

Review of MRI Wrist Results at KAUH

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ABSTRACT

Background: Magnetic resonance imaging (MRI) is defined as one of the most important modalities used for diagnosing lesions of small and complex structures in the body (1). We aimed to investigate the most common wrist pathologies detected by MRI in KAUH (King Abdulaziz University Hospital) in Jeddah.

Methodology: A retrospective study was done with a total sample size of 127 individuals who underwent wrist MRI investigation at KAUH in Jeddah (Saudi Arabia), between 2010-2016. The data entry was performed by using Microsoft Excel 2014, and statistical analysis was performed by SPSS V21.

Results: The results of the analysis showed that the most common wrist pathology was ganglion cysts, constituting 17.8% of the 157 findings we observed. Other common findings were Tenosynovitis (10.2%), TFCC (Triangular fibrocartilage complex) tear (10.2%), TFCC degeneration (5.7%) and subchondral cysts (3.8%). There was also a significant relation between normal/abnormal findings in individuals and their age of presentation. Age mean was 29.27 (± 7.46 SD) for those with normal findings, and 37.33 (± 15.62 SD) for those with abnormal findings, (P value less than 0.001). Regarding X-ray investigation, we found that most of the sample (65.4%) did not undergo X-ray prior to MRI.

Conclusion: It has been found that there is variance between all findings that were discovered by MRI, that there are differences between our study and those of others, and that due to the different sorts of cases that were presented to the hospital. We also found that most of the individuals with wrist pathologies did not get X-rays before MRI, so we recommend a clear policy of ordering MRI, also proper history and examination should be the essential tool to reach hand and wrist diagnoses. That will help in saving resources.

Keywords: MRI, wrist, hand, disease, carpal tunnel syndrome, tear, ganglion cysts, Tenosynovitis, TFCC, x-ray, subchondral cysts.

INTRODUCTION

Magnetic resonance imaging (MRI) is regarded as one of the most important modalities used in medicine for diagnosing lesions of small and complex structures in the body, such as the wrist. Because of its high resolution, it can detect a disease in its early stages⁽¹⁾. Wrist pain is common and when the exact lesion is known early, the prognosis will be better⁽²⁾.

The human wrist is a common site for many pathologies, including fractures of the carpal bones, avascular necrosis of scaphoid and lunate bones, carpal tunnel syndrome, ligamentous tears and many other disorders⁽³⁾. The application of MRI in the wrist can lead to better health care for patients, better management and increasing the accuracy of certain diagnosis^(3,4).

A previous study has shown that the most common MRI finding was occult bone fracture, including scaphoid fracture⁽⁵⁾. Another study found that triangular fibrocartilage (TFC) and scapholunate

ligament injuries were the most frequent findings in MRI in patients with wrist pain⁽⁶⁾.

There were no published studies that have been done with regards to the common pathologies of the wrist found by MRI in Saudi Arabia. Thus, in this study, we aim to identify the most common wrist pathologies found by MRI at King Abdulaziz University Hospital in Jeddah.

METHODOLOGY

A retrospective study was done at KAUH at Jeddah in Saudi Arabia in June 2016 by using paper records from the radiology department. Different groups of ages from both genders who underwent wrist MRI between 2010-2016 were included in the study, with a sample size of 127 patients.

The following data were extracted from each patient's file: Gender, age, MRI procedure date, X-ray procedure date if done, and the pathologies that were discovered by MRI.

Ethics:

This study has been approved by Institutional Review Board (IRB) of KAUH.

Statistics:

Statistical analysis was performed by SPSS V21. Qualitative data (Gender, the pathologies that were discovered by MRI) was presented by using numbers and percentages. The associations between qualitative variables had been found by using Chi-square test. Independent T test was used to define if there is significant relationship between the individuals' wrist MRI findings (i.e. normal vs. abnormal) and their mean of ages. The mean of ages had been calculated for each: males, females and the entire sample.

RESULTS

In this study, we observed the most common wrist pathologies that are detected by MRI in King Abdul-Aziz University Hospital. We took a sample of 127 cases, most of whom were women (54.3%). Age and gender distribution is shown in Table (1).

We found that 30 (23.6%) individuals had normal findings, and total individuals with abnormal findings were 97 (76.4%). The age mean of the individuals with normal findings was 29.27 (± 7.46 SD), while the mean of age for those with abnormal findings was 37.33 (± 15.62 SD). Statistically, there appears to be a significant relationship between the individuals' wrist MRI findings (i.e. normal vs. abnormal) and their age (P value less than 0.001). The results showed a total of 157 MRI findings; 23 of the patients (18.1%) had more than one

finding. Normal findings were 30 (19.1%) from both genders, and total abnormal findings were 127 (80.9%) from both genders. We found no statistical significance with relation to pathological findings in patients' wrists and their gender (P value = 0.736).

The most common pathological categories were soft tissue masses, with a total of 31 findings (19.7%). Inflammatory changes constituted 25 findings (15.9%), TFCC pathologies made up 25 findings (15.9%), bone injuries were 10 (6.4%), avascular necrosis cases were 6 (3.8%), ligament pathologies were 5 (3.2%) and other pathologies were a total of 25 findings (15.9%).

The most common wrist-related soft tissue masses were ganglion cysts 28 (90.3%), with the mean of age being 32.18 (± 14.8 SD). Most of them were among women, totaling 20 (71.4%). The most common pathology in triangular fibrocartilage complex were TFCC tears, at 16 (64%), with a mean of age of 36.25 (± 15.57 SD). The majority of them were among men, 10 (62.5%). More detailed information is shown in Table (2).

Our study also shows that 65.4% of the individuals did not have an X-ray done prior to MRI, and 22.9% of them had normal findings. Also 80% of scaphoid fractures diagnosed by MRI did not have prior wrist X-rays.

Table (1): Age and gender distribution.

Gender	N	Percentage	Age
Male	58	45.7%	34.79 (± 13.06 SD)
Female	69	54.3%	35.96 (± 15.71 SD)
Total	127	100%	35.43 (± 14.51 SD)

Table (2): Prevalence of findings

Main category	Findings	Frequency	Percent	More common in :	Mean of age (SD)
Normal NO : 30 (19.1%)	Normal	30	19.10%	Female	29.83
				56.70%	(±7.6)
Soft tissue mass NO : 31 (19.7%)	Ganglion cyst	28	17.80%	Female 71.4%	32.18 (±14.8)
	Hemangioma	1	0.60%	Male 100%	51
	Schwannoma	1	0.60%	Male 100%	50
	Bone island lesion	1	0.60%	Male 100%	25
Triangular fibrocartilage complex pathology NO : 25 (15.9%)	TFCC Tear	16	10.20%	Male 62.5%	36.25 (±15.5)
	TFC degeneration	9	5.70%	Male 55.60%	48.11 (±16.7)
Inflammatory changes NO : 25 (15.9%)	Tenosynovitis	16	10.20%	Female 56.3%	50 (±13.7)
	Synovitis	2	1.30%	50% in both gender	36 (±22.6)
	Tendonitis	5	3.20%	Male 60%	27.6 (±9.7)
	Inflammatory arthropathy	2	1.30%	50% in both gender	41 (±26.8)
Bone injury NO : 10 (6.4%)	Scaphoid fracture	5	3.20%	Male 100%	37 (±11.2)
	Distal radial fracture	2	1.30%	Female 100%	54.5 (±26.1)
	Distal radio ulnar fracture	2	1.30%	Male 100%	49.5 (±0.7)
	Occult fracture	1	0.60%	Female 100%	61
Avascular necrosis NO : 6 (3.8%)	AVN	6	3.80%	Male 66.7%	25.67 (±5.8)
					50 (±11.5)
Ligament pathology NO : 5 (3.1%)	Scapholunate ligament tear	3	1.90%	Male 66.7%	50 (±11.5)
	Tear of the distal radioulnar ligament	1	0.60%	Female 100%	36
	Tear of the extensor carpi ulnaris	1	0.60%	Female 100%	56
Others NO: 25 (15.9%)	Subchondral cyst	6	3.80%	Female	53.5
				66.70%	(±6.5)
	Degenerative changes	5	3.20%	Female	53.2
				60%	(±6.3)
	Carpal tunnel syndrome	4	2.50%	Female	50
				75%	(±16.9)
	Joint effusion	2	1.30%	50% in both gender	40 (±16.9)
	Abnormal alignment of metacarpal bones	1	0.60%	Male 100%	25
	Bifid median nerve	1	0.60%	Female 100%	57
	Dislocation	1	0.60%	Female 100%	26
Extensor carpi ulnaris subluxation	1	0.60%	Male 100%	56	
Other cysts	3	1.90%	Male 66.7%	30.67 (±8.5)	
Vascular crisis	1	0.60%	Male 100%	9	
Total		157	100.00%	Female 52.2%	38.06

DISCUSSION

In this study we aim to identify the most common wrist pathologies that are found by MRI at King Abdulaziz University Hospital in Jeddah because we think that knowing the prevalence of wrist lesions which are diagnosed by MRI can help in rearranging differential diagnosis priorities. In turn, that can help doctors to diagnose patients quicker and more efficiently, and it may help to support theories regarding the variation in comparison with other studies in other countries.

Our study shows that ganglion cysts are the most common finding (17.8%), followed by tenosynovitis (10.2%), TFC tears (10.2%) and TFC degeneration (5.7%). Comparing our study to others, we found one study conducted in the United Kingdom, which showed that ganglion cysts are the most common wrist pathology there as well (26%), followed by bone bruising (13%) and tenosynovitis (10%) (6). Another study was conducted in Egypt showed that their most common findings were TFC and ligament tear 26.6%, followed by joint effusion 23.3%, ganglion cyst and Kienböck's disease were both 16.6% (5). There are different results in different countries due to the different kinds of cases that are seen in the hospitals.

In addition, our study shows that ganglion cysts are more common in women than men (2.5:1), which is supported by the findings of a similar study conducted in North America; their ratio, however, was 3:1, women to men (7). Our results showed that tenosynovitis was common in women, which is corroborated by a similar study that was conducted in Rio de Janeiro, which showed that tenosynovitis occurs at a higher rate in women than men (12).

All of our findings in this study with regards to scaphoid fractures were distributed more among males as it was also found in a similar study that was conducted in London, which showed scaphoid fractures were more common in males (8). Our study showed that the ages of patients who had scaphoid fractures were between 24 to 50 years, which is considerably similar to what was found in an Egyptian study, in which their ages were between 25 to 50 (5).

65.4% of the individuals in this study did not undergo an X-ray prior to receiving an MRI scan, and 22.9% of them had normal findings. Also, 80% of scaphoid fracture diagnosed by MRI did not have

prior wrist X-rays. A study conducted in France stated that the sensitivity of x-ray examination in diagnosing scaphoid fractures varies from 59 to 79% (9).

In the American College of Radiology, there are standard guidelines that mandate ordering X-rays before MRI scans, and three-view or four-view radiographs should be performed first (10). Careful consideration of other modalities before undergoing MRI was found to be helpful, as well (11). Benefits of undergoing X-ray before MRI could include lowering the cost for the hospital and greater confirmation of negative metals on patient's body before undergoing MRI.

There were several limitations to our study that were mostly unavoidable. These include: incomplete patient's files and MRI reports, its retrospective design, and its humble sample size.

CONCLUSION

In this study, we aimed to investigate the common wrist pathologies that are detected by MRI in King Abdulaziz university hospital in Jeddah. We found that there is a variance between all findings that were discovered by MRI, that there are differences between our studies and those of others, which is mainly due to the different kinds of cases that were seen in our hospital compared to theirs. We also found that most of the individuals with wrist pathologies did not get X-rays before MRI, so we recommend a clear policy of ordering MRI, also proper history and examination should be the essential tool to reach hand and wrist diagnoses. That will help in saving resources.

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