Sonography of the wrist joint: Pathologic conditions

Bahaaedin A Elkhader*

Department of Radiological Sciences, College of Applied Medical Sciences, Taif University, Taif 21944, Saudi Arabia.

Magna Scientia Advanced Research and Reviews, 2022, 04(02), 005–010

Publication history: Received on 07 February 2022; revised on 10 March 2022; accepted on 12 March 2022

Abstract

Background: Proper and quick diagnosis of the musculoskeletal abnormalities is important to avoid any future defect.

Objectives: To estimate the accomplishment of sonographic investigation in evaluating several kinds of wrist joint disorders.

Methods: This prospective study was achieved at Khartoum state hospitals for a period of 2 years; on 175 participants 100 males and 75 females their age ranging from 18 to 63 who came to ultrasound department had wrist joint pain. Medical history and informed consent were taken.

Results: Spectrum of wrist joint disorders found out by ultrasound, ganglion cysts 18.29% (32 of 175), joint effusion 14.29% (25 of 175), triangular fibrocartilage complex tear 13.14% (23 of 175), carpal tunnel syndrome 12% (21 of 175), arthritis 10.86% (19 of 175), scapholunate tear 8.57% (15 of 175), tenosynovitis 8% (14 of 175), avascular necrosis 8% (14 of 175), tendon tear 4% (7 of 175) and Neoplasm 2.86% (5 of 175).

Conclusion: Ultrasound become widespread method in assessment of musculoskeletal system. It became a first-line in diagnostic purposes. Its perfect features make it trustable and safety modality to evaluate the assortment of wrist abnormalities.

Keywords: Ganglion cyst; Musculoskeletal; Pain; Sonography; Wrist

1. Introduction

The wrist joint is located in distal upper limb, it considered as a synovial joint. Also termed radiocarpal joint, it consists of multiple components bones and soft tissues [1].

According the nature of the components of the wrist joint, it is challenging to make a correct diagnosis because it mimics the presence of diseases, leading to diagnostic errors [2].

Musculoskeletal system in human body can affected by many abnormalities which refer as musculoskeletal disorders (MSDs) [3].

The MSDs contains a variation of diseases [4] for example, among the soft tissues' masses ganglia present the high ratio of occurrence [5], carpal tunnel syndrome known as sickness associated with nerve, it influences people, especially the elderly [6]. Inflammatory of joint is common among population with variation of symptoms and appearance on ultrasound [7]. And also, there are other spectrum of pathological condition [8].

*Corresponding author: Bahaaedin A Elkhader
Department of Radiological Sciences, College of Applied Medical Sciences, Taif University, Taif 21944, Saudi Arabia.

Copyright © 2022 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution License 4.0.
The special properties that ultrasound possess, in terms of safety and ease of use, qualifies the ultrasound to gain the priority in diagnosing diseases of the musculoskeletal system [9-11].

2. Material and methods

175 patients complain of wrist pain presented to various ultrasound department in Khartoum state hospitals in period from June 2019 to January 2021 were included in this descriptive cross-sectional study, 100 males (57.1%) and 75 females (42.9%) formed the study sample. Participants age between 18 and 63 years and the mean age was 38.12 ± 10.4 years.

The ethics committee in different hospitals approved this research; the sonographic scan of the wrist joint was achieved with GE LOGIQ P9 ultrasound system using linear transducer (7 -12 MHz). According standard of European society of musculoskeletal radiology, dorsal aspect of wrist is estimated first then the palmar one.

Statistical analysis was completed using SPSS version 19.0. Research data were demonstrated as mean, standard deviation, frequency and percentage.

3. Results

One hundred and seventy-five patients; 100 (57.14%) male and 75 (42.86%) female (figure 1) were attended the ultrasound departments complain from wrist problems.

![Figure 1 Distribution of the study group gender](image)

Table 1 Distribution of age groups of the study subjects

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>7</td>
<td>4.00</td>
</tr>
<tr>
<td>25-30</td>
<td>46</td>
<td>26.29</td>
</tr>
<tr>
<td>31-36</td>
<td>34</td>
<td>19.43</td>
</tr>
<tr>
<td>37-42</td>
<td>32</td>
<td>18.29</td>
</tr>
<tr>
<td>43-49</td>
<td>28</td>
<td>16.00</td>
</tr>
<tr>
<td>50-56</td>
<td>16</td>
<td>9.14</td>
</tr>
<tr>
<td>57-63</td>
<td>12</td>
<td>6.86</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean age =38.12± 10.4 years
The mean age of study sample was 38.12± 10.4 years (range 18–63) with highly occurrence percentage within 25-30 age group, then 31-36 years, and 37-42 years respectively (table 1).

Ultrasound finding categorized in two main sets according the etiology of lesions; non traumatic which had highly frequency 130 (74.29%) and traumatic 45 (25.71%) (figure 2).

![Figure 2 Classification of ultrasound findings according the causes of lesions](image)

Ganglion cysts represented most common lesion in this study; it included 32 cases followed by joint effusion 25 cases, triangular fibrocartilage complex tear 23 cases carpal tunnel syndrome 21 cases, arthritis 19 cases, Scapholunate tear 15 cases respectively; neoplasm of wrist was less common in this study, it contained only 5 cases (table 2).

**Table 2 Distribution of ultrasound findings among study population**

<table>
<thead>
<tr>
<th>Ultrasound finding</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Traumatic lesions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganglion cysts</td>
<td>32</td>
<td>18.29</td>
</tr>
<tr>
<td>Avascular necrosis</td>
<td>14</td>
<td>8.00</td>
</tr>
<tr>
<td>Arthritis</td>
<td>19</td>
<td>10.86</td>
</tr>
<tr>
<td>Carpal tunnel syndrome</td>
<td>21</td>
<td>12.00</td>
</tr>
<tr>
<td>Tenosynovitis</td>
<td>14</td>
<td>8.00</td>
</tr>
<tr>
<td>Joint effusion</td>
<td>25</td>
<td>14.29</td>
</tr>
<tr>
<td>Neoplasm</td>
<td>5</td>
<td>2.86</td>
</tr>
<tr>
<td>Traumatic lesions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFCC tear</td>
<td>23</td>
<td>13.14</td>
</tr>
<tr>
<td>Scapholunate tear</td>
<td>15</td>
<td>8.57</td>
</tr>
<tr>
<td>Tendon tear</td>
<td>7</td>
<td>4.00</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

**4. Discussion**

Nowadays ultrasound becomes one of the most common modalities used in the assessment of human body joints such as wrist joint abnormalities [12].
Out of 175 patients included in this research, male patients represent the highest percentage. This outcome was supported by Hemeeda et al. [13] who reported in study performed in 2015 male patients' percentage 64% compare to female patients' percentage 36%. But in study by Chail et al. [14] and Hampole et al. [15] stated that the proportion of female patients was dominant.

In this study patients in young age group (25-30) had the highest ratio of wrist joint abnormalities. This result was in agreement with Chail et al. [14] and El Shibiny et al. [16] who stated that most of the cases fall into the age group (20-40).

The current study classified the etiology of wrist joint abnormalities into non traumatic and traumatic groups. This subdivision was similar to categorization by Van Vugt et al. [17].

In this study ganglion cysts were most common lesion; it represented 18.29%. This finding was in agreement with Bianchi et al. [18], Singh et al. [1] and Sit et al. [19] who reported that ganglion cysts considered as the highest rate of occurrence of benign soft tissue mass.

Joint effusion came in the second order of cases; it account about 25 cases out of 175 patients. This result was matching with the finding of study by Saad et al. [20] and El Shibiny et al. [16] who stated that effusion was found out in majority of cases.

TFCC tear occupied the third commonest in this study, this was coinciding with the study of El-Deek et al. [21] and Kamal and El-Leithy [22] who reported that ultrasound has high specificity in rule out the abnormality of tear.

Current study found that the percentage of CTS was 12%; this outcome was slightly near to percentage of study by El-Deek et al. [21] which was 16%.

This study revealed that, arthritis cases were 19 out of 175 with 10%. This finding was supported by Rowbotham and Grainger [23] who stated that joint inflammation was occurred in most people.

There were 15 patients (8.57%) had scapholunate tear (SL tear) in the present study. This finding was coincided to study by El Shibiny et al. [16] who concluded that the incidence of SL tear was 10%.

Tenosynovitis was represented 8% in our study. This is in line with El-Deek et al. [21] who found out in study performed in 2019. And Nung et al. [24] stated that ultrasound accurate methods to detect this condition.

Ultrasound had significant role to detect the avascular necrosis in wrist joint. Its percentage was 8% in this study. Chail, et al. [14] reported in study carried out in 2020 that abnormality represented only 6.7%.

In study by Singh et al. [1] the tendon tear was presented in 4 (5%) patients; this finding corresponded with our result 7 patients (4%) had tendon abnormality. In contrast, study by Hampole et al. [15] who didn't find tendon disorders.

Wrist masses represent the lowest occurrences cases, it was seen in 5 (2.86%) patients. Our finding was similar to El-Deek et al. [21] who discovered 3 cases (6%) in study conducted in 2019.

5. Conclusion

Efforts are made to find the most effective method to discover any defect in the joints of the body generally. Ultrasound is characterized by its ease of use, availability and free from radiation risks, which made it the preferred choice in many cases for diagnosing diseases of the wrist joint.

Ultrasound Mostly exhibited high accuracy in determining the type of injury, which contributed to alleviating potential complications and preventing function loss.

Compliance with ethical standards

Acknowledgments

I would be grateful to all individuals who made this work to be real.
Disclosure of conflict of interest
There is no conflict of interest to declare.

Statement of informed consent
Informed consent was obtained from all individual participants included in the study.

References


