

Amalina Dina Machfula, 081511333015, 2019. **Analisis Teknik Sekuen *Multi Echo Rechalled Gradient Echo (Merge) MRI Lutut pada Kasus Meniscus Tear dan Rupture Ligament***. Skripsi ini dibawah bimbingan Prof. Dr. Ir. Suhariningsih dan Akhmad Muzamil, S.ST, M.T. Program studi S1 Fisika, Departemen Fisika, Fakultas Sains dan Teknologi, Universitas Airlangga.

ABSTRAK

Telah dilakukan penelitian yang berjudul Analisis Teknik Sekuen *Multi Echo Rechalled Gradient Echo (MERGE) MRI Lutut Pada Kasus Meniscus Tear dan Rupture Ligament*. Tujuan dari penelitian ini adalah mengetahui perbedaan mekanisme fisis terbentuknya citra T2 *Multi Echo Rechalled Gradient Echo (T2 MERGE)* dan T2 *Fast Spin Echo Fat Saturation (T2 FSE FAT SAT)* gambar MRI lutut pada kasus *meniscus tear* dan *rupture ligament*, selain itu untuk mengetahui apakah T2 MERGE memberikan hasil yang optimal pada kasus *meniscus tear* dan *rupture ligament*. Dalam penelitian ini, variasi sekuen yang digunakan yaitu T2 FSE FAT SAT dan T2 MERGE. Hasil penelitian didapatkan pengaruh sekuen terhadap kualitas citra MRI lutut dianalisa pada 24 citra dari empat pasien. Analisa data dilakukan secara kuantitatif dengan metode *Region Of Interest (ROI)* langsung pada citra computer pesawat MRI kemudian dilakukan analisis *Signal to Noise Ratio (SNR)* dan *Contras to Noise Ratio (CNR)*. SNR dan CNR paling tinggi terdapat pada sekuen T2 MERGE. Perbedaan mekanisme fisis terbentuknya citra yaitu T2 FSE FAT SAT merefocusing 180° RF dan T2 MERGE merefocusing medan gradient. Karena SNR dan CNR pada T2 MERGE lebih tinggi maka dapat dikatakan sekuen tersebut memberikan hasil yang optimal.

Kata Kunci : MRI, T2 *Fast Spin Echo Fat Saturation (T2 FSE FAT SAT)*, T2 *Multi Echo Rechalled Gradient Echo (T2 MERGE)*

Amalina Dina Machfula, 081511333015, 2019. **Technical Analysis of The sequence *Multi Echo Rechalled Gradient Echo (MERGE) MRI of Knees in The Case of Meniscus Tear and Rupture Ligament***. This thesis is under the guidance of Prof. Dr. Ir. Suhariningsih and Akhmad Muzamil, S.ST, M.T. S1 Physics study program, Physics Department, Science and Technology Faculty, Airlangga University.

ABSTRACT

It has carried out, a study of technical analysis of the sequence *Multi Echo Rechalled Gradient Echo (MERGE) MRI of knees in the case of meniscus tear and rupture ligament*. The purpose of this study is to determine the differences in the physical mechanism of the formation T2 *Multi Echo Rechalled Gradient Echo (T2 MERGE)* and T2 Fast Spin Echo *Fat Saturation (T2 FSE FAT SAT)* of knee MRI images in the case of meniscus tear and rupture ligaments. In addition, this study is also to know whether T2 MERGE provides more optimal results in the case of *meniscus tear and rupture ligament* or not. In this study, the sequence variations used are T2 FSE FAT SAT and T2 MERGE. The results show that there are sequence effects of the quality of knee MRI images; it has been analyzed in 24 images from four patients. Data analysis is carried out quantitatively using the *Region Of Interest (ROI)* method directly on MRI aircraft computer images. Then, the researcher analyses the *Signal to Noise Ratio (SNR)* and *Contrast to Noise Ratio (CNR)*. The highest SNR and CNR are found in the sequence T2 MERGE. The difference in the physical mechanism of image formation is T2 FSE FAT SAT refocusing 180° RF and T2 MERGE refocusing the gradient field. Because SNR and CNR on T2 MERGE are higher, it can be concluded that the sequence gives optimal results.

Keywords: MRI, T2 *Fast Spin Echo Fat Saturation (T2 FSE FAT SAT)*, T2 *Multi Echo Rechalled Gradient Echo (T2 MERGE)*