EPIDEMIOLOGICAL and BIOMECHANICAL INFLUENCES on the PREVALENCE and PROGRESSION of PERIPROSTHETIC OSTEOLISIS AFTER TOTAL HIP REPLACEMENT.

Analysis with Magnetic resonance imaging.

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Introduction

There is an increasing interest in knowing the factors related to the wear particle-induced disease in total hip replacement (THR), after long-term follow up. Numerous studies have analyzed the development and the destruction patterns of the osteolisis. The objectives of this study were to determine the factors associated with major frequency and severity of this disease and their influence in the osteolytic progression pattern, using magnetic resonance imaging (MRI)

Materials & Methods

Our study included 86 consecutive THR of the same model, with a circunferencial porous hydroxyapatite-coating, implanted between 1990 and 2007. The mean follow up were 13,20 years. We performed a clinical and radiological analysis recording epidemiological and biomechanical variables including the polyethylene (PE) wear, using a specific software. In each case a MRI was performed, applying special protocols in order to reduce artifacts. We evaluated the location, size and osteolytic progression pattern (Figures 1 and 2). Finally, we made a statistical analysis. Pearson correlation and multiple regression techniques were used to analyze the data.

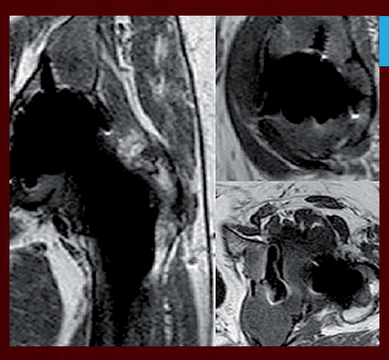


Fig. 1

Granulomatous lesion with peripheral and continuous growth pattern, involving bone and joint space.
Left: coronal view.
Right-up: sagittal view.
Right-down: axial view.

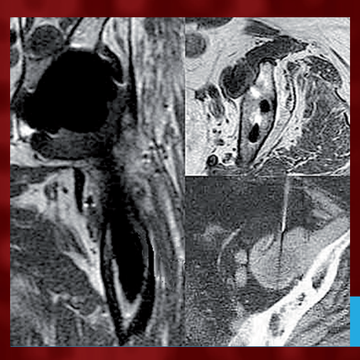


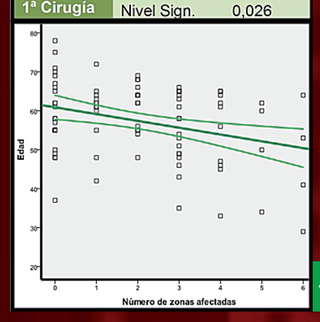
Fig. 2

Osteolysis with mixed growth pattern and cystic lesion associated.
Left: coronal section.
Right-up: axial section with cystic formation. Right-down: cystic lesion punctured by radiology.

Discussion

We found statistically significant differences ($p<0.05$) between the osteolytic size and many variables: patients age at primary surgery ($r= -0.239$) [Table 1], physical activity ($r= 0.325$) [Table 2], acetabular inclination ($r= 0.231$) [Table 3] and rate of PE wear ($r= 0.484$) [Table 4].

Spearman	Parametros	Nº zonas
Edad 1ª Cirugía	Coef. Corr.	-0,239
	Nivel Sign.	0,026



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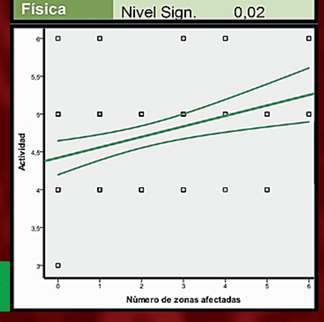
Spearman	Parametros	Nº zonas
Actividad Física	Coef. Corr.	0,325
	Nivel Sign.	0,02



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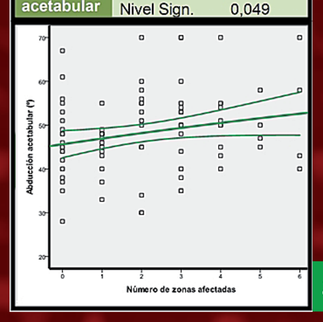
Spearman	Parametros	Nº zonas
Abducción acetabular	Coef. Corr.	0,231
	Nivel Sign.	0,049



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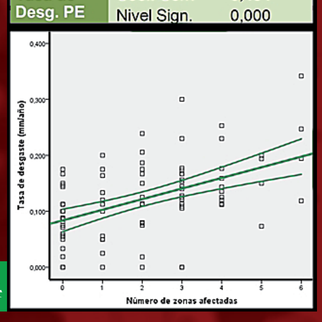
Spearman	Parametros	Nº zonas
Tasa de Desg. PE	Coef. Corr.	0,484
	Nivel Sign.	0,000



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Conclusions

The severity of osteolytic damages is larger in young patients, with more postsurgical physical activity. These factors, as well as acetabular inclination, are associated with increased PE wear rate and larger progression of the osteolytic disease. Higher wear rate and large osteolytic lesions were related with peripheral and continuous destruction patterns.