

COMPARISON OF 18F-FDG-PET/CT VERSUS WB DW-MRI IN STAGING AND EVALUATION OF RESPONSE FOR LYMPHOMA PATIENTS

Ahmad El-Gowily, Azza Darwesh, Rafik Ibrahim, Mwanajaa Mwachui

Clinical Oncology and Nuclear Medicine Department, Alexandria University, Egypt

Introduction

For over two decades the vast majority of research on the value of Whole Body DWI in radiologic evaluation has been established in comparison to FDG PET/CT and has mainly focused on aggressive lymphoma subtypes including diffuse large B cells lymphoma (DLBCL) and follicular lymphoma which are the most common subtypes of NHL. Thus it's role in the diagnosis and monitoring of lymphomas with indolent nature and a varied avidity such as MALT lymphoma needs to be explored.

Aim of the work

The aim of this study is to assess the diagnostic value of Whole Body DWI in the staging and assessment of treatment response in lymphoma as a viable alternative in comparison to FDG PET/CT.

Material and methods

a prospective study enrolled 20adult lymphoma patients including both aggressive and indolent subtypes (DLBCL, follicular, MALT , anaplastic and mantle cell) for staging purposes or treatment response assessment. The lesions detected by MRI-DWI (1.5 Tesla)were evaluated with PET/CT as the reference standard. The impact of DWI and PET/CT on disease staging was analyzed according to Ann Arbor. Exclusion criteria included previous malignancies and general contraindications of MRI(claustrophobia and pace makers).Agreement was considered poor at a kappa value of 0; weak at 0.01–0.20; fair at 0.21–0.40; moderate at 0.41–0.60; good at 0.61–0.80; excellent at 0.81–1.

Results

The mean age at diagnosis was 58.44 (SD ± 5.16) years. 90% (18/20) had NHL. 6/20 patients (2 HD vs 4 NHL) were recruited for treatment response. The remaining 14 patients had 100% agreement in staging ; 9were stage IV, 1 stage III, 1 stage II and 3 were stage I disease. The agreement based on kappa statistic was moderate ($\kappa = 0.57$)for Total nodal sites and very good ($\kappa = 0.84$) for extra nodal sites. Discordance in extra nodal sites in 2 cases included: splenic infiltration at DWI on one and focal Bone Marrow infiltration at FDG PET/CT on the other. Individual sites showed a good agreement $\kappa > 0.69$ except for hilar region with a poor agreement ($\kappa = 0.35$).However failure to detect these lesions did not impact staging.

Table 1. Agreement between Whole-body Diffusion weighted MRI and FDG PET/CT showing nodal and extra nodal regions.

Parameter	κ (CI)
All nodal regions	0.573 (0.339-0.801)
Nodal regions	
Cervical	0.895 (0.696-1.000)
Axillary	0.898 (0.704-1.000)
Infraclavicular	1.000
Mediastinal	0.692 (0.307-1.000)
Hilar	0.348 (-0.168-0.864)
Para-aortic	0.700 (0.401- 0.998)
Mesenteric	N/A
Inguino-femoral	1.000
All extra nodal regions	0.835 (0.627-1.000)
Extra nodal regions	
Spleen	0.876 (0.639-1.000)
Bone marrow	0.773 (0.349-1.000)
Lung	1.000
Liver	1.000
Bowel	1.000
Muscle	1.000

Note- The values in parenthesis are 95% CI. N/A = not applicable (Insufficient number of categories for statistical analysis)

Table 2:Cause of discrepancy in site involvement

Patient No.	Ann Arbor Stage		Cause of discrepancy in site involvement
	Whole-Body DWI	FDGPET/CT	
1	IV	IV	Splenic infiltration only visualized on WB-DWI while Porta hepatic LN only at FDG PET/CT. Splenomegaly and Hepatic lesions were seen on both imaging modalities. Bone marrow lesion only seen on FDG PET/CT thus need for a bone marrow biopsy.
2	IV	IV	

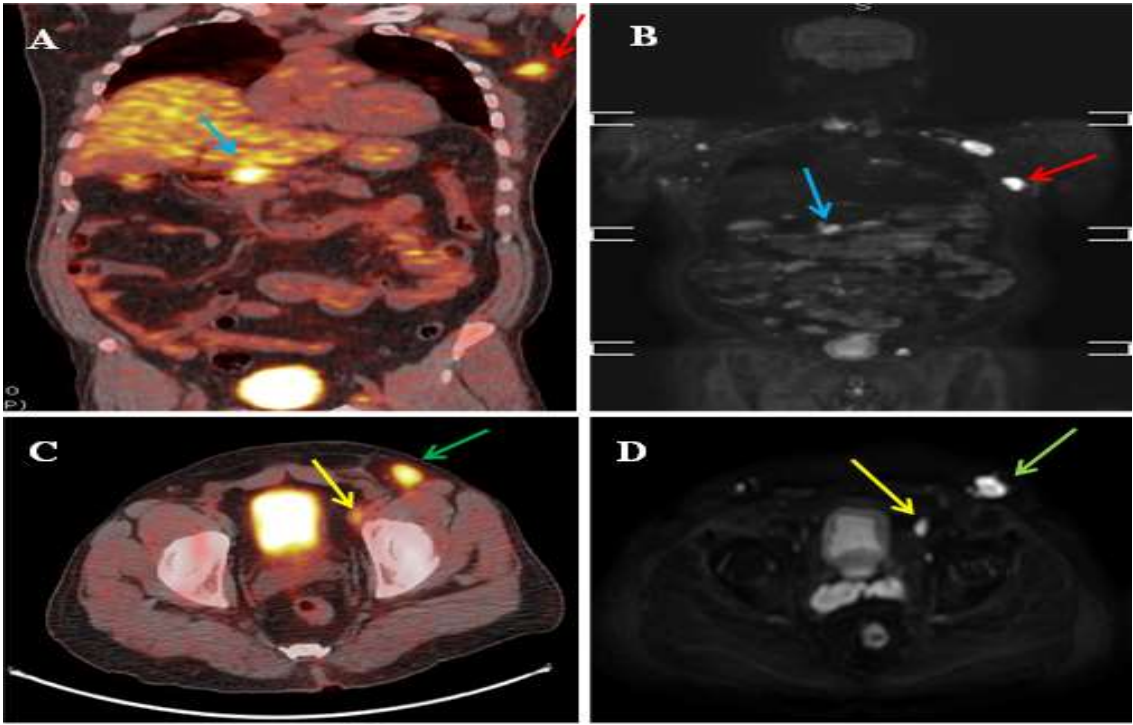


Fig 1 ; A 60 year old male with histopathologically proven follicular lymphoma with concordant staging (stage III) at whole body diffusion weighted imaging (DWI) and FDG PET/CT. (A)Coronal FDG PET/CT and (B) Coronal DWI showing axillary (red arrow) and porta hepatis (Blue arrow) LNs showing diffusion restriction with hyperintense signal on DWI and increased radio-tracer uptake on fused colour-coded FDGPET/CT images (C) Axial FDG PET/CT and (D) axial DWI showing external Iliac and Inguinal (green and yellow arrows) LNs showing diffusion restriction with hyperintense signal on DWI and increased radio-tracer uptake on fused colour-coded FDGPET/CT images

CONCLUSION

DWI is a good alternative to FDG PET/CT and can be used in varied FDG avid lymphomas and as an alternative for radiation free imaging due to its good level of agreement to the standard reference. It showed a good evaluation especially of extra nodal sites and also nodal sites except for hilar LNs where FDG PET/CT remains superior