

DEDICATION

Dedicated to:

My beloved father and mother..... ..

*For their kind support, encouragement and unlimited
attention for me and shined so gracefully.*

My beloved husband..... ..

For support and encouragement.

My dear sons, brother and sisters..... ..

My teacher, colleague and dear friends..... ..

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Abstract

The relaxation times T_1 and T_2 plus the proton density (ρ) are the quantities Likely to give the best tissue discrimination in nuclear magnetic resonance imaging (NMR).

These parameters play a pivotal role in determining tissue contrast, which allows clinicians to clearly see the details of tissue structure, including soft tissue, and to distinguish normal from diseased tissue in order to diagnose and track the progress and treatment of disease.

In this study relaxation times T_1 and T_2 measurements were performed using MRI system operating at 1.5T magnet strength.

T_1 and T_2 values were calculated from carefully selected regions of interest representing gray matter, white matter, fat and cerebrospinal fluid (CSF) of human brain.

The result shows a difference in T_1 and T_2 values for the different type of tissue.

These differences are found to be responsible for the different tissue contrast in MRI and consequently the ability of this imaging modality to characterize the different type of tissue for diagnostic assessment.

المستخلص

زمن الاسترخاء T_1 و T_2 بالإضافة الي كثافة البروتون (ρ) هما الكميات التي تعطي التوصيف الافضل للانسجة في التصوير بالرنين المغناطيسى للنواة.

هذه المعاملات تلعب دور حيوي في تحديد وضوح الانسجة، والذي يساعد الطبيب في رؤية تركيبة الانسجة بصورة واضحة، والتي تضم الانسجة الدقيقة، وللتمييز بين الانسجة الطبيعية والمريضة، وذلك من اجل المتابعة و التشخيص لتطور ومعالجة المرض.

في هذه الدراسة قيس زمن الاسترخاء T_1 و T_2 باستخدام نظام الرنين المغنطيسي والذي يعمل علي شدة مغنطيسية تعادل ١,٥ تسلا.

حسبت قيم زمن الاسترخاء T_1 و T_2 خلال مناطق في الدماغ البشرى يتم تحديدها بدقة وهذه المناطق هي الأنسجة السنجابية، الأنسجة البيضاء، منطقة الدهون و منطقة الCSF.

وأظهرت النتائج الاختلاف في قيم T_1 و T_2 وذلك باختلاف نوع الانسجة. هذه الاختلافات هي المسؤولة عن تحديد درجة الاختلاف في وضوح التصوير بالرنين المغنطيسي وبالتالي امكانية هذا النوع من التصوير في التمييز بين الانواع المختلفة للانسجة للتقييم التشخيصي.

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