Degenerative Changes in Patients with Knee Pain: A Comparative Study Between Ultrasound and Conventional Radiology

Santiago Ruta[1], Erika Catay[1], Javier Rosa[1], David A. Navarta[1], Ricardo Garcia-Monaco[2] and Enrique R. Soriano[3], [1]Rheumatology Unit, Internal Medical Services, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina, [2]Radiology and Imagenology Department, Hospital italiano de Buenos Aires, Buenos Aires, [3]Rheumatology Unit, Internal Medical Services, Hospital Italiano de Buenos Aires, Instituto Universitario Hospital Italiano de Buenos Aires, and Fundacion PM Catoggio, Buenos Aires, Argentina

Background/Purpose: Knee osteoarthritis (OA) is one of the most common rheumatologic joint diseases and causes an important disability in the elderly population. To date the gold standard for the diagnosis of knee OA is radiographic. However, these findings might not be useful in early stages. **Objectives:** to investigate the ability of ultrasound (US) to detect abnormal findings related to OA in patients complaining of knee pain in comparison with conventional radiology (CR).

Methods: Consecutive patients over 50 years of age complaining of knee pain without a previous diagnosis of knee OA (ACR criteria) and no other known rheumatologic disease were included. US examination was performed by an experienced rheumatologist, blinded to clinical data, using a My Lab 70 machine (Esaote) provided with a multi-frequency linear transducer (4-13 MHz). A standardized scanning method was adopted in order to investigate the following US abnormal findings (presence/absence):

- osteophytes: defined as cortical protrusions at the joint margin seen in two planes and visualized as either proximal or distal to the joint
- degenerative femoral hyaline cartilage involvement: defined as loss of sharpness of the cartilage margins, loss of homogeneity of the cartilage layer and/or cartilage thinning (focal or extend to the entire cartilaginous layer)

Weight-bearing anteroposterior (AP) and lateral knee radiographs were read by an experienced rheumatologist, blinded to the clinical date and US findings, who assessed the presence or absence of osteophytes and degenerative femoral hyaline cartilage involvement, defined as the presence of femorotibial (FT) joint space narrowing. The FT space width was measured at the most peripheral site and at the mid-point of the medial compartment and lateral compartment. Frequency of each feature was calculated and compared between groups by chi2 test. A p value <0.05 was considered significant.

Results: 84 patients (mean age 69 ± 10 years, 66 female/18 male) were included for a total of 116 knees evaluated (32 patients complained of bilateral knee pain). Both the presence of osteophytes and degenerative femoral hyaline cartilage involvement were significantly more frequently detected by US than CR (Table). The presence of at least one of these degenerative changes was found in 81/116 knees in 56 patients by US and in 64/116 knees in 42 patients by CR ($p < 0.05$ for both comparisons) (Table).

Table. US and CR features among patients with knee pain.

		Ultrasound	Conventional radiology	p
Degenerative femoral hyaline cartilage involvement	***Patients,*** nº (%)	41/84 **(48.8)**	26/84 **(30.9)**	**0.0181**
	Knees, nº (%)	70/116 **(60.3)**	46/116 **(39.6)**	**0.0016**
Osteophytes	***Patients,*** nº (%)	52/84 **(61.9)**	26/84 **(30.9)**	**0.0001**
	Knees, nº (%)	77/116 **(66.4)**	41/116 **(35.3)**	**< 0.0001**
Degenerative changes¶	***Patients,*** nº (%)	56/84 **(66.6)**	42/84 **(50)**	**0.0285**
	Knees, nº (%)	81/116 **(69.9)**	64/116 **(55.2)**	**0.0211**

¶ defined as the presence of at least one of the other findings: degenerative femoral hyaline cartilage involvement and/or osteophytes

Conclusion: US had the ability to detect more degenerative changes compared with CR in patients > 50 years old complaining of knee pain and without a previous diagnosis of knee OA. The use of US in patients with knee pain and normal CR might be useful in the diagnosis of early stage OA.