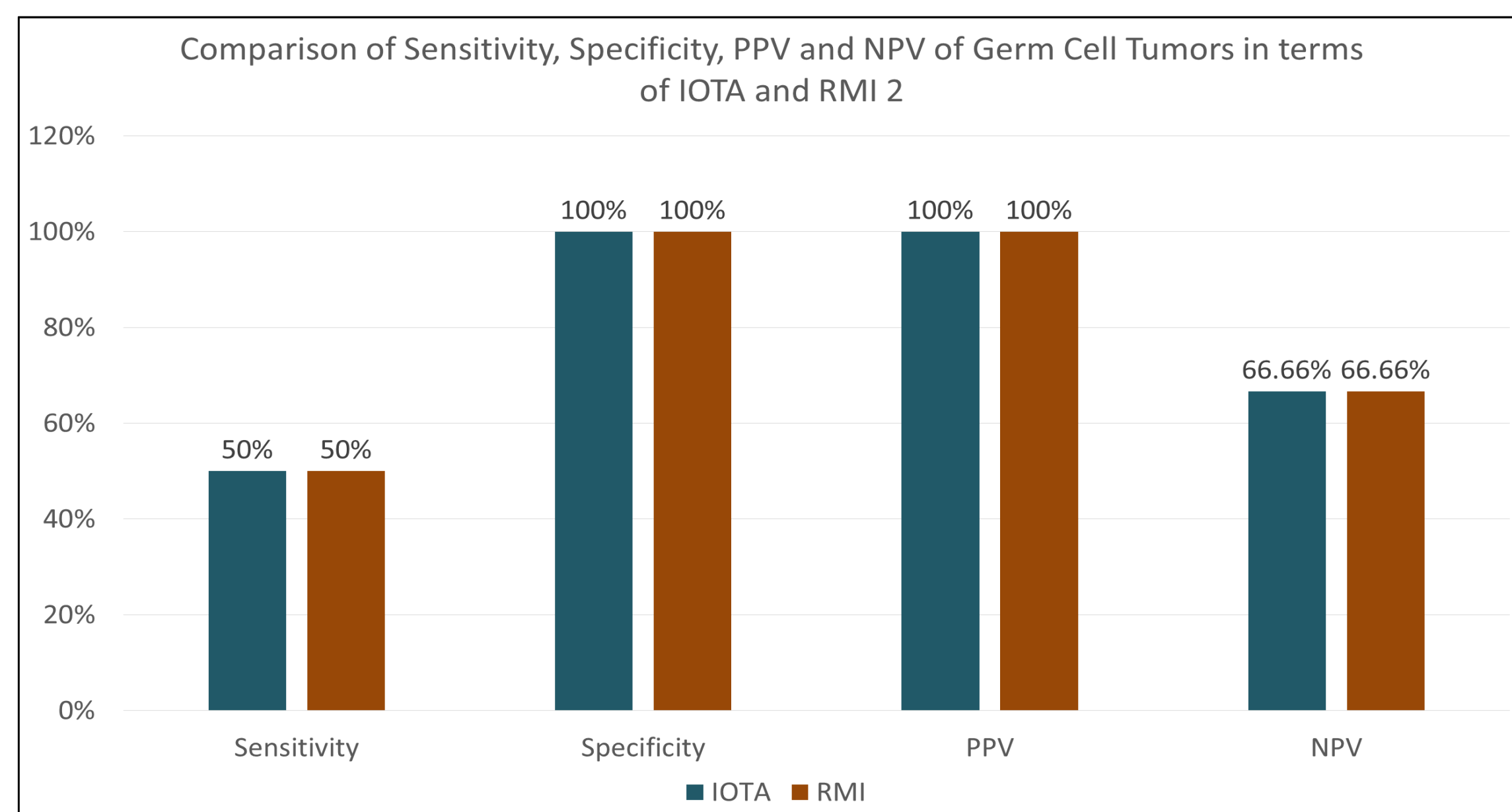
- After surgery, histopathology reports were obtained and compared against the respective scores obtained using IOTA and RMI scoring; and the sensitivity, specificity, PPV and NP of both scoring systems were assessed.

## RESULTS

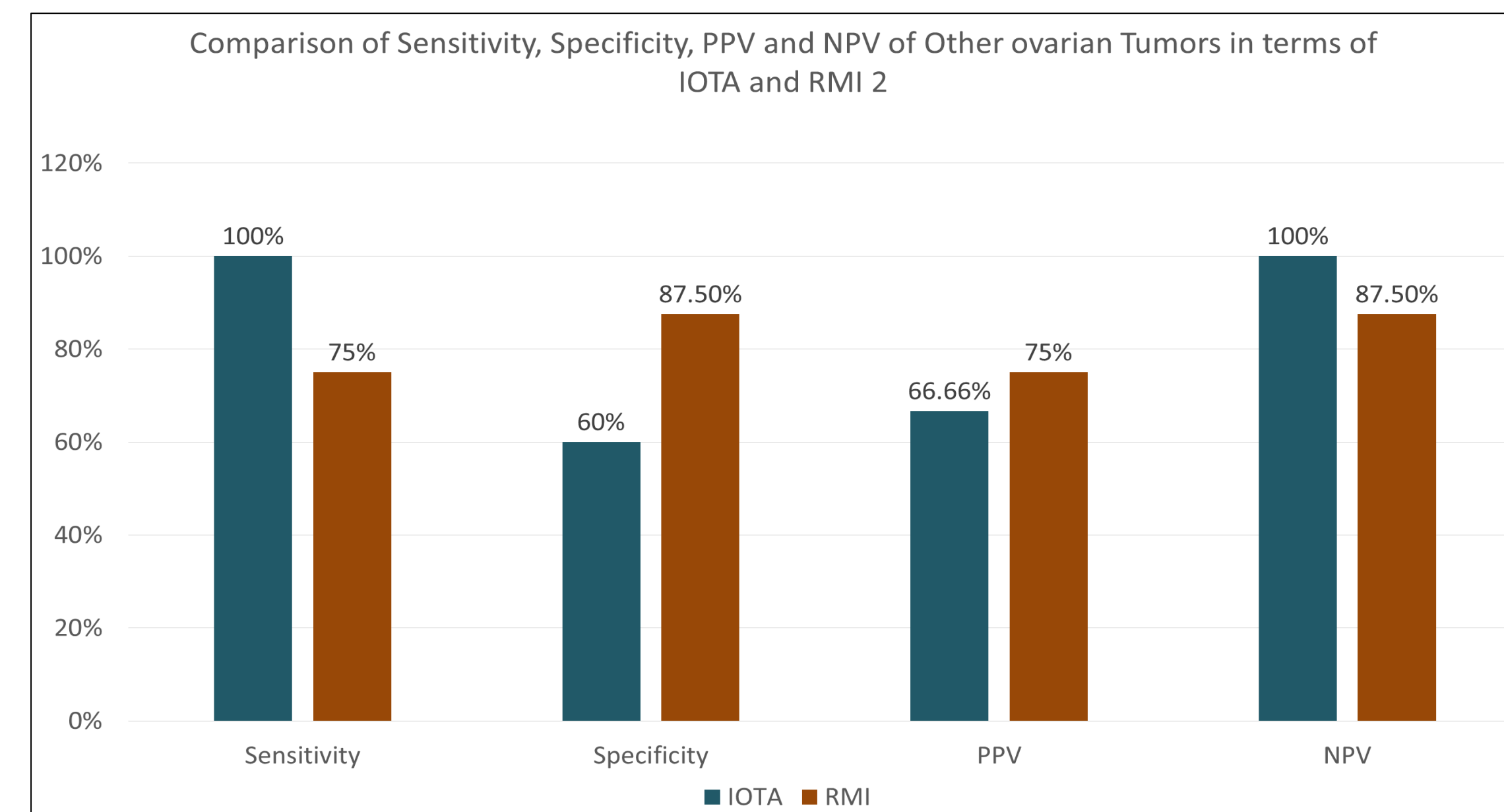
- In the present study, fifty patients with ovarian mass presenting to our institute fulfilling the inclusion criteria were enrolled.
- Ovarian tumours classified as indeterminate by IOTA Simple USG rules were :
  - Serous cystadenoma of ovary
  - Haemorrhagic ovarian cyst
  - Hydatid cyst of ovary
- Out of them, 17(34%) were benign and 33(66%) were malignant as per histopathology after surgery.
- The comparative values in terms of sensitivity, specificity, PPV and NPV of different histopathological varieties of ovarian masses as identified by IOTA Simple Ultrasound Rules and RMI 2 are as follows :



- For Epithelial tumours of ovary the sensitivity, specificity, PPV and NPV of IOTA is more than that of RMI.



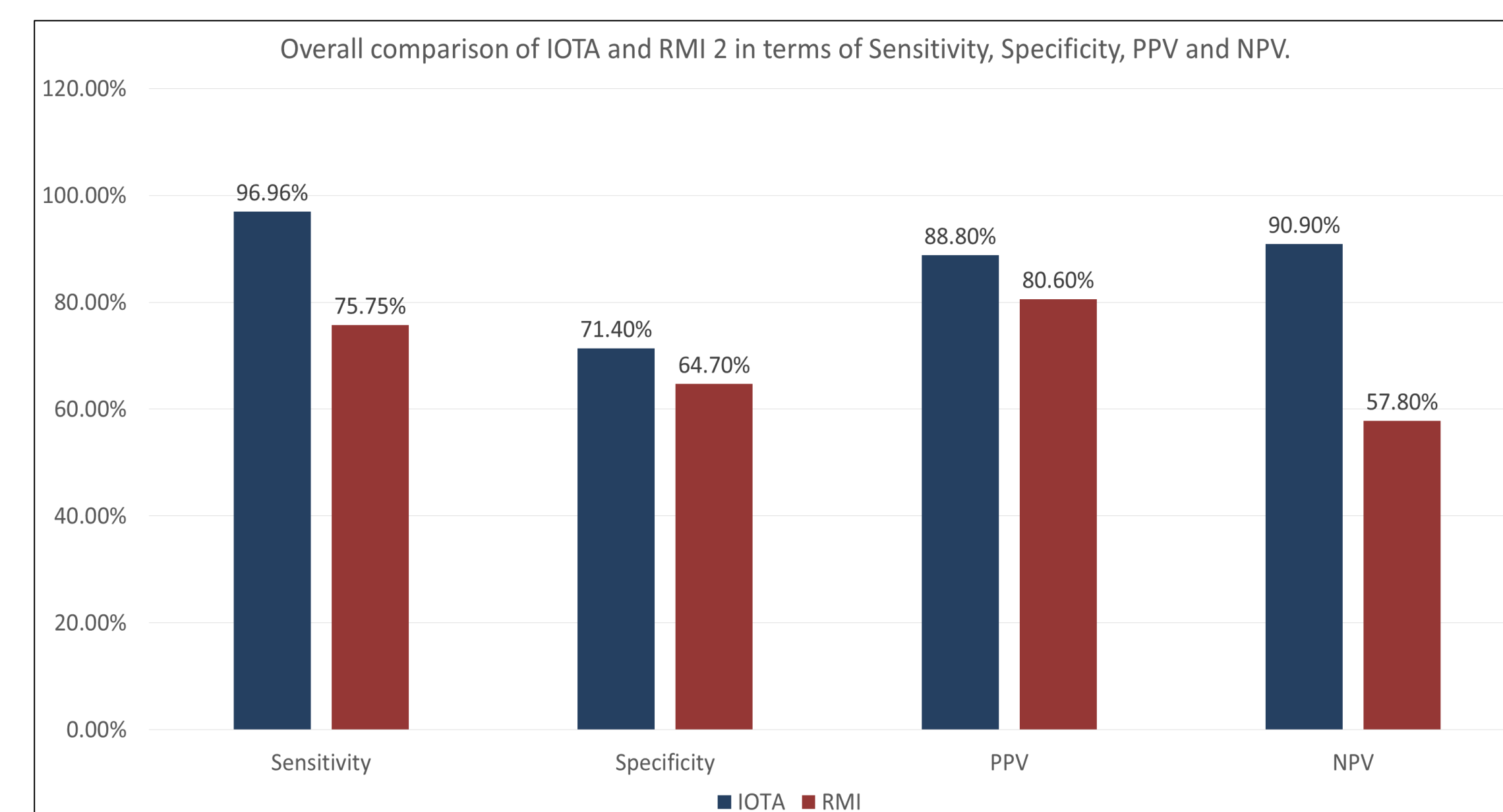
- For Germ Cell tumours of ovary the sensitivity, specificity, PPV and NPV of both IOTA and RMI are same



- The other Ovarian tumours include- Sex cord stromal tumours, Metastasis from other primaries, Non neoplastic lesions of ovary and infective /inflammatory conditions

- Here, the sensitivity and NPV of IOTA is more than that of RMI, whereas, the specificity and PPV of RMI is more than that of IOTA.

- Overall comparison of Sensitivity, specificity, Positive predictive value and Negative predictive value of RMI 2 and IOTA Simple USG rules.



- We also analysed individual M and B rules of IOTA Simple Ultrasound rules and it was noted that B1, B3 and M5 had 100 % predictive accuracy with respect to the HPE results .

- Furthermore, comparison of our study with other studies was made.

- However, it may be noted that variations may be seen, in part due to limited sample size and skewed data in view of more malignant lesions than benign.

- Comparison of Sensitivity, Specificity, PPV and NPV of RMI with previous studies:

Study	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Present study	75.75	64.7	80.6	57.8
Rujuta et al	70.5	87.8	70.5	87.8
Aliya et al	53.8	92.2	52.5	92.5
Erhan Akturk et al	75	85	55	93

The sensitivity of our study was comparable to that conducted by Erhan Akturk et al, Specificity and NPV are lower and PPV is higher than previous studies.

- Comparison of Sensitivity, Specificity, PPV and NPV of IOTA Simple USG Rules with previous studies:

Study	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Present study	96.96	71.4	88.8	90.9
Sungadha et al	91.66	84.84	68.75	96.55
Hartman et al	90	87	69	97

The sensitivity and PPV of our study is more than the previous studies though specificity and NPV are on the lower side .

## CONCLUSION

- Early diagnosis and prompt treatment is the pressing priority to prevent the associated mortality and morbidity in cases of ovarian tumours.
- In the present study, we have seen that overall and with epithelial ovarian tumours IOTA Simple USG rules had better sensitivity, specificity, positive predictive value and negative predictive value as compared to RMI 2, where it was same for Germ Cell tumours and variable for other histological varieties.
- IOTA is found to be easy, simple and better performing algorithm in order to differentiate benign from malignant ovarian masses

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