Injury, Int. J. Care Injured 43 (2012) 1732–1742

Contents lists available at SciVerse ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

A new definition of wrist sprain necessary after findings in a prospective MRI study

T.H. Bergh [a,b,*], T. Lindau [b,c], S.V. Bernardshaw [a], M. Behzadi [d], L.A. Soldal [a], K. Steen [a], C. Brudvik [a,b]

[a] Bergen Accident and Emergency Department, Bergen, Norway
[b] Department of Surgical Sciences, University of Bergen, Bergen, Norway
[c] The Pulvertaft Hand Centre, Kings Treatment Centre, Royal Derby Hospital, Derby, UK
[d] Department of Radiology, Stavanger University Hospital, Stavanger, Norway

ARTICLE INFO

Article history:
Accepted 25 June 2012

Keywords:
Wrist
Sprains
Magnetic resonance imaging
Fractures
Bruises
Triangular fibrocartilage complex
Ligaments
Soft-tissue injuries

ABSTRACT

Introduction: Wrist injuries with negative X-rays are diagnosed as acute wrist sprains. The prognosis is usually good, but some patients suffer from long-lasting pain and reduced wrist function, probably due to missed diagnosis followed by inappropriate treatment. The aim of this study was to investigate acute wrist sprains with MRI to detect the pathoanatomy of the injury.

Patients and methods: This prospective magnetic resonance imaging (MRI) study included patients between 18 and 49 years, who attended the Accident and Emergency Department (A&E) Bergen, Norway, after sustaining an acute wrist trauma within the previous week. Initial X-rays of the wrist were normal. MRI was done within a median of 1 day (range 0–31 days) after the trauma, 80% within 4 days. The study period lasted from 5 November 2009 to 4 November 2010.

Results: A total of 155 acute MRIs were done, out of which 30 were completely normal. Patients with positive MRI had a median of two (range 0–8) pathological findings. We found 54 fractures and 56 bone bruises, mostly located to the radius followed by the scaphoid, the triquetrum, the capitate and the lunate. There were 73 soft-tissue injuries, which included 15 injuries to the triangular fibrocartilage complex (TFCC) and five scapho-lunate (SL) ligament lesions.

Conclusions: Wrist sprain is an inaccurate diagnosis. In four out of five patients with normal X-rays, MRI identified pathological findings and a large variety of injuries in different structures. We suggest that wrist sprain should be defined as "occult partial or complete soft tissue (ligament, tendon, muscle) or bony injury in relation to a trauma with negative X-ray". The MRI findings led to a more differentiated treatment in more than a third of the patients. We recommend that MRI should be considered as a part of an early investigation, especially when the wrist pain does not settle within the first couple of weeks.
© 2012 Elsevier Ltd. All rights reserved.

Pain and swelling in the wrist after a trauma is a common presentation in clinical practice. The routine diagnostic work-up for acute wrist trauma consists of a physical examination, usually with radiography. This diagnostic strategy probably identifies the majority of fractures and dislocations, but provides very little information about injuries to soft tissues, such as tendons, inter-carpal ligaments and the triangular fibrocartilage complex (TFCC).[1] Another diagnostic problem in the injured wrist is the relatively high rate of occult carpal bone injuries not identified with traditional X-ray.[2]

There are, to the best of our knowledge, no prospective studies examining the distribution of injuries of a wrist sprain using acute magnetic resonance imaging (MRI). Most articles describe the findings of injury by the use of different radiological investigations when fractures are suspected.[3,4]

Wrist injuries with negative X-rays are usually diagnosed as acute wrist sprains. Wrist sprain is defined by the International Wrist Investigator Workshop (IWIW) as a partial ligament tear,[5] often without identifying exactly which ligament is injured. Allegedly, there is sometimes a change in the dimensions of the affected ligaments, with or without loss of its structural integrity.[5] The treatment is often PRICE (Protection, Rest, Ice, Compression, Elevation).[6] The prognosis is usually good,[6] but some patients suffer from prolonged pain and reduced wrist function. This is probably due to missed diagnoses of more serious pathology.[7] The aim of this study was to investigate acute wrist sprains with MRI to detect which pathoanatomical structures are injured.[8–12]

Patients and methods

This prospective study was conducted at Bergen Accident and Emergency Department (A&E), Norway from 5 November 2009 to 4 November 2010. Bergen A&E is an outpatient clinic

* Corresponding author at: Bergen Accident and Emergency Department, Vestre Strømkaien 19, 5008 Bergen, Norway. Tel.: +47 55568700; fax: +47 55327934.
E-mail address: torbjorn.bergh@kir.uib.no (T.H. Bergh).

0020–1383/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.injury.2012.06.028

treating almost all of the minor injuries in Bergen, the second-largest city in Norway. Annually, 100 000 patients attend our A&E, out of which 40 000 are treated at the surgical division at the A&E due to different types of injuries. We included patients aged 18–49 years who attended the A&E within a week after sustaining an acute wrist trauma requiring X-rays. Patients with clear radiographic fractures or dislocations were excluded. Other exclusion criteria were patients with rheumatoid arthritis and previous wrist fractures. Furthermore, patients with contraindications for MRI such as pregnancy, metal implant and claustrophobia were also excluded.

Mechanisms of injury were divided into high- and low-energy trauma, defining low-energy trauma as equivalent to that generated by a fall from standing position or lower. Falls from higher positions or other injury mechanisms during sports were defined as high-energy trauma.

Both the clinical examination and the interpretation of the X-rays were done by the doctors on duty at the A&E as a part of their daily clinical practice. All doctors were instructed in appropriate wrist examination.

We used a standardised X-ray protocol with extended wrist views including the distal part of the radius and the proximal parts of the metacarpals. A series of four images were used (Fig. 1 and legends) (Philips Diagnost with micro focus (0.3 mm), Agfa CR and digitiser, Agfa Picture Archiving and Communication System (PACS)).

The MRI protocol included coronal T1 spin echo (SE) (fractures), coronal short tau inversion-recovery (STIR) (bone bruise), coronal T2* (T2 gradient echo) (ligament- and TFCC ruptures) and axial proton density fat-saturated (PD FS) (field of view (FOV): 11 cm). Slice thickness: overall 3 mm but 1 mm on T2. MRI scans were performed in a 1.5-T whole-body scanner with a wrist coil. Five of the MRIs were done at a different institute. However, our radiologist accepted the quality of the pictures and found them acceptable to be included in our study.

MRI was done with a median of 1 day (0–31 days) after the trauma. All MRIs were interpreted by an experienced musculoskeletal radiologist (MB). As an internal quality control, we used three other experienced radiologists to interpret a random selection of 10% of the MRI scans. Their results were in accordance with the reported findings by MB.

The following definitions were used in our study for pathological findings:

Fracture. A complete occult fracture extends through the entire cross-section of the bone. An incomplete fracture does not extend through the full transverse width of a bone, only

Fig. 1. X-ray wrist in four projections. The first was a standard posterior–anterior (PA) view with the wrist in ulnar deviation. The second was a lateral view of the carpus and distal radius/ulna. The third and fourth views were oblique: one with the hand in 45° supination the other with 45° pronation (Pat id 145).

Download English Version:

https://daneshyari.com/en/article/3240325

Download Persian Version:

https://daneshyari.com/article/3240325

Daneshyari.com