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Research Article

**A CROSS-SECTIONAL RESEARCH TO IDENTIFY MRS
(MAGNETIC RESONANCE SPECTROSCOPY) CORRECTNESS
IN THE BREAST LESIONS OF CANCER**¹Dr. Rida Ilyas, ²Dr. Shama Benazir, ³Dr. Junaid Ahmed Rana¹House Officer, Jinnah Hospital, Lahore²Punjab Medical College, Faisalabad³Latin American School of Medicine Havana, Cuba**Abstract:**

Objective: To find out identification correctness of MRS in cancerous breast lesion cases is objective of the research.

Material and Methods: The design of our research was cross-sectional, carried out at Mayo Hospital, Lahore March to December 2017. The total numbers of breast lesion patients enrolled for our research are one hundred and fifty-eight having age in between thirty to fifty years and diagnosis through mammography and ultrasonography. All those patients who acquired chemotherapy for major or inferior breast cancer conceived or Childs feeding mothers, all kidney collapse patients, patients of breast tissues injuries, and contradiction to magnetic resonance spectroscopy are not included in our research. Entire breast lesions are passes through magnetic resonance spectroscopy and results were compared with histopathology results.

Results: Entire patients of the study were in between thirty-four to forty-six years of age. The number of fatal breast lesion patients detected through magnetic resonance spectroscopy were eighty (50.63%) along with malignancy patients' diagnosis through histopathology were eighty-three (52.53%). Among eighty magnetic resonance spectroscopy diagnosed patients, seventy-four patients had positive and remaining six patients had negative malignant breast lesion on histopathology reports. Among seventy-eight patients who declared negative malignant breast lesion through magnetic resonance spectroscopy, nine patients had positive and sixty-nine had negative malignant breast lesion on histopathology results. Usually sensitivity, particularity, absolute presume value, adverse presume value and identification correctness of magnetic resonance spectroscopy in MBL was 89.16%, 92.0%, 92.50%, 88.40%, and 90.50 % respectively.

Conclusion: The research determined that MRS is much perceptive and very accurate methodology for identifying MBL.

Keywords: Magnetic Resonance Spectroscopy (MRS), Malignant Breast Lesion (MBL), Magnetic Resonance Imaging (MRI), Positive Presume Value (PPV), Receiver Operating Characteristic (ROC).

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INTRODUCTION:

The difficulties of breast tumorous patients are most frequent, ranging from forty to seventy percent of those females coming for a checkup. Any type of breast tumour either diagnosed by herself, diagnosed by screening as well as through concern physician promote the worries of breast cancer in all females regardless of age [1]. Luckily the huge number of breast tumour are heartless, however, this does not abrogate the demand for examination of any suspicious breast lesion [2]. The essential object behind the examination of the recently exposed apparent tumour is primarily to overcome malignancy. Assessment of breast tumour comprises of logical usage of a comprehensive record, clinical breast analysis, imaging technique as well as identification of tissues [1, 2]. Breast cancer is genera most cancer influencing females globally and is also the 2nd most general factor of cancer causalities after lung cancer. It also normally exists like a tumour or nipple discharge [3]. Baltzer pa et al in his research demonstrated the dominance of breast cancer in sixty-five percent existing with breast lesion [4]. Without invasion identification of breast cancer is constantly a main clinical issue. In the probable malignancy patients, imaging studies are beneficial to specify the level of malignancy as well as diagnosis of non-apparent masses anywhere in the breast or any other side. These results may change the usual methodology particularly the option of native treatment [5]. Mammography and sonography are presently the most utilized technique for diagnosing breast cancer [6]. However, the drawbacks of sonography along with mammography and craze of patients not to lose a malignant lesion in the initial phase of complication advance to barbaric biopsy, however, the biopsy proportion for cancer is ten to thirty percent. According to the research, seventy to ninety percent of biopsies are carried out for a heartless tumour which caused unrequired patient trouble and depression along with its huge expenses [7, 8]. MRI prevents disclosure to radiation has batter exactness reference to mammography and additional procure as compare to mammography and ultrasonography in concluding the volume of breast cancer mass [9]. The recommendation of PMRS as an aid to MRI investigation to develop the exactness to differentiating dangerous breast tumours from hurtles breast tumours [8, 10, 12]. In a research, the exactness and precision of MRS in distinguishing dangerous from heartless breast lesion is identified as 89.5% and 92.3% respectively [11]. There are too limited studies accessible on this specific subject so object of our research is to find out identification correctness of MRS in cancerous breast lesion cases additionally it would also benefit to decrease

detective biopsies in breast lesion which would not only decrease difficulties of invasion procedure but also reduce unrequired patients' discomfort, depression, and huge expenses.

Operational Definition:**Malignant Breast Tumor:**

A breast tumour declared as cancerous if choline peak was identified on MRS and colonic /creatinine percentage was greater than 1.5.

Begin Breast Tumor:

A breast tumour declared as harmless if no choline peak was identified on MRS and colonic /creatinine percentage was less than or equal to 1.5.

Histopathology Findings:

The existence of entire of the subsequent was declared as positive, Cellular atypia, mitotic activity, raise in nuclear-cytoplasmic percentage.

True Positive:

Diagnosed patients of cancerous breast lesion on magnetic resonance spectroscopy and histopathology.

True Negative:

Diagnosed patients of heartless breast lesion on magnetic resonance spectroscopy and histopathology.

False Positive:

Diagnosed patients of cancerous breast lesion on magnetic resonance spectroscopy but harmless breast lesion on histopathology.

False Negative:

Diagnosed patients of heartless breast lesion on magnetic resonance spectroscopy but cancerous breast lesion on histopathology.

Diagnostic Accuracy: was measured in Terms of;

$$(a) \quad \text{Sensitivity} = \frac{\text{TP}}{\text{All positive cases on histopathology}} \times 100$$

$$(b) \quad \text{Specificity} = \frac{\text{TN}}{\text{All negative cases on histopathology}} \times 100$$

$$(C). \quad \text{Positive Predictive Value (PPV)} = \frac{\text{TP}}{\text{All positive cases on MRS}} \times 100$$

$$(D). \quad \text{Negative Predictive Value (NPV)} = \frac{\text{TN}}{\text{All negative cases on MRS}} \times 100$$

MATERIALS AND METHODS:

The design of our research was cross-sectional, carried out at Mayo Hospital, Lahore March to

December 2017. The researcher selected the entire of one hundred and fifty-eight breast lesion patients of any volume on ultrasonography as well as on mammography having age domain from thirty to fifty years along with 90 days' time period. All those patients who acquired chemotherapy for major or inferior breast cancer conceived or Childs feeding mothers, all kidney collapse patients, patients of breast tissues injuries, and contradiction to magnetic resonance spectroscopy are not included in our research. The researcher takes written recommendations from hospital reappraisal panel along with patients and performed PMRS in each patient utilizing 1.5 Tesla MR System with gradient potency of 33mT/m and achieved a rapid advance research in sagittal axial and coronal planes. The practice search method was the point resolved spectroscopy single-voxel approach. Every MRS was explained by concern radiological specialist and examined for cancerous or hurtles breast lesion achieving histopathology as a benchmark. The researcher recorded entire facts on pre-designed Performa and evaluated composed facts on SPSS software, measured SD and mean for numerous variants i.e. age, the time period of the disease, the volume of a tumour and body mass index along with consistency and percentage for qualitative variables i.e. cancerous or hurtles breast lesion. Generally, sensitivity, particularity, absolute presume value, adverse presume value and identification correctness

of magnetic resonance spectroscopy in MBL was 89.16%, 92.0%, 92.50%, 88.40%, and 90.50 % respectively.

RESULTS:

The age of entire patients of our research was in between thirty to fifty years along with (41.27 ± 5.48) and (41.27 ± 5.48) of average age. The maximum patients ninety (56.96%) of the research was in between forty-one to fifty years. Disease average time period was one to three months whereas the average volume of a tumour was twenty-four to thirty-five kg/m² BMI. The number of fatal breast lesion patients detected through magnetic resonance spectroscopy were eighty (50.63%) along with malignancy patients' diagnosis through histopathology were eighty-three (52.53%). Among eighty magnetic resonance spectroscopy diagnosed patients, seventy-four patients had positive and remaining six patients had negative malignant breast lesion on histopathology reports. Among seventy-eight patients who declared negative malignant breast lesion through magnetic resonance spectroscopy, nine patients had positive and sixty-nine had negative malignant breast lesion on histopathology results. Usually sensitivity, particularity, absolute presume value, adverse presume value and identification correctness of magnetic resonance spectroscopy in MBL was 89.16%, 92.0%, 92.50%, 88.40%, and 90.50 % respectively.

Table – I: Age, Disease Duration, Lump Size and BMI Stratification

Variables	Number	Percentage	
Age	30 - 40 Years	68	43.04
	41 - 50 Years	90	56.96
	Total	158	100
Disease Duration (Months)	≤ 1	76	48.10
	Above 1	82	51.90
Lump Size (Centimeters)	≤ 5	93	58.86
	Above 5	65	41.14
BMI (kg/m ²)	≤ 30	71	44.94
	>30	87	55.06

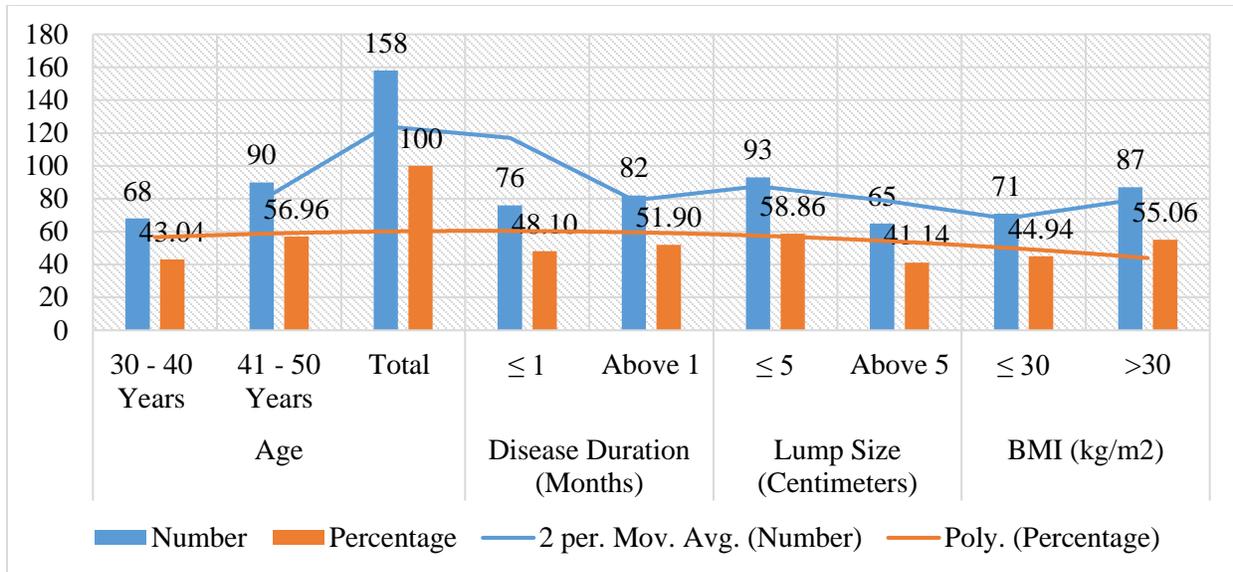
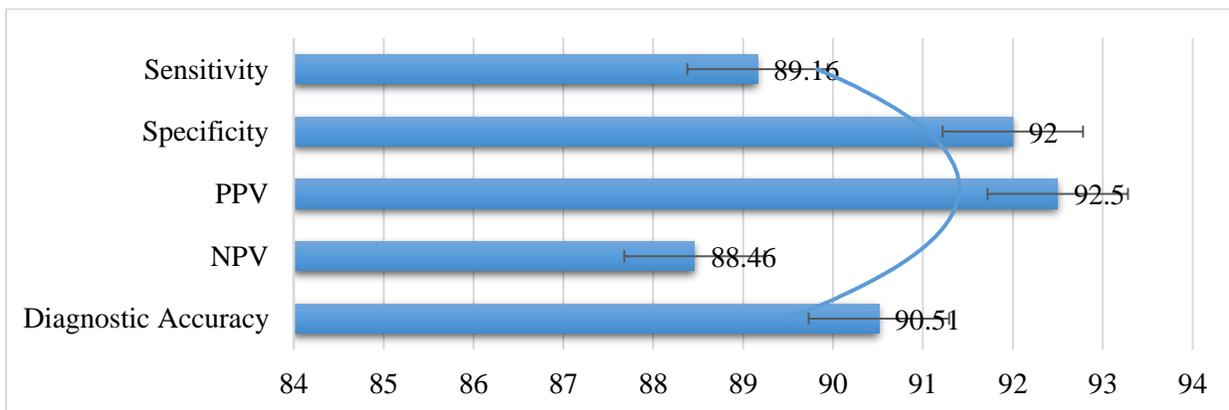


Table – II: Outcomes Summary

Histopathology	Positive on MRS	Negative on MRS	P-Value
Positive	74 (TP)	09 (FN)	0.736
Negative	06 (FP)	69 (TN)	

Table – III: Magnetic Resonance Accuracy

Magnetic Resonance	Percentage
Diagnostic Accuracy	90.51
NPV	88.46
PPV	92.5
Specificity	92
Sensitivity	89.16



DISCUSSION:

The number of fatal breast lesion patients detected through magnetic resonance spectroscopy were eighty (50.63%) along with malignancy patients'

diagnosis through histopathology were eighty-three (52.53%). Among eighty magnetic resonance spectroscopy diagnosed patients, seventy-four patients had positive and remaining six patients had

negative malignant breast lesion on histopathology reports. Among seventy-eight patients who declared negative malignant breast lesion through magnetic resonance spectroscopy, nine patients had positive and sixty-nine had negative malignant breast lesion on histopathology results. Usually sensitivity, particularity, absolute presume value, adverse presume value and identification correctness of magnetic resonance spectroscopy in MBL was 89.16%, 92.0%, 92.50%, 88.40%, and 90.50 % respectively. In a research, the researcher identified exactness and precession of MRS in distinguishing dangerous from heartless breast lesion as 89.5% and 92.3% respectively. The application of magnetic resonance spectroscopy as an assistant to magnetic resonance imaging in the assessment of breast lesion was initially inquired by Cecil *et al* (2001) [13]. In the study (level III-I detective proof) magnetic resonance spectroscopy has developed an organ of the magnetic resonance imaging in assessment of thirty-eight females, entire who appeared with a dubious mass of 1cm diameter or bigger size in the breast. Utilization of biopsy outcomes as the benchmark, the researcher identified that visionless reappraisal of magnetic resonance imaging outcomes presumed cancerous malignancy with exactness and precession of ninety-five to eighty-six percent respectively. The researcher recorded that if tabular adenomas, a familiar factor of false positive reading on magnetic resonance spectroscopy had been eliminated by the magnetic resonance imaging, the peculiarity and positive presume values of magnetic resonance spectroscopy would have developed to ninety-three to ninety-five percent respectively. Kalz Brull *et al* published a disorganized reappraisal and Meta assessment of five clinical research, inquired the applicability of magnetic resonance spectroscopy to differentiate hurt less and cancerous breast lesion. In previous mentioned Meta assessment, combined results of five clinical research from one hundred and fifty-three lesion provide on approximated exactness for magnetic resonance spectroscopy of eighty three percent (seventy-three to eighty nine percent CI) and peculiarity of eighty five percent (seventy-one to ninety three percent of CI) in the categorization of hurtless and cancerous breast lesion [14]. Freshly, Haddadin *et al* presented seventy-three percent exactness and seventy-seven percent precession of MRS for differentiating hurtless from cancerous lesions [15].

In one additional new research Meisamyet *et al* retrospectively inquired the detecting characteristic of magnetic resonance spectroscopy and magnetic resonance imaging in fifty-five those patients who had formerly experienced biopsy [16]. In the research

four specialists of radiology were needed to independently judge the possibilities of breast malignancy established on magnetic resonance imaging outcomes and form a suppositional proposal established on this outcome as a weather a patient should experience verifying biopsy. The radiological experts were further needed to reanalyze the judgment pursuing the acknowledgement of magnetic resonance spectroscopy outcomes. Entire of the radiology experts, the augmentation of magnetic resonance spectroscopy to the breast checkup concluded in improved exactness, peculiarity and correctness (as denoted by the volume below the ROC curve) concerning the malignancy of the lesion. Two out of four radiology experts noted expressive advancement in exactness over the two conditions along with entire four presented expressive advancement in detection correctness. The meaning of weighted in precession (sensitivity) and exactness (specificity) for the basic classification was eighty-seven and fifty-one percent respectively.

Sardanelli in his research has demonstrated the precession (sensitivity) and exactness (specificity) of magnetic resonance spectroscopy in detecting malignant breast lesion as ninety percent and ninety-two percent respectively [17].

In a Meta assessment, nineteen research were for common combined data. The research composed of eleven hundred and eighty-three, as well as eleven hundred and ninety-eight lesions (773 cancerous and 452 hurtless) combined preciseness (sensitivity) and specificity (exactness), were seventy-three percent (556 of 761%: ninety-five percent CI), (64 & 82% = eighty-eight percent), (386 of 439; ninety five percent CI eighty-five and ninety five percent) respectively. The combined DDR was 34.30 (ninety-five percent CI: 16.71,70.43) for a breast tumour against hurtless breast lesion, the volume below the balanced summary receiver functioning symptomatic angle of magnetic resonance spectroscopy was 0.88 as well as Q index was 0.81 [4].

In probably the most appropriate research into the clinical applicability of magnetic resonance spectroscopy Bart *et al* inquired the distinctive achievement of magnetic resonance spectroscopy and magnetic resonance imaging in fifty-six patients with fifty-seven recognized lesion [18]. Total of fifty-seven lesions analyzed in the research, forty had been categorizing as ambiguous by magnetic resonance imaging had been sent for further biopsy, moreover, seventeen of the lesions formerly verified to be tumorous by biopsy. By utilizing biopsy as a benchmark thirty-one and twenty-six out of fifty-

seven lesions were diagnosed to be cancerous and hurtless respectively. A choline peak was diagnosed in entire twenty-one biopsy verified malignant lesion (hundred percent sensitivity), whereas peak was missing in twenty-three out of twenty-six hurtless lesions (eighty-eight percent peculiarity).

To conclude the consequence exordium of magnetic resonance spectroscopy would have on biopsy referred cases. The researcher inquired the forty lesions firstly categorized as ambiguous through magnetic resonance spectroscopy. In these lesions, the application of magnetic resonance spectroscopy as an assistant to magnetic resonance imaging would have expressively developed the positive presume value of biopsy referral cases from thirty-five to eighty-two percent ($P < 0.01$).

Moreover, if the biopsy had just conducted on these lesions with a choline peak, biopsy approval would have been expressed among twenty-three to forty lesions (fifty-eight percent) and no lone cancerous lesion would have been loosed.

In additional research fifty-two patients (fifty-seven lesions, forty-two cancerous, fifteen hurtless) were examined, the precession, exactness, and PPV (positive presume value), NPV (Negative presume value) of presuming cancerous were hundred percent respectively, utilizing DCE-MRI and 95.2, 93.3, 97.6 and 87.5 percent respectively. The match cut off for (ROC) curve was 0.33mmol/L. the association within the level in cancerous breast lesion with histopathology sub-kinds was not statically important ($P = 0.3$) [19]. Brennan et al proposed that if magnetic resonance spectroscopy had been applied, a biopsy would have been excess in fifty-nine percent without losing any tumorous. Therefore, our research determines that MRS has remodelled the detection and treatment of cancerous breast lesion.

CONCLUSION:

The research determined that MRS is much perceptive and very accurate methodology for identifying MBL and not only effectively developed our ability of detecting breast cancer but also develop patients care by correct and in time detection for gaining appropriate management choice for these specific patients additionally it would also give benefit to decrease detective biopsies in breast lesion which would not only decrease difficulties of invasion procedure but also reduce unrequired patients discomfort, depression, and huge expenses.

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