ADDITIONAL ROLE OF DIFFUSION WEIGHTED MAGNETIC RESONANCE IMAGING AND CHEMICAL SHIFT IMAGING IN TISSUE CHARACTERIZATION OF CERVICAL LYMPH NODES

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Introduction

Cervical lymph node metastasis is a very important prognostic factor for most head and neck neoplastic lesions. Both the site and number of the nodes can directly change its tumor stage, thus influence the treatment guidelines and affect the survival rate. Histopathological assessment of the lymph node is the most accurate way to differentiate between benign and malignant nodes; however it is an invasive procedure. Many studies were done to characterize the lymph node without the need of biopsy or intravenous contrast.

Aim of the work

The aim of this study is to evaluate the role of Diffusion Weighted Imaging DWI MRI and chemical shift imaging (In and Out of phase) in differentiation between malignant and benign cervical lymph nodes.

Methods

This research included 31 patients referred from the Oncology, Otorhinolaryngology and head and neck surgical ward with cervical lymphadenopathies to the Radiology department of Alexandria Main University Hospitals for MR imaging. The MR diagnoses of the cervical lymph nodes were correlated with histologic findings from biopsy.

Results

An ADC value of 0.9 mm^2/s was concluded to be the best cutoff value for differentiating benign from malignant LNs. It showed a diagnostic ability of 72.77% sensitivity, 88.7 % specificity.

A cutoff value of approximately 0.9 was concluded to be the best cutoff value for differentiating benign from malignant LNs. It showed a diagnostic ability of 95.45 % sensitivity, 88.89 % specificity

Table (1) : Validity (AUC, sensitivity, specificity) for ADC value to discriminate malignant (n = 22) from benign (n = 9)

	AUC	p	95% C.I	Cut off[#]	Sensitivity	Specificity	PPV	NPV
ADC value	0.775[*]	0.028[*]	0.549 – 0.961	≤0.9[#]	72.7	88.7	93.7	53.3

Table (2) : Validity (AUC, sensitivity, specificity) for Ratio in/out to discriminate malignant (n = 22) from benign (n = 9)

	AUC	p	95% C.I	Cut off[#]	Sensitivity	Specificity	PPV	NPV
Ratio in/out	0.939[*]	<0.001[*]	0.849 -1.030	>0.9[#]	95.45	88.89	95.5	88.9
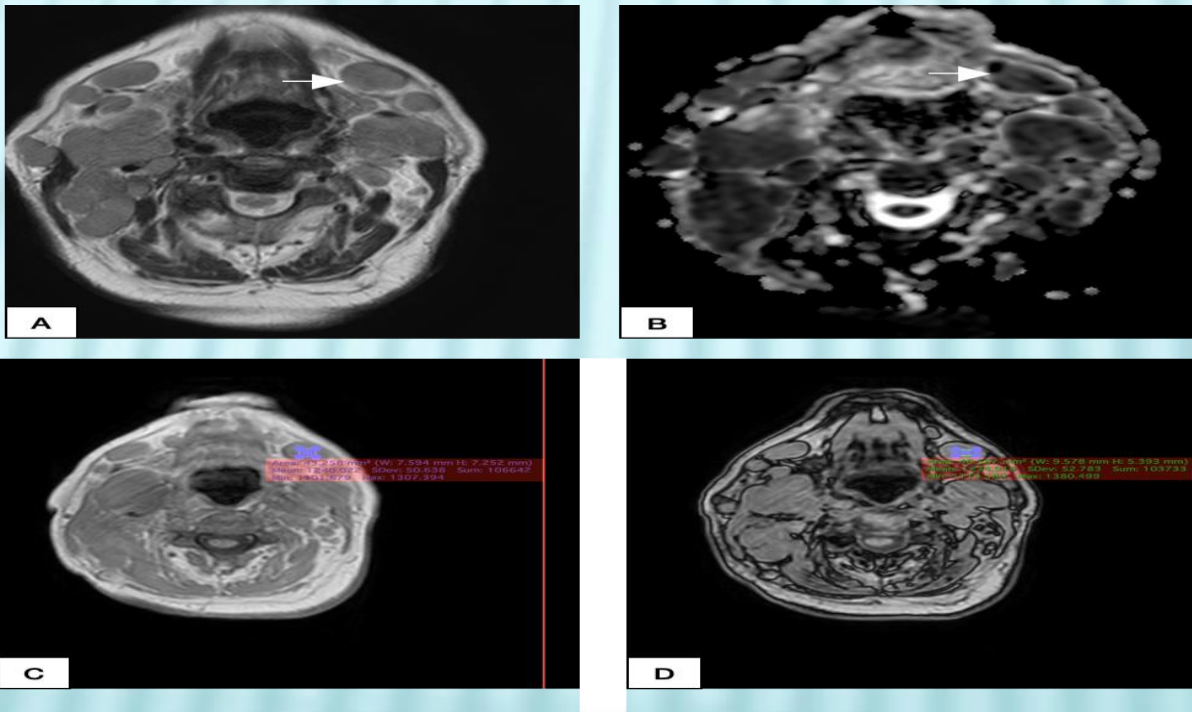
Figure(1): Male patient 65 years old presenting with lymphoma and multiple cervical lymphadenopathy. The LN studied was left level IB. Axial T2 image (A) shows homogenous signal of the node (white arrow) seen rounded measuring 13 mm in short axis. The ADC map (B) shows restricted diffusion (white arrow) of the node with ADC value (0.6) in ADC map. The LN showed loss of signal drop on CSI (C, D) with In/Out of phase ratio of 0.9. Core biopsy from the LN proved to be Non Hodgkin Lymphoma.
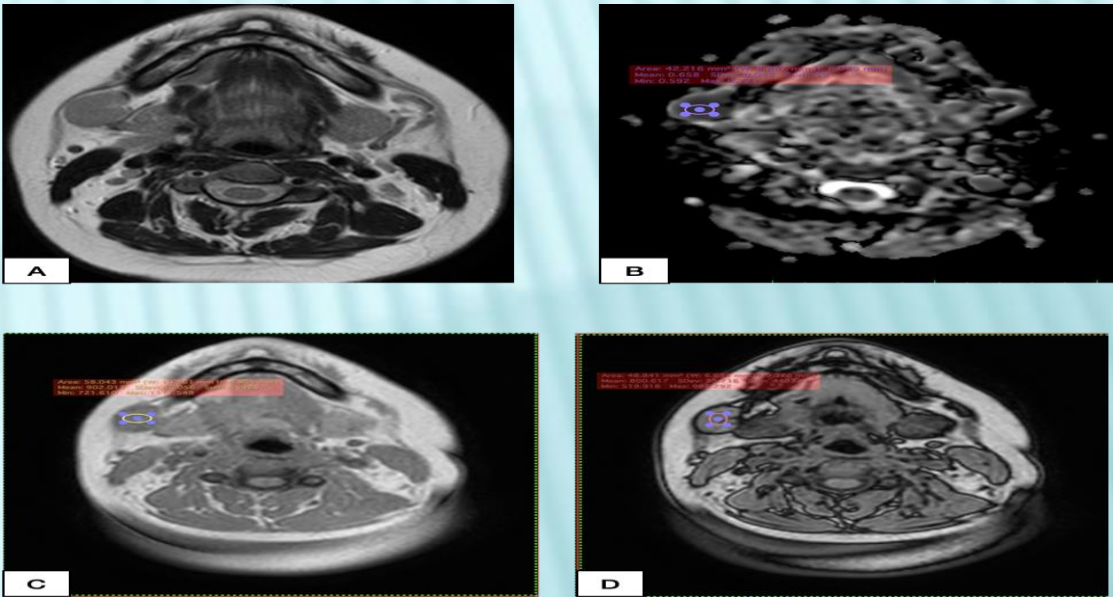
Figure(2) : Female patient 32 years old presenting with papillary thyroid cancer and Right Level II cervical lymphadenopathy. Axial T2 image (A) shows homogenous signal of the node seen oval measuring 18mm in short axis. The LN shows restricted diffusion (B) with low ADC value (0.6) in ADC map reflecting malignant nature of the lesion. The LN showed signal drop on CSI (C, D) with In/Out of phase ratio of 0.88. By excisional biopsy the LN was proved to be reactive.

Conclusion

DWI and CSI can differentiate between malignant and benign LNs in patients with known head and neck primary.

Qualitative and quantitative assessment of DWI and values of ADC map can differentiate between benign and malignant LNs with a cutoff value 0.9 mm^2/s.

CSI can differentiate between malignant and benign LNs with a cutoff value of In/out phase ratio of 0.9.

Adding CSI sequence to conventional MRI in examining the nodal status in patients with head and neck primary adds little to examination time but adds more to the diagnostic ability, thus we recommend using CSI whenever there is a diagnostic dilemma when it come to the LN characterization.