

(RESEARCH ARTICLE)



Sonography of the wrist joint: Pathologic conditions

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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].

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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.

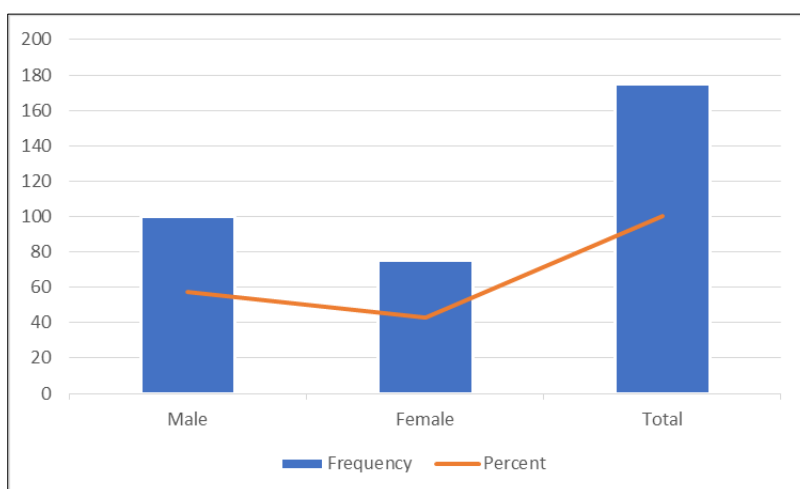


Figure 1 Distribution of the study group gender

Table 1 Distribution of age groups of the study subjects

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

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).

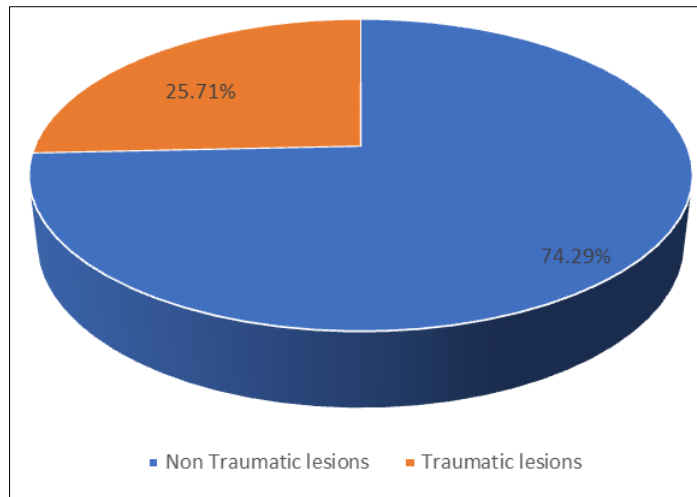


Figure 2 Classification of ultrasound findings according the causes of lesions

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

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

TFCC triangular fibrocartilage complex

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

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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.

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