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Evaluation of Role of Magnetic Resonance Imaging in Detection and Characterization of Soft Tissue Masses of the Hand and Wrist

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Abstract

Background: The wrist and hand joints are complex structures with an extensive differential diagnosis for a presenting mass. However, the vast majority of wrist and hand masses are benign. Magnetic Resonance Imaging (MRI) by virtue of its ability to provide detailed soft tissue characterization is the preferred method of imaging the problematic soft tissue masses.

Aim of Study: To evaluate the role of MRI in diagnosis of the most commonly encountered soft tissue masses of the wrist and hand, describing their main features; specifically the signal characteristics and location that helps to differentiate them.

Methods: This cross section study included 42 patients (22 females and 20 males), their ages range between 1 year and 79 years, with mean age of 32.24 year. The study was performed in Radiology Department El-Demerdash Hospital between March 2018 and September 2019.

Results: Benign and malignant lesions represented (97.6%) and (2.4%) respectively of the encountered lesions. The most commonly found lesions were ganglia (33.3%). The most frequently seen solid tumors, included Giant Cell Tumor of the Tendon Sheath (GCTTS) (9.5%), benign Nerve Sheath Tumors (NST) (4.8%), lipoma (2.4%), hemangioma (4.8%)/ vascular malformation (9.5%), fibroma of the nerve (4.8%) and malignant lesions (2.4%). Joint and soft tissue infection were encountered in (2.4%) of cases. A specific diagnosis was made, or strongly suspected, from the MRI features found in certain conditions like ganglion, hemangioma, arteriovenous malformation, giant cell tumor of the tendon sheath, lipoma, fibroma, and soft tissue infections. MR imaging of the wrist and hand provides a wealth of information regarding the status of and the relationship of the osseous and soft tissue components, both of which are necessary to confirm the clinical diagnosis and manage the patient in the most efficient way possible.

Conclusion: Magnetic resonance imaging is the imaging method of choice for evaluating the presence and extent of soft tissue masses. It is particularly useful for assessing masses in the wrist and hand, where lesions are predominantly benign. By noting the signal characteristics and determining the lesion location, a specific diagnosis of the mass can often be made. unfortunately, when lesion doesn't exhibit typical features, differentiation from malignancy can't be categorically made.

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Key Words: *Magnetic resonance imaging – Soft tissue masses.*

Introduction

THE wrist and hand region is very unique in several ways. It has the most complex and variable anatomical structure in the whole body and is very vital in daily activities. It is the seat of several pathologies and it is also the site where many diseases first manifest themselves. That is why it is a common site for complaint. Most of the wrist problems are associated with swelling which may be diffuse or localized according to the etiology. Thus by defining the nature of wrist swelling a diagnosis can be reached **[1]**.

Frequently the etiology of a soft tissue mass cannot be established by conventional radiographs and further imaging is necessary **[2]**. Plain films and CT may detect calcification and allow assessment of adjacent bony structures but, unlike MRI, do not offer much in the way of tissue characterization. Ultrasound has an extremely useful role in localizing lesions and determining if the lesion is cystic or solid, but further tissue characterization is limited **[3]**.

The vast majority of soft tissue mass lesions of the wrist and hand are benign **[4]**. In general, benign soft tissue tumors are estimated to be 100 times more common than malignant soft tissue tumors, with a reported annual clinical incidence of 300 per 100,000. Magnetic Resonance Imaging (MRI) has long been established as the imaging technique of choice for such lesions **[5]**.

In practice, the most common lesions encountered are ganglia. The most frequently seen solid masses include Giant Cell Tumours of Tendon Sheath (GCTTS), lipomas, Dupuytren's contractures, nerve sheath tumours, glomus tumours, haemangioma/vascular malformations and synovial pathology [6].

There is much controversy regarding the value of MR imaging to differentiate between benign and malignant soft tissue tumors. In spite of the fact that MRI remains relatively expensive, it often provides useful information for tumor characterization, hence often precluding the need for additional evaluation (imaging or histology). The combination of several criteria improves the sensitivity and specificity. In addition to signal characteristics, other criteria are useful for tumor characterization: Location and relation with surrounding structures, shape, presence of multiple lesions, presence of fluid-fluid levels, presence of intratumoral calcifications and association with other diseases. All of these MRI findings are useful to further characterize soft tissue tumors and narrow the differential diagnosis. However, histological confirmation remains necessary in many cases [7].

Aim of the work:

To evaluate the role of MRI in diagnosis of the most commonly encountered soft tissue masses of the wrist and hand. We will describe their main features; specifically the signal characteristics and location that help to differentiate them.

Patients and Methods

This is a cross section study included 42 patients (22 females and 20 males), their ages ranging in age between 1 year and 79 years, with mean age of 32.24 year. The study was performed in Radiology Department El-Demerdash Hospital between March 2018 and September 2019.

The study included patients presented to the Medical Imaging Department of Ain Shams University Al-Demerdash Hospital with soft tissue swelling of the hand and wrist. Males, females and all age groups are included.

Contraindication to magnetic resonance imaging eg: Claustrophobia, patients with non MR compatible cardiac pacemaker or cochlear implants were excluded from the study.

Methodology:

All patients included in the study were subjected to the following: History taking and clinical provisional diagnosis was obtained, MRI: The studies were done in the MR Unit at Ain Shams University hospitals using super conductive MRI scanner (Philips Achieva-XR 1.5 Tesla) using standard scanning protocol, and all metallic objects were removed from the patient's body.

MRI protocol:

Patient position: The patients were scanned in the supine position, with the arm by the side of the body and the dorsum of the hand parallel to the coronal plane of the magnet. However, some patients were scanned in the prone position with the arm above their head in the so-called "Superman" position-to ensure that region of interest brought isocentre as possible-it less tolerated if patient in pain.

- *Surface coil:* Circular coils, (C1 and C3), were used. They were placed over the wrist joint, wrapped and fixed by rubber bands.
- Protocol of MR imaging.
- Preliminary scout localizers in axial, coronal and sagittal planes were done.
- A wide variety of pulse sequences was obtained. Routine conventional MR study including axial T1 and T2, sagittal T2, coronal T2 fast (turbo) spin-echo and coronal STIR weighted sequences were performed for all patients. Sagittal T2 gradient recalled echo sequence was done for some of cases.
- Intravenous Gadolinium was used in some cases, axial, sagittal and coronal T1-weighted sequences were obtained after administration of the contrast.

The accompanying MRI report for soft tissue mass in hand and wrist was assessed for the presence of: The anatomical location of the tumor; its relationship to the adjacent bone; its relationship to the neurovascular bundle; and a provisional diagnosis (neoplastic or non-neoplastic; benign or malignant).

Statistical analysis:

Statistical analysis was performed using the statistical software: SPSS statistical package version 21 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation or median and range as appropriate. Qualitative data were expressed as frequency and percentage and MRI features that were analyzed included the location, signal characteristics.

Results

Our study was conducted upon 42 patients (22 females and 20 males) complaining of swellings

of the hand, wrist or both. They are ranging in age between 1 year and 79 years, with mean age of 32.24 year. MRI study was done for all patients. Injection of intravenous contrast medium was used in 4 cases (9.5%). The MR findings were analyzed and correlated with the clinical data, other available studies. The percentage of patients according to age. The most involved age group involved range between 20-29 years (31.0%) of all lesions as shown in Fig. (1). The frequency and percentage of patients according to sex. Number of female presented by mass of hand and wrist 22 female more than the males as shown in Fig. (2). The frequency and percentage of affection of the right left hands and wrist joint. Affection of the right and left hands were found in 16 cases and 12 cases respectively while affection of right and left wrist joint were found in 11 and 4 cases respectively as shown in Fig. (3). The frequency and percentage of different lesions in the study population. The most frequently encountered lesion was ganglion cyst in 14 cases represented (33.3%), followed by enchondroma in 5 cases represented (11.9%), then giant cell tumor of the tendon sheath and vascular malformation in 4 cases for each represented (9.5%), neurogenic tumors neurofibroma in 2 cases represented (4.8%), haemangioma in 2 cases represented (4.8%), fibroma in 2 cases represented (4.8%) and lipomatous hypertrophy in 1 case (2.4%), hypertrophied osteoarthritis in1 case represented (2.4%), osteomyelitis in 1 case represented (2.4%), morel lavalle in 1 case (2.4%), simple bone cyst in 1 case represented (2.4%), aneurysmal bone cyst 1 case represented (2.4%), epidermoid cyst in1 cases represented (2.4%), glomus tumor in 1 case represented (2.4%) and metastases in 1 case represented (2.4%) in Fig. (4).

The age range of different lesion was shown in (Table 3) mean lesion compared to all lesion is ganglion cyst presented (33%).

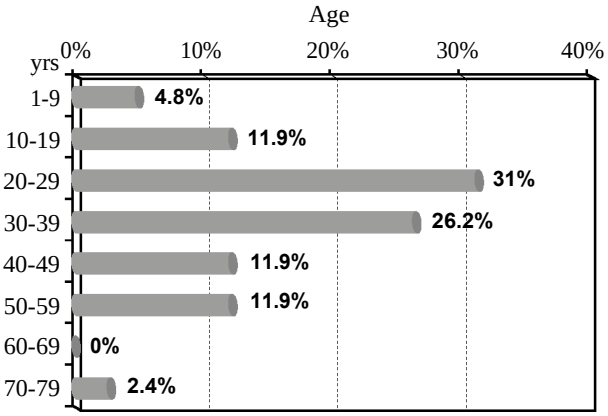

Fig. (1): The percentage of patients according to age.

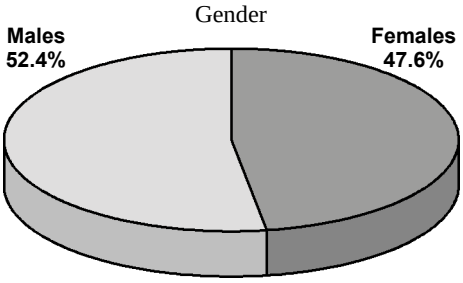

Fig. (2): The frequency and percentage of patients according to sex.

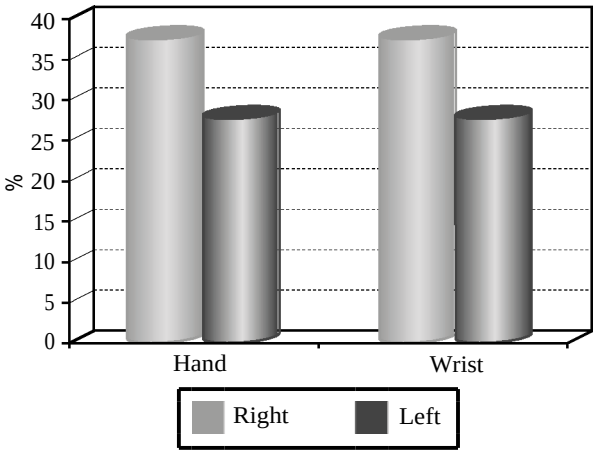

Fig. (3): The frequency and percentage of affection of the right, left hand and wrist joint.

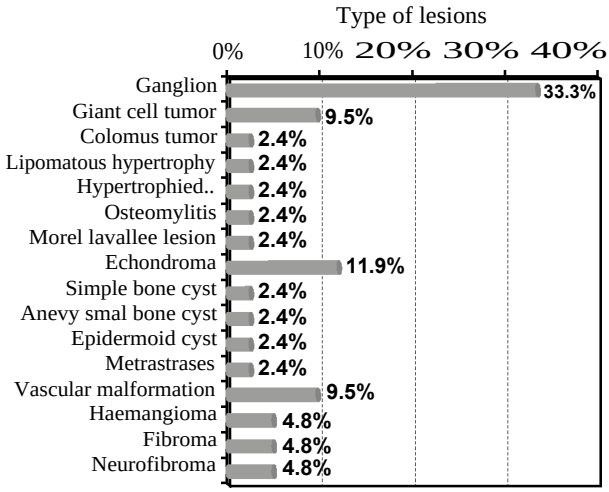

Fig. (4): The frequency and percentage of different lesions in the study population.

The frequency of different lesions in relation to size:

Is shown in Fig. (5).

Relation to trauma, site and aspect involved by lesion in addition to relation to tendons.

Lesions related to trauma represented (14%), lesion involved hand represented (66.7%) and lesion which involved wrist represented (35.7%). lesion are involved volar aspect represented (31.0%)

and lesion which involved dorsal aspect represented (19.0%). Lesions related to flexor tendons represented (31.0%) compared to extensor tendons which represented (50%).

Relation of lesions to the bones:

Is shown in Fig. (6).

Table (1): The number and frequency of the lesions and mean age of the patients in the study population.

Pathological lesion	No. of patients out of 42	%	Mean age (year)
Ganglion cyst	14	33,3	20-29
Giant cell tumor of the tendon sheath	4	9.5	50-59
Encondroma	5	11.9	20-39
Vascular malformation	4	9.5	10-19
Haemangioma	2	4.8	20-39
Fibroma	2	4.8	20-49
Neurofibroma	2	4.8	20-29
Glomus tumor	1	2.4	50-59
Lipomatous hyperatrophy	1	2.4	1-9
Hyperatrophied osteoarthritis	1	2.4	20-29
Morel lavalle lesion	1	2.4	40-49
Simple bone cyst	1	2.4	30-39
Aneurysmal bone cyst	1	2.4	30-39
Epidermoid cyst	1	2.4	40-49
Metastases	1	2.4	50-59
Osteomyelitis	1	2.4	40-49

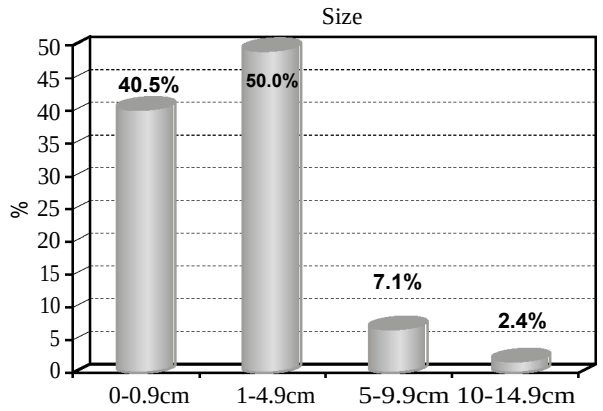

Fig. (5): The frequency of different lesions in relation to size.

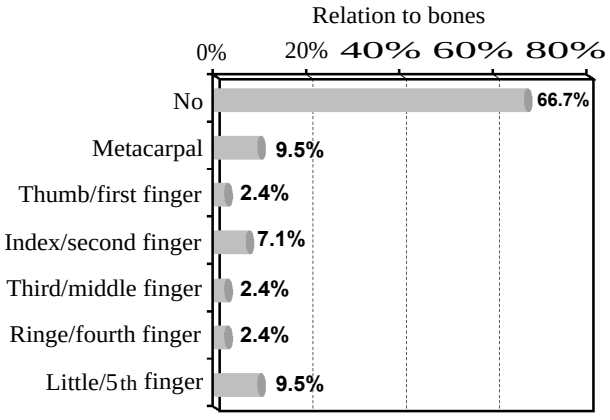

Fig. (6): The frequency of different lesions in related to the bones.

The frequency of different lesions according to MRI signal:

Was shown in (Table 2).

Table (2): The frequency of different lesions according to MRI signal.

	Total no.=42
T1:	
High	3 cases (7.1%)
Low	29 cases (69.0%)
ISO	10 cases (23.8%)
T2:	
High	34 cases (81.0%)
Low	3 cases (7.1%)
ISO	5 cases (11.9%)
STIR:	
High	39 cases (92.9%)
Low	1 case (2.4%)
ISO	2 cases (4.8%)

Classification of lesions according to their location:

Was shown in (Table 3).

Table (3): Classification of lesions according to their location.

Location	Lesion
I- Intra-muscular	1- Hemangioma 1 case 2- Lipomatous hyperatrophy 1 case
II- Inter-muscular	1- BNST 2 cases 2- Fibroma 1 case
III- Juxta-articular	1- Ganglia 3 cases 2- Metastases 1case
IV- Subcutaneous	1- Lipomatous hyperatrophy 2- Epidermoid cyst 3- Hemangioma 1 cases
V- Tendineous	1- GCTTS 4 cases 2- Fibroma 1 cases 3- Ganglia 11 cases
VI- Intra-articular	Hyperatrophied osteoaethritis 1 case
VII- Multicompartmental	AVM 4 cases
VIII- BONY	1- Enchondroma 5 cases 2- Simple bony cyst 1 case 3- Aneurysmal bone cyst 1 case 4- Osteomyelitis 1 case

Table (4): The frequency of different lesions according to MRI signal.

	Total no.=42
T1:	
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T2:	
High	34 cases (81.0%)
Low	3 cases (7.1%)
ISO	5 cases (11.9%)
STIR:	
High	39 cases (92.9%)
Low	1 case (2.4%)
ISO	2 cases (4.8%)

Case presentation:

Case No. (1):

A fifteen years old female patient presented with right hand swelling since birth. There was history of previous operative intervention. On clinical examination right hand swelling on the second web space and radial aspect of the third and the second finger on ventral and dorsal aspect of right hand.

On MRI examination subcutaneous, irregular mixed solid and macrocytic mass lesion centered on 2nd web space involving mainly radial aspect of 3rd finger and to lesser degree ulnar of 2 nd finger with ventral and dorsal extension from the level of metacarpal head up to the 2 nd proximal inters phalangeal joint level and 3 rd phalangeal tip shown on Figs. (7,8). Diagnosis of Venous-lymphatic malformation (low flow vascular malformation was made.

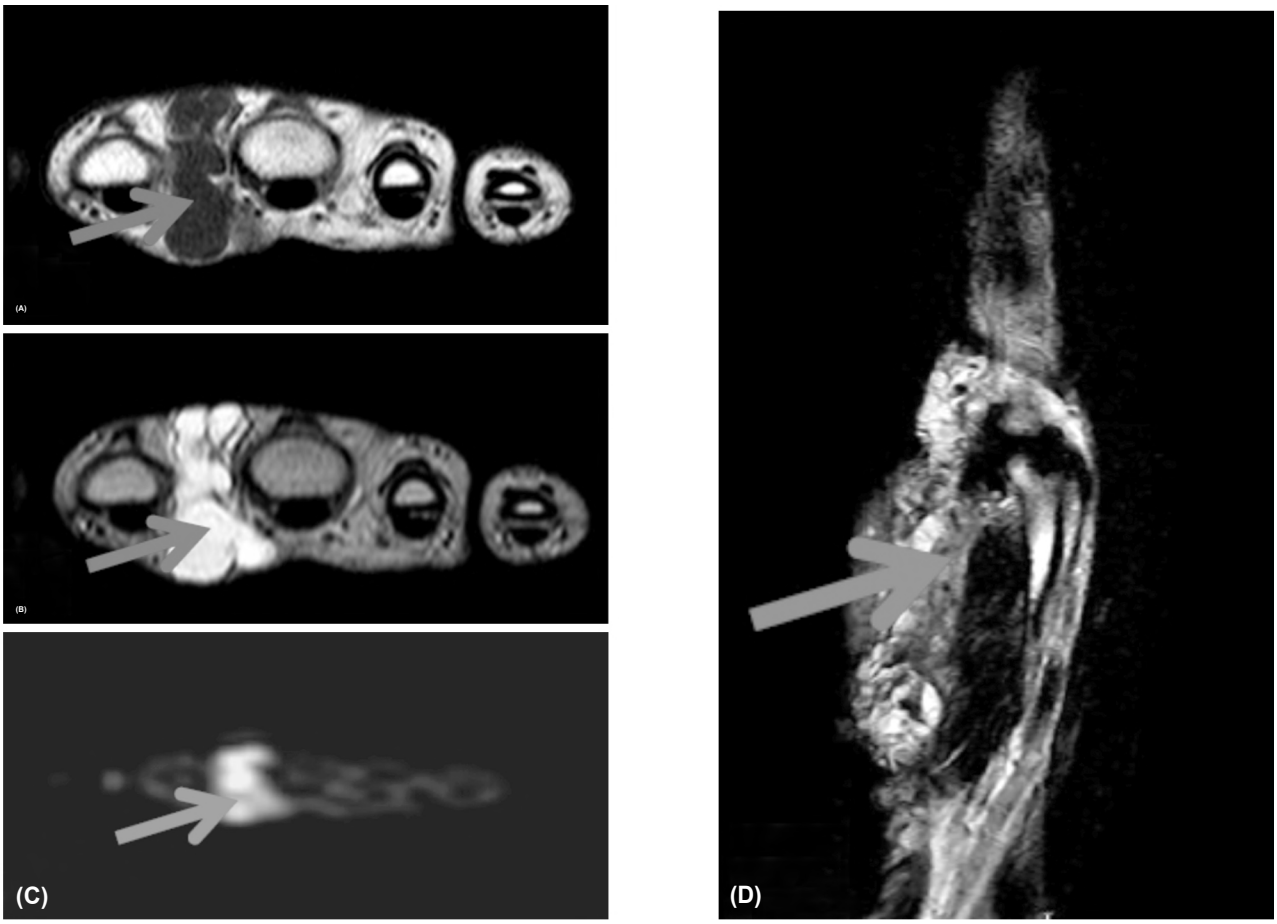

Fig. (7): Axial T1 (A), axial T2 (B), axial DWI (C) Sagittal T2 (D), of the right hand showing intermediate signal in (A), high signal (B, C & D) Subcutaneous trans spatial, mass lesion centered on 2 nd web space involving mainly radial aspect of 3rd finger and to lesser degree ulnar of 2 nd finger with ventral and dorsal extension.

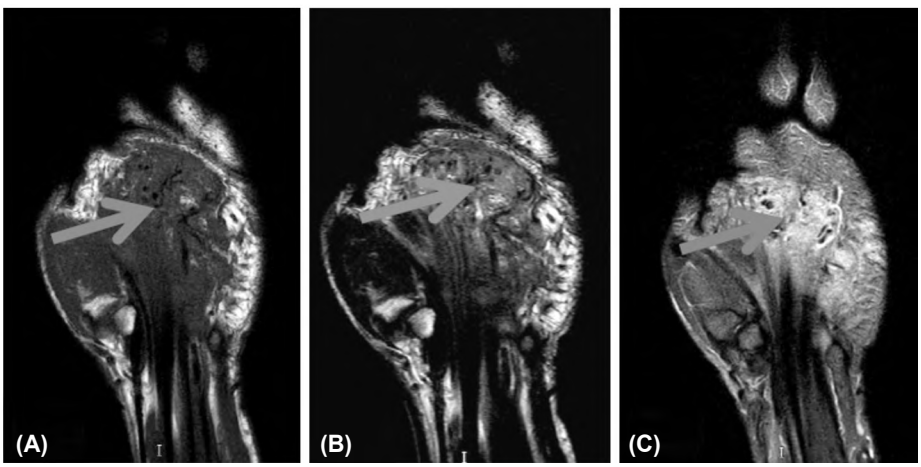

Fig. (8): Coronal T1 (A), Coronal T2 (B), Coronal STIR (C) showing intermediate signal in (A), high signal (B & C) Subcutaneous trans spatial, mass lesion involving mainly radial aspect of 3 rd finger and to lesser degree ulnar of 2 nd finger with ventral and dorsal extension from the level of metacarpal head up to the 2nd proximal inter phalangeal joint level and 3 rd phalangeal tip.

Case No. (2):

Forty seven years old male patient presented with left hand index finger swelling. On examination non-tender swelling of the left index finger. On MRI examination a well-defined binoculars subcutaneous cystic swelling. It measures about 3 X 1.8 X 1.7cm is observed opposite to posterior lateral aspect of distal phalanx of index finger. It appears hyper intense to muscle in T1 WIs, hyper intense in T2 WIs and hypo intense in STIR WIs. It shows thick turbid fluid content was shown on Figs. (9,10). Diagnosis of Epidermoid cyst was made.

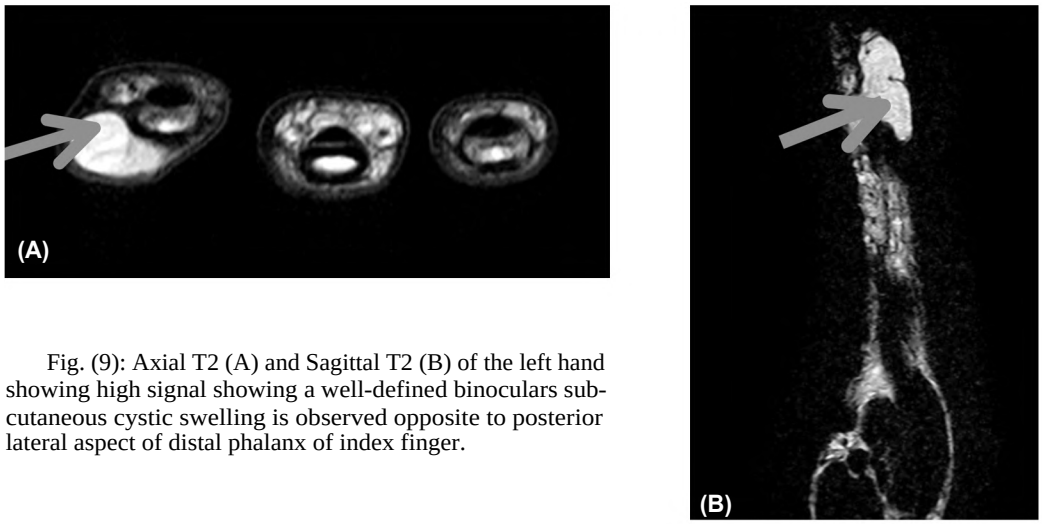

Fig. (9): Axial T2 (A) and Sagittal T2 (B) of the left hand showing high signal showing a well-defined binoculars subcutaneous cystic swelling is observed opposite to posterior lateral aspect of distal phalanx of index finger.

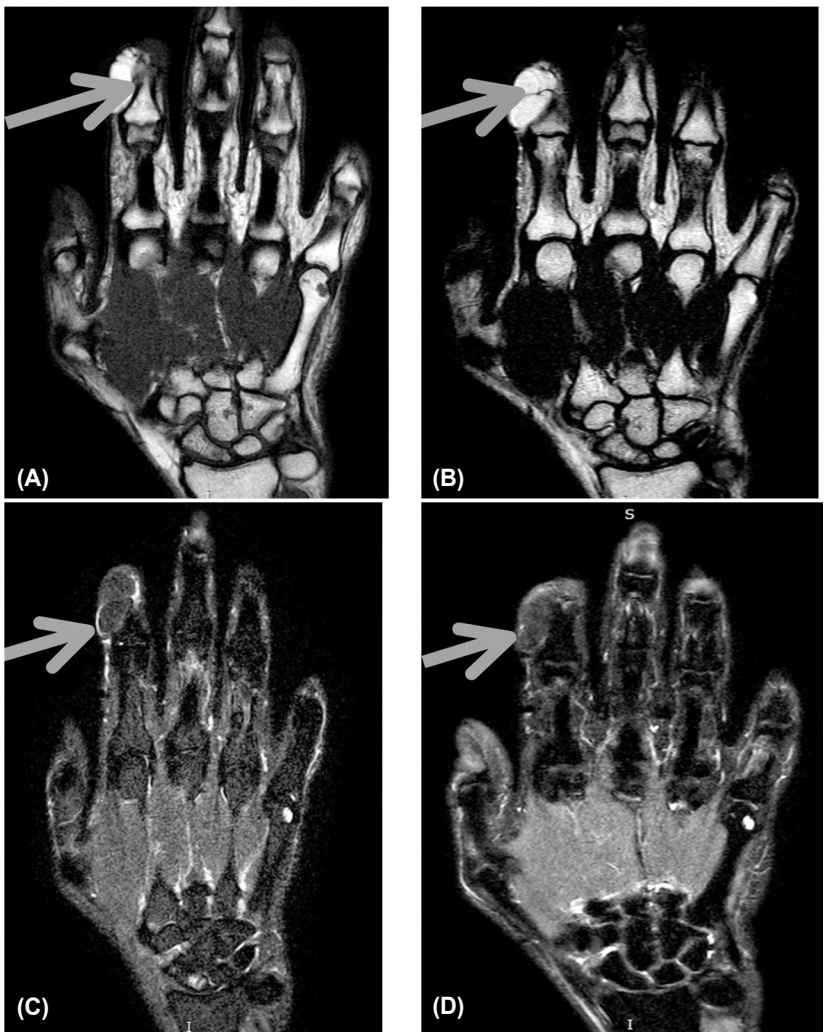

Fig. (10): Coronal T1 (A), coronal T2 (B), coronal PDWI (D) and coronal STIR (C) of the left hand showing A well-defined binoculars subcutaneous cystic swelling. Is observed opposite to posterior lateral aspect of distal phalanx of index finger. It appears hyper intense to muscle in T1 WIs, and T2 WIs (A & B) and hypo intense in STIR WIs and PDWI (D & C). It shows thick turbid fluid content.

Discussion

In our study, 42 cases presented with wrist and/or hand swellings. Benign and malignant lesions represented (97.6%) and (2.4%), respectively MRI was conducted for each one of them. The most commonly encountered lesions were ganglia, which represented (33.3%) of the study population, followed by enchondroma represented (11.9%), then giant cell tumor of the tendon sheath and vascular malformation for each represented (9.5%), neurogenic tumors neurofibroma represented (4.8%), haemangioma represented (4.8%), fibroma represented (4.8%) and lipomatous hypertrophy represented (2.4%), hypertrophied osteoarthritis represented (2.4%), osteomyelitis. These results coincide with work of De La Ketthulle et al., [8] who reported that 62% of the cases in their study had benign lesions (including ganglia), 9.8% had malignant lesions and 28.2% had pseudotumoral masses.

In the present work, ganglia were the most common cause of palpable mass of the wrist and hand (33.3%). They were most commonly found in young adults with slight female predominance (64.3%). Approximately (14.3%) of patients had a history of trauma.

These results coincide with work of Teh and Whiteley [9] who reported that ganglia are more common in females and only 10% are related to trauma. These small differences could be attributed to the small number of this group of the study population.

Bencardino et al., [10] reported that approximately (70%) of soft tissue ganglia occur about the wrist. Fifty percent to seventy percent of soft tissue lesions about the wrist are ganglia. Most are small, 2 to 3cm in the greatest dimension, without joint space communication.

These results matched with ours, the most ganglia were encountered around the wrist joint represented (85.7%) and hand ganglion represented (14.3%) of all detected ganglion.

In the current study, the typically displayed low T1, high T2 and strongly high STIR signal intensities as previously reported by Stevanovic and Sharpe [11]. Also the dorsal ganglion cysts represented (35.7%) compared to volar cysts represented (14.3%) of all ganglion cases in this study. In relation to tendons, (50%) of the ganglion cysts related flexor tendon and (28.6%) related extensor tendons of the all ganglion cyst. These results were slightly different from the results of Teh & Whiteley [9], who reported that the frequency of dorsal ganglia around (60%), volar ganglia (20%), flexor tendon sheath ganglia (10%) and distal inter phalangeal ganglia (10%).

Soft tissue chondromas are small nodules of cartilage not attached to bone. They represent 6% of all hand and wrist soft tissue tumors [7].

There is a wide range of ages at presentation. Patients present with a slow growing mass less than 2cm in size. They may be attached or associated with tendons or tendon sheaths, joint capsule or periosteal. Plain film shows a well-defined soft tissue mass with most lesions showing foci of calcification which may be central or peripherally located. Typical rings and arcs of mineralization may be seen and adjacent bony remodeling or extrinsic erosion may be evident. On MRI the lesions are intermediate signal on T1 weighted images and high on T2 weighted images. If calcification is present, foci of low signal may be seen on both sequences [12]. In the current study, the enchondromas in the study population represented (11.9%) of the reported masses of the hand and wrist. The most common affected age ranged between (20-39) years, in 4 cases represented (80%) of all enchondromas, the size range between (0.4-0.9) cm with evidence of female predominance 3 cases represented (60%) male 2 cases represented (40%).

In relation to trauma 2 cases represented (40%) were directly related to frank trauma and in the others there wasn't any history of obvious trauma. Tenderness was encountered in 2 cases represented (40%) of all enchondromas. All enchondromas were encountered on the hand represented (100%) of detected lesions. According to site about 4 case volar enchondromas represented (80 %). According to relation to bones, 3 lesions were related to the metacarpal bones, one lesion at the ring finger, and last lesion at the little finger. The enchondromas displayed T1 low signals all cases about (100%), T2 high signals in 4 cases represented (80%), T2 iso signal in 1 case presented about (20%) and STIR high signals in all cases presented (100%). These results coincide with work of Larbi et al., [13].

Giant cell tumors of the tendon sheath are the second most common tumors of the hand [14].

These results compared with our results as giant cell tumors of the tendon sheath were the third most common tumors of the hand reported in 4 cases (9.5%) of the study population.

GCTTS or localized nodular pigmented tenosynovitis is a benign soft tissue tumor that can present at any age but most common in the 3 rd-6th decades. There is slight female preponderance [15]. The mass is approximately 2 to 4cm in greatest dimension [11].

These results not matched with our results.

Teh & Whiteley [9], reported that GCTTS usually affects the volar aspects of the first three digits, much less commonly affecting the wrist.

In the current work, all lesions were related to the digits with no cases reported at the region of the wrist, there were 2 lesions related to the index finger 1 lesion at the thumb and lesion at middle finger. No lesions at the ring or little finger. In our study, the lesions displayed intermediate to low T1, high and iso and low T2 and high STIR signal intensities, whilst in T2 GRE weighted images they showed high signal intensity with dark signal areas denoting hemosiderin deposition.

These results coincide with Flors et al., [16] who reported that hemosiderin-laden tissue exerts a paramagnetic effect that shortens T 1 and T2 relaxation times resulting in low/intermediate signal intensity on both T 1 and T2-weighted FSE sequences Joint or tendon sheath effusion is uncommon with giant cell tumor of the tendon sheath.

None of the cases with GCTTS in our study showed joint or tendon sheath effusion. Bone erosion was detected in (28.39%) of cases in the study conducted by Farid et al., [15]. In our results, bone erosions were in three cases (25%) because of close proximity of the bone and limited soft tissue space.

Benign peripheral nerve sheath tumors (neurofibroma and schwannoma) are common masses of the hand. They represent (11.5%) of benign tumors of the hand. Both tend to present in the young adults and are small, solitary and slow growing. Schwannomas are slightly less common than neurofibromas [5].

In our study, 2 cases (4.8%) of the study population 2 neurofibromas and no schwannoma. The most common affected age was ranged between (20-29 years and 50-69 years) respectively with no evidence of sex predominance.

In contrast to many other soft tissue tumors, certain imaging features suggest a neurogenic origin. These characteristic imaging findings include a specific clinical presentation or location, relationship to a nerve, and certain lesion shape and signal intensity patterns [17].

Both neurofibroma and schwannoma typically demonstrate a fusiform mass. The nerve can often be seen entering and exiting the mass, especially when large nerves are involved. Larger nerves also demonstrate a split-fat sign [17].

In the present work, the mostly encountered imaging features impressive of PNST were their characteristic fusiform shape along the axis of nerves and split-fat sign. They The T2 high signal was depicted in all lesions represented (100%). T1 high signal was found in 1 case and low signal in the another case. STIR high signal was found in 2 cases. These results coincide with those of Nelson [17] who described similar signal intensities and pattern of enhancement of PNST.

In our research the majority of lesions were small; related to superficial and small nerves and they had overlap MR findings making the differentiation between schwannoma and neurofibroma on MR basis difficult. This difficulty was reported by Clavero et al., [18].

Haemangioma/vascular malformations represent (5-10%) of benign hand and wrist tumors [19]. These results matched with ours, they represented (14.3%) of encountered tumors of the hand and wrist. Hemangiomas are the commonest soft tissue vascular tumor commonly occurring in infancy and childhood [20]. In our findings, vascular malformation 4 cases were reported representing (9.5%) of the study population.

Hemangiomas were encountered in 2 cases represented (4.8%) of the study population of encountered swelling of the hand and wrist. The mean age was (20-39 years) with no evidence of sex predominance Hemangioma were The hyper intensity in one case and iso in other case in T2-WIs. T1 ranged between low signal in 1 case presented (50%) and iso in another case presented (50%). STIR high signal in all cases (100%). These results matched with the findings of Flors et al., [16] who described similar signal intensities and pattern of enhancement of such lesions. Robinson & Learch [21] stated that lesions composed entirely of serpentine vascular channels and fat on MRI are pathognomonic for hemangioma.

All results agreed with Van Rijswijk et al., [22] who reported that conventional MR imaging is successful in categorizing vascular malformations and in defining the anatomic extent of vascular

malformations using the presence or absence of flow voids in characterizing these malformations.

Fibroma of the tendon sheath is a rare benign tumor of the tendon sheath which may be confused with GCTTS. It is usually a firm, well-defined mass attached to the tendon sheath. The MRI appearance is variable but usually the presence of fibrous tissue results in low signal on both T1 and T2 weighted images **[23]**. These results agreed with our findings, was encountered in 2 cases represented (4.8%) of the study population. The age was ranged between (20-29 years) and (40-49 years), with no evidence of sex predominance. There was 1 case presented with painful swelling in the (50%) in the wrist, 1 case underwent a previous operation with recurrent/residual lesion. T 1 signal ranged between low and iso signals, T2 signals ranged between low and iso signals and STIR range between high and iso signal in reported cases.

According to Weiss & Goldblum **[20]**, lipomas are uncommon in the hand despite being the most common soft tissue tumor. However, in the current study, we reported 1 case of lipomas representing (2.4%) of the study population. The high sensitivity and specificity of MRI for diagnosis of such lesion in our study could be attributed to their characteristic features being well described, with high signal intensity in both T1 and T2-weighted images and reduced signal intensity in fat-suppressed images, identical to that of subcutaneous fat.

In our findings, the relative small size subcutaneous and intra muscular lesions of (<5cm), the absence of internal nodular or thick septa, the absence of non-adipose soft tissue component and the lack of enhancement in the post-gadolinium study were of help in differentiation of lipoma from liposarcoma.

Malignant soft tissue tumors lesions of the hand are rare and often carry a poor prognosis. Examples include sarcomas, malignant nerve sheath tumors, and metastatic lesions with primary tumors predominantly located in the lung, breast, or kidney **[24]**. Malignant tumors characteristically present as destructive lytic lesions, have poorly defined margins, are edematous, lobulated, and show signs of hemorrhage and necrosis **[25]**. In our findings, our case was a 58 years old female with past history of breast cancer and right wrist mass.

Septic arthritis, abscesses, cellulitis, and osteomyelitis may occur in the hand and wrist. The MRI findings of infection in the hand and wrist are not different than in other anatomic sites. One feature of this anatomic region to keep in mind is that infection spreads rapidly along compartments and tendon sheaths. On MRI abscess typically demonstrates fluid signal, with intermediate/low signal on T1 weighted images and high signal on T2 weighted and STIR images **[9]**.

Our study agreed with the previous works, as we reported a case of osteomyelitis of the hand in the middle phalanx of the little finger/low signal on T1 weighted images and high signal on T2 weighted and STIR images.

Although there is general agreement on the diagnostic value of MRI in many cases, the issue of whether MRI reliably can differentiate benign from malignant is much less clear. One study has suggested that MRI can differentiate benign from malignant masses in greater than (90%) of cases based on the morphology of the lesion **[26]**.

Criteria used for benign lesions included smooth, well-defined margins; small size; and homogeneous signal intensity, especially on T2-weighted images. Other studies, however, noted that malignant lesions may appear as smoothly marginated, homogeneous masses and MRI cannot reliably distinguish benign from malignant processes **[27]**. This discrepancy likely reflects differences within the studied populations.

In our study, benign tumors of the hand had well defined margins and small size (less than 5cm in greatest dimension) except a case of morel lavallee which measured 13cm in maximum dimension and two cases of and vascular malformation which had a mean maximum dimension of 8 to 7cm. The malignant lesion detected in our study were less than 5 centimeters in maximum dimension.

Conclusion:

Magnetic resonance imaging is the imaging method of choice for evaluating the presence and extent of soft tissue masses. It is particularly useful for assessing masses in the wrist and hand, where lesions are predominantly benign. By noting the signal characteristics and determining the lesion location, a specific diagnosis of the mass can often be made. unfortunately, When lesion doesn't exhibit typical features, differentiation from malignancy can't be categorically made.

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تقيم دور الرنين المغناطيسى
فى تشخيص ورصد وخصائص آورام اليد والرسغ

تركيب اليد ومفصل الرسغ من الآماكن التى تعتبر آكثر تعقيداً من غيرها فى ما يخص تشخيص الآورام وتعدد إحتمالية التشخيص لتشابها.

الرنين المغناطيسى له المقدرة التصويرية على توضيح التفاصيل والسمات المختلفة للآنسجة الناعمة لذلك يعتبر من وسائل التشخيص المفضلة لذلك يستعمل فى هذه الدراسة التى تشمل ٤٢ مريض بتورم فى اليد والرسغ تمت دراستهم بالتصوير بواسطة الرنين المغناطيسى وتم توضيح موقع وشكل الورم فى المقاطع المختلفة.

الآورام الحميدة تشكل (٩٧.٦٪) والخبيثة (٢.٤٪). آكثر الحالات شيوعاً هى الورم القرنى بنسبة (٣٣.٣٪) يآتى بعده ورم الخلية العملاقة بنسبة (٩.٥٪)، وورم العصب الليفى بنسبة (٤.٨٪)، والتورمات الدهنية تمثل (٢.٤٪)، آما آورام التشوهات الوعائية تمثل (٩.٥٪)، بينما الورم الدموى يمثل (٤.٨٪) والورم الليفى يمثل (٤.٨٪). آما الآورام الخبيثة تمثل (٢.٤٪) والآورام الإلتهابية تمثل (٢.٤٪).

التصوير بالرنين المغناطيسى يعطى معلومات كافية عن الآورام وعلاقتها بالتراكيب المجاورة بالمقارنة مع المعلومات السريرية لتساعد فى عمليتى التشخيص والمعالجة.

الرنين المغناطيسى هو الآداة التشخيصية الآولى فى تقيم وتحديد درجة تمدد الورم فى الآنسجة المجاورة لذلك هو ذو فائدة عظيمة فى تحديد طبيعة الآورام التى تكون فى آغلبها حميدة وذلك بإستخلاص المعلومات من مكان وشكل الورم فى المقاطع المختلفة ولسوء الحظ لم تتوفر فى الدراسة آورام خبيثة آكثر تمكننا من المقارنة بصورة آوسع.