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ORIGINAL STUDY

Magnetic resonance imaging for diagnosing lesions of the triangular fibrocartilage complex

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In a retrospective survey we compared the magnetic resonance imaging (MRI) protocols with the arthroscopic findings for triangular fibrocartilage complex (TFCC) lesions. We found a sensitivity of 0.61 and specificity of 0.88 for MRI. The positive predictive value was 0.85 and the negative predictive value was only 0.68. These values are very similar to those in other recent surveys.

These findings and the reviewed publications all indicate that MRI cannot replace arthrocopy. Special coils and MRI-arthrography can significantly enhance the specificity and the sensitivity. A negative MRI is not an endpoint and not a contraindication for further exploration, in particular for arthroscopy.

Keywords : wrist ; triangular fibrocartilage ; NMR.

INTRODUCTION

Ulnar wrist pain is a common clinical problem and the differential diagnosis is not always straightforward. Although history taking, physical examination and plain radiographs are usually appropriate for most problems, further investigations are required in chronic wrist pain.

Arthrography has been used but the sensitivity (ss) and the specificity (sp) are not high enough to establish a correct diagnosis (and surgical indication), especially for lesions of the TFCC (triangular fibrocartilage complex) (*10*).

Arthroscopy has proven its superiority for definitive diagnosis but it remains an invasive technique.

Magnetic resonance imaging (MRI) is of course tempting but the results for sensitivity and specificity are varying. Also different coils and techniques have been used which also can explain the large variation in the results reported.

Most series started from the MRI results and looked for confirmation by arthroscopy or arthrotomy.

The purpose of this survey was to start from a clinical situation and from the arthroscopic findings and afterwards to look if the lesion had been seen on the MRI

MATERIAL AND METHODS

All files of patients who had undergone an arthroscopy of the wrist from January 2002 to July 2004 were reviewed ; 132 files were retrieved ; the majority however (n = 97) had been done for therapeutic reasons on an already established diagnosis without MRI. For 35 cases, the diagnosis was unclear and these patients had an MRI and subsequently an arthroscopy. There

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were 13 males and 22 females with a mean age of 33 years (range 14 to 57).

The MRI was done in several hospitals by several radiologists with a standard available scanner without special coils for the wrists and without contrast. For the status of the TFCC we looked for rupture or not, according to the radiologist's protocol as a non continuous variable.

The arthroscopy was performed by several residents and fellows, under the direct supervision of the author. Hereto the TFCC was judged as ruptured or not ; it was retrospectively impossible to describe the tears more in detail.

RESULTS

Arthroscopy was considered the gold standard. We found 18 tears and 17 intact TFCC's. The TFCC was seen on MRI to be ruptured in 11 cases and a rupture of the TFCC was missed in 7. On the other hand, the TFCC was found at arthroscopy to be intact in 2 cases but had been considered ruptured on MRI. The MRI findings had been considered normal in 22 cases, among which arthroscopy showed rupture of the TFCC in seven. MRI demonstrated a rupture of the TFCC in 13 cases ; the TFCC was found to be normal in two of them at arthroscopy.

These findings translate into a sensitivity of 0.61 and a specificity of 0.88. The positive predictive value was 0.85 and the negative predictive value was 0.68.

DISCUSSION

The diagnosis of TFCC lesions is not always simple. Non invasive techniques have been reported to allow for a better understanding and a sharper diagnosis before planning arthroscopy or any other (surgical) treatment. MRI is a powerful tool for imaging soft tissue. The first surveys confirmed the usefulness of this technique, giving the - wrong - impression that MRI should be the gold standard in the diagnosis of chronic wrist pain (*1, 11*). However with standard available scanners and less sophisticated coils, the lower resolution was reflected in lower sensitivity and specificity of this imaging technique in the diagnosis of TFCC and other ligamentous lesions of the wrist (*2-9*). Some comparative series are summarised in table I (*1-9, 11*).

Table I. — ***S***ummarised data of comparative studies (ss : sensitivity, sp : specificity, NP : not performed, * 2 observers)

	Year	N	ss	sp
Oneson *et al* (*5*)*	1997	56	0.89/0.83	0.78/0.74
Potter *et al* (*7*)	1997	77	1.0	0.9
Johnston *et al* (*2*)	1997	46	0.8	0.70
Morley *et al* (*4*)	2001	56	0.44	0.87
Shionoya *et al* (*9*)	1998	102	0.73	0.72
Zlatkin *et al* (*11*)	1989	23	0.89	0.92
Golimbu *et al* (*1*)	1989	14	0.93	NP
Schweitzer *et al* (*8*)	1992		0.51	0.91
Meier *et al* (*3*)	2003	125	0.9	0.89
Pederzini *et al* (*6*)	1992	11	0.8	1.0

Interpretation of MRI images should be done with caution and especially the high number of false negatives should be a warning. In fact the ss and the sp were not superior to arthrography (ss = 0.72 sp = 0.92) (*10*).

This and other surveys have in common a rather modest sensitivity, indicating that a negative MRI is not an endpoint, and a relatively high specificity, indicating that a positive MRI should be trusted and is a good base for further treatment.

The small size of the TFCC and even smaller signals of a rupture requires special techniques and adapted coils. This allows making slices as thin as 2 to 3 mm. Standard coils cannot provide enough details to detect such small lesions. An interesting evolution is MRI-arthrography which can considerably increase the specificity and sensitivity (*3*).

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