Association of Mucoid Degeneration of the ACL with Medial Tibiofemoral Osteoarthritis Progression at MR Imaging

Thesis

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List of Abbreviations

Abb.	Full term
ACL	Anterior cruciate ligament
BMLs	Bone marrow lesions
JSN	Joint space narrowing
JSW	Joint space width
LCL	Lateral collateral ligament
MCL	Medical collateral ligament
MRI	Magnetic resonance imaging
MTFC	Medial tibio-femoral compartment
OA	Osteoarthritis
PCL	Posterior crucuiate ligament
WORMS	Whole-Organ MRI Score

INTRODUCTION

Anterior cruciate ligament (ACL) mucoid degeneration was first described in 1999. Histologically, it is characterized by degradation of collagen fibers and deposition of new glycosaminoglycans **(Kumar et al., 1999).**

Using magnetic resonance imaging (MRI), ACL mucoid degeneration is defined as a thickened ACL with increased signal intensity on all MR pulse sequences, with discrete fibers easily distinguished on fat-saturated T2-weighted or fat-saturated proton-density (PD)-weighted images but poorly differentiated on T1-weighted or non-fat-saturated PD-weighted images **(McIntyre et al., 2001)**.

Despite several reports on the imaging appearance of ACL mucoid degeneration, it is still a poorly understood entity in terms of its prevalence, etiology, and association with other structural damage in the knee joint. ACL mucoid degeneration may be a precursor of knee Osteoarthritis (OA) but it could also be part of a general degenerative process of the knee **(Cushner et al., 2003; Kim et al., 2008).** Since its initial description using MR imaging, it was suggested that this condition is probably underdiagnosed **(Fernandes et al., 2008).**

Indeed, a study by **Hovis et al**. in 2012 in elderly patients with symptomatic OA from the OA Initiative progression cohort, found that as many as 9% of participants had ACL mucoid degeneration diagnosed at 3 T MR imaging.

The link between ACL insufficiency and medial tibiofemoral compartment (MTFC) cartilage damage has been clearly established **(Maffulli et al., 2003; Amin et al., 2008).**

In a recent study, a group of knee MR examinations with a combination of various ACL abnormalities, including complete and partial tears and mucoid degeneration, demonstrated a higher prevalence of MTFC meniscal and cartilage damage compared to knee MR examinations with a normal ACL **(Hovis et al., 2012)**.

Aim of the Work

This study aims to assess the prevalence of ACL mucoid degeneration in a population of patients referred for routine knee MRI, and its association with age and structural joint damage.

Chapter 1

ACL Mucoid Degeneration

I. Epidemiology

Mucoid degeneration of the ACL was considered a rare entity, but recent publications show that it is more frequent than previously thought. This infiltration of glycosaminoglycan deposits between collagen bundles is a distinct condition from mucoid cysts but can be found in association with the latter. It is thought to arise from an initial injury to the ACL synovial lining, secondary to acute trauma or chronic impingement.

Historically, mucoid degeneration was not described in the skeletal system. Initial literature in the 1950s related to the cardiovascular system. The first report in a limb, in 1974, concerned striated muscle. The first ligament case in a patellar ligament was in fact histologically a mucoid cyst (MC). This illustrates the main downside of ACL mucoid degeneration literature, being that it is intermingled with ACL MC literature, making it difficult to identify evidence specifically related to mucoid degeneration **(Kwee et al., 2015).**

The first case of ACL mucoid degeneration was described in 1999. Since then, twelve articles have been published on ACL mucoid degeneration. Mucoid cysts have been moreregularly reported in the ACL in 24 articles since 1988 and PCL since 1965 **(Kumar et al., 1999).**