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Sensitivity of magnetic resonance (MR) for early diagnosis of lymphoma

Alaa EL-Din AA[1], Said S Moselhy[2*]
[1] Head of Radiology Department, Ghamrah Armed Forces Hospital, Cairo, Egypt
[2] Department of Biochemistry, Faculty of Science, Ain Shams University, Cairo, Egypt

Abstract
The diagnosis of Non- Hodgkin's lymphoma (NHL) is critical in starting treatment protocol. This including, serum biological markers, histo-pathological and CT. The clinical importance of biological markers in NHL stems from their function in morphologic diagnosis, staging, and prognostic assessment, as well as their contribution to disease monitoring. The current study investigated the sensitivity of magnetic resonance (MR) in fifty patients with NHL compared with other methods. This prospective study including 50 patients (18-50 years) were selected from oncology Unit, Ghamrah Military Hospital, suspected with NHL. Fasting blood samples, needle aspiration from lymph node and scanning with MR.
Results: Data obtained from MR, 44 /50 patients showed an enlarged lymph nodes separated from vessels, 40/50 showed a significant elevation of CA125, LDH and β 2-Microglobulin while 42/50 showed pathological alteration of lymph node cell samples. It was concluded that, Lymphoma lesions with MR showd high accuracy than biochemical and histo-pathological diagnosis.

Keywords: non-lymphomas hodgkin's- biochemical- NMR-diagnosis

Introduction
Lymphoma may be a threatening tumour of the different tissues. It include two distinctive types, non-Hodgkin lymphoma (NHL) and Hodgkin lymphoma (HL). According to WHO classification depend on histopathological changes, biochemical, molecular and CT scan prescribed to decide an precise assignment, offer prognostic information and select the first worthy and successful restorative care [1, 2]. Surgical demonstrative test is taken into consideration the gold ordinary for the assignment of dangerous neoplastic\malady [3], for it assesses the subject field design of development, building up the evaluating, as for vesicle harmful neoplastic illness [4], and distinguishes potential zones that will advance into a part of forceful shapes [5]. The patients unacceptable for surgical strategies showing extra-nodal or deep-rooted injuries (such as intrathoracic, intra-abdominal, or diverse anatomical locales wherever the injuries vague or not basically open by shallow demonstrative measure which ima ging directing is required for satisfactory investigation) [6, 7]. It has been established smears and cytological examination from fine needle aspiration, combined with biochemical may well be supportive to accomplish an assignment of NHL [8]. The lympho-proliferative to be recognized and has impediments much appreciated to its scattered physiological condition. However, immune-cyto-chemical and physical examinations may be performed [9].
Lactate dehydrogenase (LDH) is a ubiquitous enzyme found in the cytoplasm of cells throughout the body. Increased LDH levels have been linked to the tumor mass's proliferative activity and have been reported as an early indication of concealed malignant lymphoma [10]. LDH is one of the five pre-diabetic hormones that are independently significant.
The CA 125 is a glycoprotein generated by mesothelium cells and epithelial ovarian cancers. Increased serum CA 125 levels are detected in 40% of NHL patients and are linked to mediastina and/or abdominal involvement, substantial tumor mass, and effusions, demonstrating the response of pleuropericardial or peritoneal mesothelium cells to the tumor [11]. The level of CA 125 level reflect the patient's response to the tumor's invasive potential, thus providing a measure of its infiltrative activity. While β 2-Microglobulin and LDH levels indicate the tumor load and proliferation activity of a lymphoma, CA 125 level reflect the patient's response to the tumor's invasive potential thus providing a measure of its infiltrative activity [12].
The rational of this study is to evaluate the sensitivity of MR in diagnosis of NHL as confirmatory examination side by side biochemical analysis and histopathological examination.

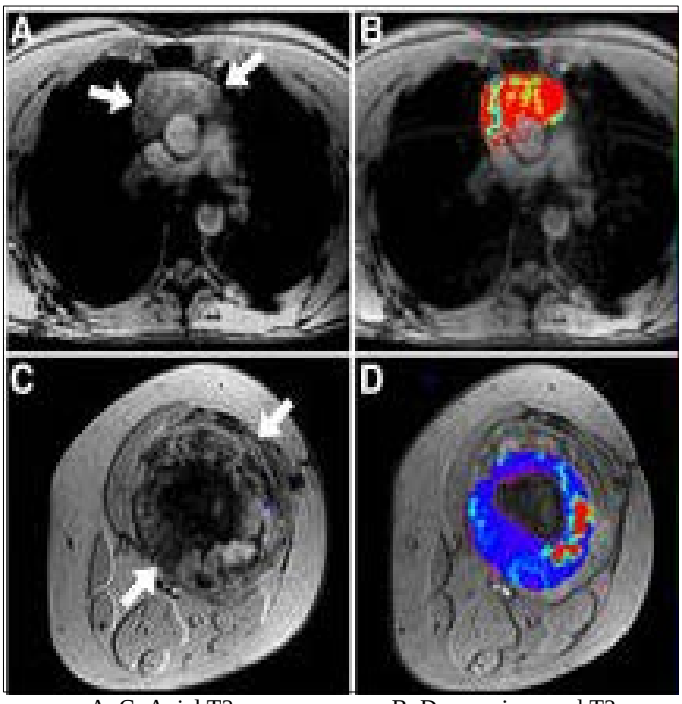
Subjects and Methods
Fifty patients diagnosed with NHL age from 25-55 years were selected from the Oncology Unit, Ghamrah Hospital. Blood samples were collected from all patents. Tissue biopsy was used to confirm the diagnosis. In all of the patients, a standardized advanced magnetic resonance protocol was used. Six photos (1000 mm2). For each of the 23 axial slices, one low (3 mm2/s) was obtained. The parameters that were used were as follows: TR = 6 s, TE = 72.9 ms, diffusion encoding = 47 ms, 128 128 matrix, field of view, 5 mm slice thickness, 1 mm spacing, 128 128 matrix, field of view 2222, 5 mm slice thickness, 1 mm spacing In this retrospective analysis, the imaging time points were not stand-alone. Following the start of chemotherapy.

Results

Data obtained showed that, serum LDH, B2-M and CA125 were significantly elevated in 40 out of 50 with sensitivity 80%. The borders of the lesions were apparent, with low-density edoema surrounding the tumour. After the enhanced scan, all lesions showed improved signals. A total of 50 lesions were discovered in 44 patients who had their MRIs done. The plain scan revealed that all lesions were in the same condition, that all lesions had low signal on T1WI, that 88 % of lesions had high signal on T2WI, and that 20.2 percent. After the enhanced scan, 88% (44) of the lesions had markedly uniform enhancement, 12(6) had uneven enhancement. Histo-pathological examination showed that, 41 out of 50 showed alteration in the cytoplasm, nuclear condensation, granulation compared with control. The accuracy of MR was found to be higher than Biochemical and histopathological examination.

Table 1: accuracy of different methods for diagnosis of lymphoma

Method	Diagnosis	Misdiagnosis	Accuracy %
MR	44	6	88
Biochemical	40	10	80
Histopathological	41	9	82



A, C: Axial T2 B, D: superimposed T2

Fig 1: Different MRI enhancement and different TAM quantities in Lymphomas

Discussion

The NHL was mainly diagnosed depend on the morphological changes of the cell [13], But the advancement of medical technology has resulted in the application of a variety of technologies that degrade the operation of the patient's body, as well as the deterioration of the social environment. As a result, the incidence of NHL has been rising in recent years. According to studies [14, 15, 16, 17], the beginning age of NHL is getting younger, necessitating more attention in the clinic. Early-stage of NHL usually has no visible symptoms, and misinterpretation and erroneous diagnosis are prevalent [18]. In this study, 44 of 50 patients with NHL were confirmed with MR scans. Compared with biochemical and histopathological investigation, In terms of general information, there was a significant difference between the three methods ($p<0.05$). According to MRI imaging studies, the disease frequently develops between the mononuclear phagocyte system and the perivascular region [19, 20, 21, 22]. The results of MR-examined lesions in this investigation were largely isodense or high-density nodules, implying that the organisation of cells in NHL is different. Tumor scanning with improved MR revealed increased signal in this investigation, confirming the disease's mass effects and invasive aspects. In order to avoid the progression of NHL, early identification and therapy are required. The results of MR and combined diagnosis were all satisfactory, however they were sufficient for the qualitative diagnosis of NHL. As a result, the diagnosis should include both clinical imaging and pathological testing results.

Conclusion

It was concluded that, MRI can be used to for early diagnosis of NHL that support biochemical and pathological tests.

References

1. Farinha P, Masoudi H, Skinnider BF, Shumansky K, Spinelli JJ, Gill K *et al.* Analysis of multiple biomarkers shows that lymphoma-associated macrophage (LAM) content is an independent predictor of survival in follicular lymphoma (FL). Blood,2005:106:2169-74.
2. Tan KL, Scott DW, Hong F, Kahl BS, Fisher RI, Bartlett NL *et al.* Tumorassociated macrophages predict inferior outcomes in classic Hodgkin lymphoma: a correlative study from the E2496 Intergroup trial. Blood,2012:120:3280-7.
3. Fujiwara T, Fukushi J, Yamamoto S, Matsumoto Y, Setsu N, Oda Y *et al.* Macrophage infiltration predicts a poor prognosis for human ewing sarcoma. Am J Pathol,2011:179:1157-70.
4. Lee CH, Espinosa I, Vrijaldenhoven S, Subramanian S, Montgomery KD, Zhu S *et al.* Prognostic significance of macrophage infiltration in leiomyosarcomas. Clin Cancer Res,2008:14:1423-30.
5. Edris B, Weiskopf K, Volkmer AK, Volkmer JP, Willingham SB, Contreras-Trujillo H *et al.* Antibody therapy targeting the CD47 protein is effective in a model of aggressive metastatic leiomyosarcoma. Proc Nat Acad Sci U S A,2012:109:6656-61.
6. Herrmann D, Seitz G, Fuchs J, Armeanu-Ebinger S. Susceptibility of rhabdomyosarcoma cells to macrophage-mediated cytotoxicity. Oncoimmunology,2012:1:279-86.
7. De Palma M, Lewis CE. Macrophage regulation of tumor responses to anticancer therapies. Cancer Cell,2013:23:277-86.
8. Lewis CE, Pollard JW. Distinct role of macrophages in different tumor microenvironments. Cancer Res, 2006:66:605-12.
9. Leimgruber A, Berger C, Cortez-Retamozo V, Etzrodt M, Newton AP, Waterman P *et al.* Behavior of endogenous tumor-associated macrophages assessed *in vivo* using a functionalized nanoparticle. Neoplasia,2009:11:459-68.2 p following 68.

10. Daldrup-Link H, Coussens LM. MR imaging of tumor-associated macrophages. Oncoimmunology,2012:1:507-9.
11. Daldrup-Link HE, Golovko D, Ruffell B, Denardo DG, Castaneda R, Ansari C *et al.* MRI of tumor-associated macrophages with clinically applicable iron oxide nanoparticles. Clin Cancer Res,2011:17:5695-704.
12. Klenk C, Gawande R, Uslu L, Khurana A, Qiu D, Quon A *et al.* Ionising radiation-free whole-body MRI versus (18)F-fluorodeoxyglucose PET/CT scans for children and young adults with cancer: a prospective, non-randomised, single-centre study. Lancet Oncol,2014:15:275-85.
13. Muehe AM, Feng D, von Eyben R, Luna-Fineman S, Link MP, Muthig T *et al.* Safety report of ferumoxytol for magnetic resonance imaging in children and young adults. Invest Radiol,2015:51:221-7.
14. Shi Q, Pisani LJ, Lee YK, Messing S, Ansari C, Bhaumik S *et al.* Evaluation of the novel USPIO GEH121333 for MR imaging of cancer immune responses. Contrast Media Mol Imag,2013:8:2818.
15. Collins TJ. ImageJ for microscopy. Bio Techniques, 2007:43:25-30.
16. Endo-Munoz L, Evdokiou A, Saunders NA. The role of osteoclasts and tumour-associated macrophages in osteosarcoma metastasis. Biochim Biophys Acta, 2012:1826:434-42.
17. Schmitz SA, Taupitz M, Wagner S, Wolf KJ, Beyersdorff D, Hamm B. Magnetic resonance imaging of atherosclerotic plaques using superparamagnetic iron oxide particles. J Magn Reson Imaging,2001:14:355-61.
18. Simon GH, von Vopelius-Feldt J, Wendland MF, Fu Y, Piontek G, Schlegel J *et al*. MRI of arthritis: comparison of ultrasmall superparamagnetic iron oxide vs. Gd-DTPA. J Magn Reson Imaging,2006:23:720-7.
19. Simon GH, von Vopelius-Feldt J, Fu Y, Schlegel J, Pinotek G, Wendland MF *et al.* Ultrasmall supraparamagnetic iron oxide-enhanced magnetic resonance imaging of antigen-induced arthritis: a comparative study between SHU 555 C, ferumoxtran-10, and ferumoxytol. Invest Radiol, 2006:41:45-51.
20. Melancon MP, Lu W, Huang Q, Thapa P, Zhou D, Ng C *et al.* Targeted imaging of tumor-associated M2 macrophages using a macromolecular contrast agent PG-Gd-NIR813. Biomaterials,2010:31:6567-73.
21. Perez-Medina C, Tang J, Abdel-Atti D, Hogstad B, Merad M, Fisher EA *et al.* PET imaging of tumor-associated macrophages with 89Zr-labeled highdensity lipoprotein nanoparticles. J Nucl Med,2015:56:1272-7.
22. Locke LW, Mayo MW, Yoo AD, Williams MB, Berr SS. PET imaging of tumor associated macrophages using mannose coated 64 Cu liposomes. Biomaterials, 2012:33:7785-93.