Role of high resolution U/S and MRI in evaluation of meniscal and cruciate ligaments injuries of the knee joint

Essay
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Introduction

The knee joint is the most commonly injured joint of the body. Ultrasound is the most rapidly developing technique in musculoskeletal imaging especially with the advancement of high-resolution equipment and an increasing role of expertise and interest worldwide **(Euqene G Mc Nally,*2008).***

Meniscal injuries of the knee are common ***(UpToDate,2014)*** Sonographic examination of the menisci is an easily available, non invasive imaging technique that, as a supplement to clinical findings, can be used to optimize preoperative diagnosis and to check the indication for arthroscopy***(Casser and Fusting, 2002)***.

Ultrasound examination of the knee and especially of the cruciate ligaments showed to be accurate tool in order to obtain additional information on an injured knee even if clinical examination is difficult or impossible. Sonography is able to exclude lesions of the cruciate ligaments precisely therefore it helps to restrict the necessity of acute or early arthroscopy of knee joints***(Ritzman and Weynand, 2000)***.

Over the past decade MRI has rapidly established itself as a diagnostic technique for knee disorders. Previous reports revealed a spectrum of MRI diagnostic accuracy reaching up to 98% when compared with findings at arthroscopic surgery regarding the composition of the internal structures e.g. menisci (lateral and medial), ligaments (anterior and posterior cruciate) or articular surfaces lesions especially with the new developing MRI sequences***(Stanestiski, 1998)***.

There are many advantages of US over MRI imaging that warrants its wide use as a first line of investigation in the assessment of knee joint, as it is: much cheaper, real time imaging, dynamic assessment, no sedation of children required, portable, mobile, and easy providing rapid side to side comparison***(Wang et al., 2002).*** Also some disorders can only

be observed when demonstrated dynamically during motion of the extremity ,muscle contraction ,probe compression ,or position change of the patient ***(Jacobson ,ultrasounclinic ,2008).***

But also US of the knee joint has some limitations as there is poor visualization of the deeper joint structures , with an inability to evaluate intra-articular or subchondral lesions **(Gunter Schmidt**,**2011**)

So musculoskeletal ultrasound should be viewed as acomplementary tool rather than one that competes with MR imaging .The choice of ultrasound versus MR imaging depend upon many factors ,such as access ,expertise ,expense ,clinician preference ,the anatomical area imaged and the pathology suspected **(Jacobson,ultrasound clinic,2008).**

Aim of Work:

The aim of this work is to evaluate the role of high-resolution ultrasonography and MRI in the diagnosis of meniscal and cruciate ligaments injuries of the knee joint .

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List of abbreviations

- *MRI…….Magnitic Resonance Imaging.*
- *MSUS…….Musculoskeletal Ultrasound.*
- *T.S……Transverse Section.*
- *L.S……..Longitudinal Section.*
- *M.M……..Medial meniscus.*
- *MCL…….Medial Collateral Ligament.*
- *LCL…….Lateral Collateral Ligament.*
- *ACL…….Anterior Cruciate Ligament.*
- *PCL…….Posterior Cruciate Ligament*.

ANATOMY OF THE KNEE JOINT

The knee joint is the largest and most complicated joint in the body. Basically, it consists of two condylar joints between the medial and lateral condyles of the femur and the corresponding condyles of the tibia, and a patellofemoral articulation between patella and the patellar surface of the femur. The fibula is not directly involved in the joint. *(Snell, 2007)*.

Bone and articular surfaces

The knee is formed by the femoral and tibial condylar articulations. The tibiofibular articulation though often considered a part of the knee, is in fact not a portion of the true knee joint. The knee is primarily a hinge joint that is protected anteriorly and posteriorly by muscles with special ligamentous attachments to the capsule. The articular surfaces of both the femoral condyles and tibial condyles are covered with hyaline cartilage. The femoral condyles are oval anteriorly and rounded posteriorly to provide increased stability in extension and increased motion and rotation in flexion *(Ryan and McNicholas ,2010).*

The medial femoral condyle is larger and important in load transmission across the knee. Medial and lateral tibial condyles form the expanded articular portion of the tibia.These condyles are separated by the intracondylar area, which serves for cruciate attachement and restricts translation. Between the tibial condyles are raised areas, known as the intercondylar eminence, that have medial and lateral tubercles.The weight bearing surfaces of the tibial and femoral condyles are separted by the fibrocartilagenous menisci, which are triangular when viewed tangentially and thicker laterally than medially *(Gray et al, 2008).*