SUMMARY AND CONCLUSION

Magnetic resonance spectroscopy (MRS) is a noninvasive analytic technique that measures the biochemistry and important metabolites in living tissues, therefore, MRS is the only technique in clinical medicine that provides non invasive access to living chemistry in vivo.

MRS is based on physics phenomenon called Nuclear magnetic resonance (NMR) and rely on the same physical principles where, the nuclei of certain atoms have a magnetic moment when placed in a magnetic field they absorb energy in the radio frequency range and then reemit this energy in the form of radio signals, the strength of these signals is proportional to the amount of the atomic nucleus, while the radio frequency range depends mainly on the molecule in which the nucleus is located and on the interaction with neighboring nuclei, post-processing and mathematical manipulation known as "Fourier transformation" is necessary to be applied to transform the signals into series of peaks called MR spectrum, not Images as in MRI.

Magnetic resonance spectroscopy is an application of Magnetic resonance Imaging (MRS).

MRS potentially complement the results of MRI examining combining the anatomical and pathological information provided by conventional MRI with functional metabolic and biochemical processes information provided by MRS, and that is very useful in studying different pathological conditions involving skeletal muscle, giving easier interpretation and better results.

Adequate MR spectra may be obtained in about 10 minutes. Therefore, MRS studies may be added on to routine magnetic resonance

imaging with multiplaner capability coupled with contrast resolution, giving ideal imaging of musculoskeletal system.

MRS, is unique in its ability to detect the important ^{31}P, ^{1}H and ^{13}C metabolites in the human body noninvasively.

^{31}P- MRS in vivo is sensitive to the change in concentration of high-energy phosphate compounds of the skeletal muscle such as ATP, PCr, PI, PDE and PME noninvasively.

MRS must be performed at magnetic field strength of about 1.5 Tesla or greater.

MRS signals are much weaker than the water proton signals for MRI, therefore, signal acquisition takes more time, and the VOI is considerably larger than that of MRI.

MRS of human skeletal muscle can play a significant role in under standing healthy muscle metabolism and the mechanisms of muscle fatigue, understanding the effects of disease on muscle metabolism and function, confirming the disease diagnosis, monitoring the therapeutic intervention and distinguishing neoplastic from non neoplastic lesions.

Development and use of MRS have proceeded more slowly than MRI, because the technical requirements for MRS are more stringent than for MRI and also because Magnetic field homogeneity is extremely important for MRS, requiring shimming for each measurement.