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Radiological Evaluation of Giant Cell Tumour of the Soft Tissue: A Rare Case Report.

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Abstract

Background.

The Giant cell tumour of soft tissue (GCT-ST) is a rare primary tumour of soft tissue. It usually involves superficial and deeper soft tissue of the upper and lower extremities. However, a case report on the trunk, breast, head, and neck are reported as unusual locations.

Case presentation

Thus, we present a 34-year-old female who presented with a 5-year history of swelling on the lateral aspect of the left elbow joint. The swelling was initially the size of her index finger and gradually increased in size. There was no history of trauma, surgery, or previous lesions on the left elbow joint, no associated pain, ulceration, no mass or masses anywhere in her body, and no history of surgical excision of any lesion in the past. There was an associated weakness of the left hand especially the thumb, index, and middle finger as the patient cannot grip things firmly; however, there was no loss of sensation. She had a plain X-ray, ultrasound, and CT scan which illustrated a well-defined mass within the soft tissue and excised. The specimen was subjected to histopathology examination with a diagnosis of a giant cell tumour. She has been on regular follow with satisfactory outcomes.

Conclusion: The definitive diagnosis of giant cell tumour of soft tissue is extremely difficult to establish with radiological assessment only without recourse to histopathology appraisal. The goal standard to establish a definitive diagnosis is histopathology examination and rule out the mimickers. The optimal treatment involves surgical excision with tumour tumor-free margin.

Keywords: Giant cell tumour, CT scan, plain X-ray**.**

1.Introduction

Primary giant cell tumour of soft tissue (GCTST) is a very rare, slow-growing soft tissue mass that has high similarities with the conventional giant cell tumour of the bone (GCTB), even though both are different entities.[1] The World Health Organization (WHO) classified it as a distinct entity with a low malignant risk, potential for local recurrence, and rarely metastasizing.[2]

The mass is usually asymptomatic and does not show malignant behaviour. Its commonest locations are the lower limb (at the thigh), the trunk, followed by the upper limb, and

head and neck region.[3] It can occur as either deep or superficial soft tissue masses, frequently multinodular and made up of two main cell types: the mononuclear stromal cells type, and multinucleated giant cell of the osteoclastic type.[1] It is surgically treated by excision with tumour free margin, and expected to follow a benign clinical course. [1] It may, however, recur after excision, with the potential to malignant transformation, and may rarely metastasize.[6]

This is a case of GCTST in a 35-year-old female who presented with a three-year history of slowly but progressively growing mass at the left elbow joint. This case report is important due to the rarity of this case and the need to consider GCTST in the list of differential diagnoses of soft tissue masses.

Case presentation

Mrs A. U. C is a 34-year-old female who presented with a 5-year history of swelling on the lateral aspect of the left elbow joint. The swelling was initially the size of her index finger and gradually increased in size. There was no history of trauma, surgery, or previous lesions on the left elbow joint, no associated pain, ulceration, no mass or masses anywhere in her body, and no history of surgical excision of any lesion in the past. There was an associated weakness of the left hand especially the thumb, index, and middle finger as the patient cannot grip things firmly; however, there was no loss of sensation. There was no weight loss, jaundice, and no significant change in her usual activities. The patient presented to the hospital because of the sustained increase in the size of the swelling; and that she could no longer grip things with her left palm as firmly as she used to do.

Physical examination revealed a young lady in no obvious distress, not pale, afebrile, acyanosed, anicteric, not dehydrated, and no pedal oedema. The temperature was 36.8ºC, the Pulse rate of 94 b/min, and BP 100/60 of mmHg.

Musculoskeletal and neurovascular examinations revealed a mass of about 16x14 cm at the lateral aspect of the left elbow joint. The mass was not tender, no differential warmth, not attacked to the skin, but attached to the underlying muscle. It was firm-hard, non-reducible, and non-pulsatile. There was weakness of the thumb, index, and middle finger with loss of the left thenar eminence. No loss of sensation. The pulse was full, regular, and synchronous with the right radial pulse. The findings in the right upper limb were unremarkable. Investigation reports revealed a normal haemogram, urinalysis, and negative retroviral screening test.

The chest radiograph was normal. Left elbow radiographs showed a smooth, rounded mass with regular and well-defined outlines noted within the region of the left cubital fossa. There was a preserved osseous outline and joint alignment.

Ultrasonography showed a heterogenous echo mass measuring 8.2x 4.6x5.3cm with multiple echogenic septations, originating within the muscular planes, but no evidence of extension to the joint capsule. Colour Doppler interrogation revealed a highly vascular mass. A computed tomography scan was obtained and showed an enhancing isodense mass arising from the proximal part of the left brachioradialis muscle. The rest of the muscle planes, elbow joint alignment, and osseous outlines appeared normal. There was no vascular encasement and no evidence of infiltration of the surrounding structures.

A provisional diagnosis of soft tissue elbow mass with benign features was made with rhabdomyoma as the first on the list of differentials. The patient underwent an excision biopsy.

The specimen was sent in 10% neutral buffered formalin to the Department of Histopathology for analysis. Thereafter, accessioning of the specimen was done with surgical cut -up which was described as round to oblong, firm to hard, grey-white to brown, and measures 8.1x4.6x5.4cm. Serial cut sections are firm to hard, grey-white, and representative sections were submitted into tissue cassette. The tissue subsequently underwent tissue processing such as fixation, dehydration (ascending grade of ethanol), clearing with xylene, infiltration with paraffin wax, embedding, microtomy, and staining with haematoxylin and eosin (H&E). The H&E slides were reported by a consultant Anatomic Pathologist as a giant cell tumour. The histopathology report revealed a cellular lesion composed of multiple giant cells having numerous nuclei, abundant cytoplasm admixed with fibrocollagenous stroma within the background.

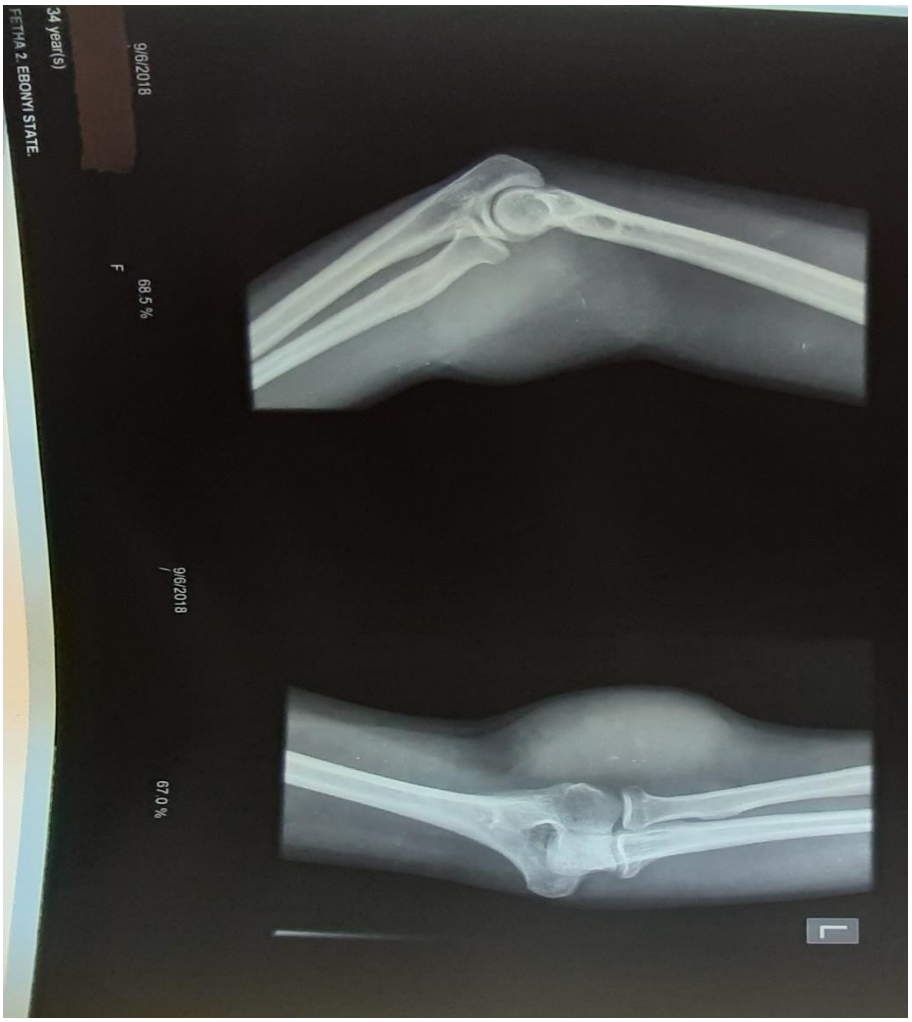

Figure 1. Plain radiographs of both elbow joints showing normal right elbow joint radiographs, and an oval soft tissue mass projected over the left elbow joint (arrows).

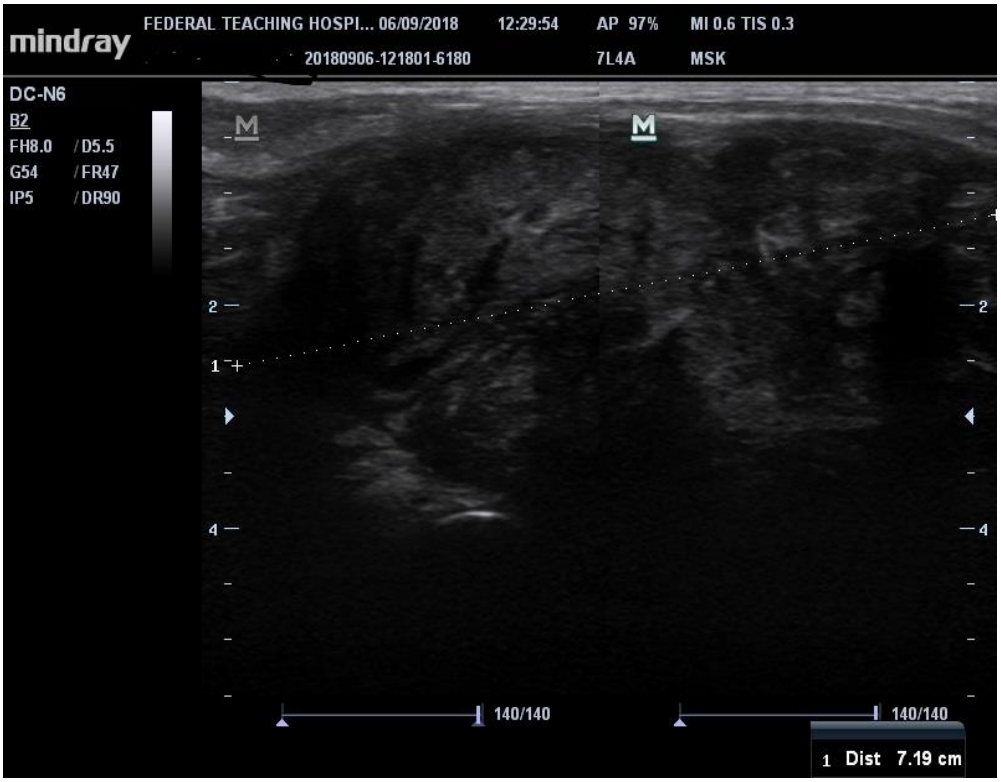

Fig.2: Longitudinal ultrasonographic scan of the left elbow showing a circumscribed mass with heterogenous echotexture.

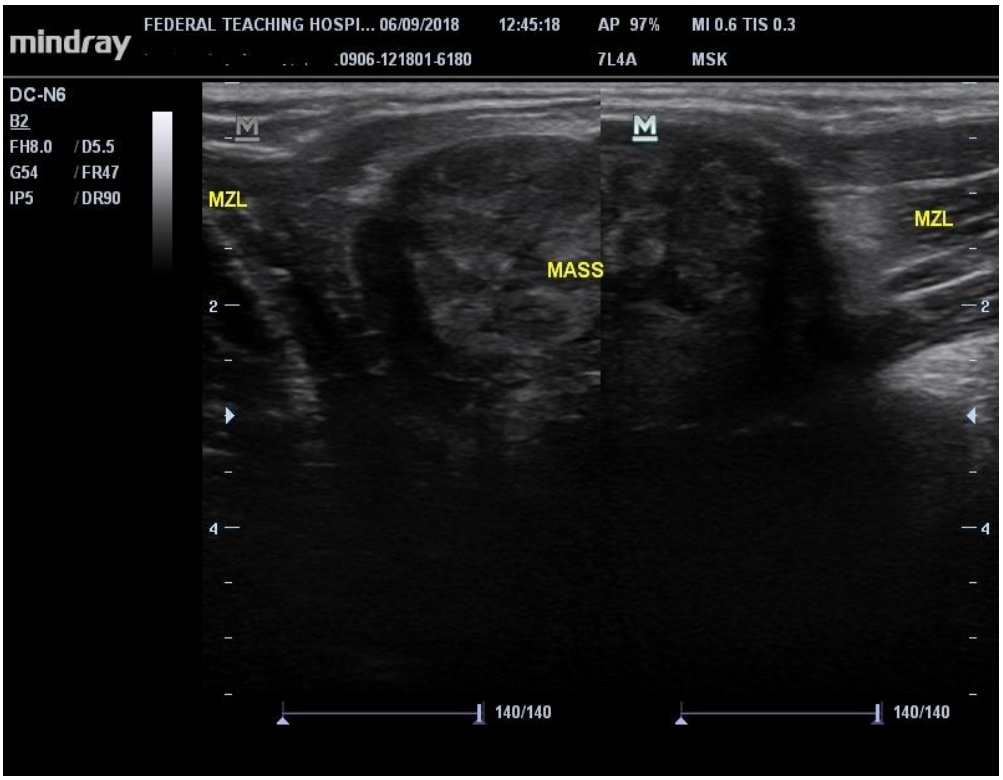

Figure 3: Longitudinal ultrasonographic image of the elbow joint showing a well-defined heterogeneously echogenic mass displacing the adjacent muscles posteriorly.

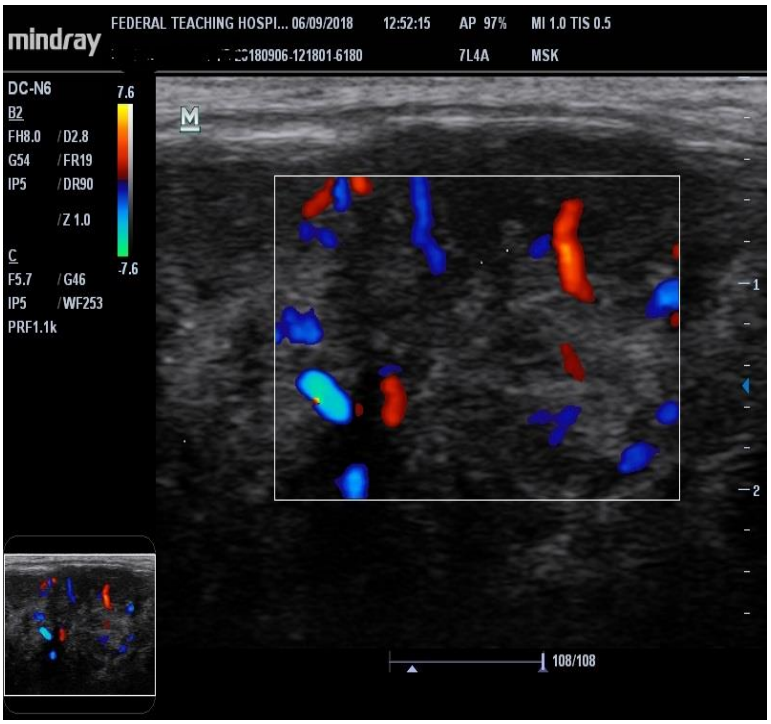

Figure 4: Colour Doppler assessment showing increased colour vascular flow within the mass.

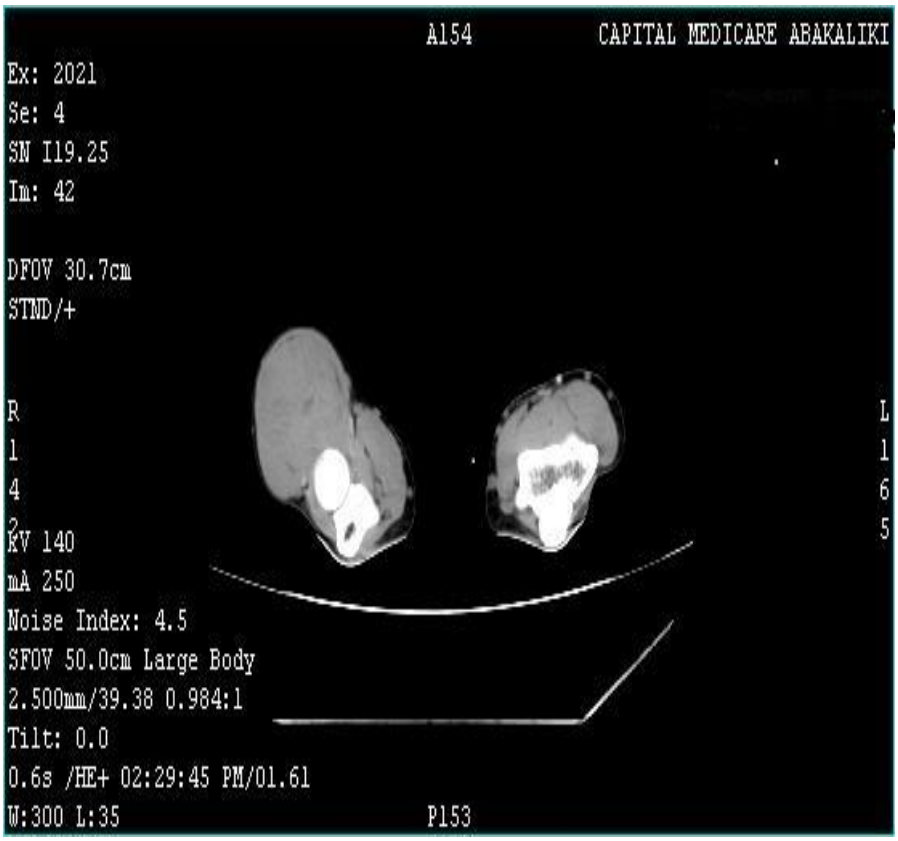

Figure 5: Axial computed tomogram of both elbows showing moderately enhancing soft tissue mass on the left elbow (arrows).

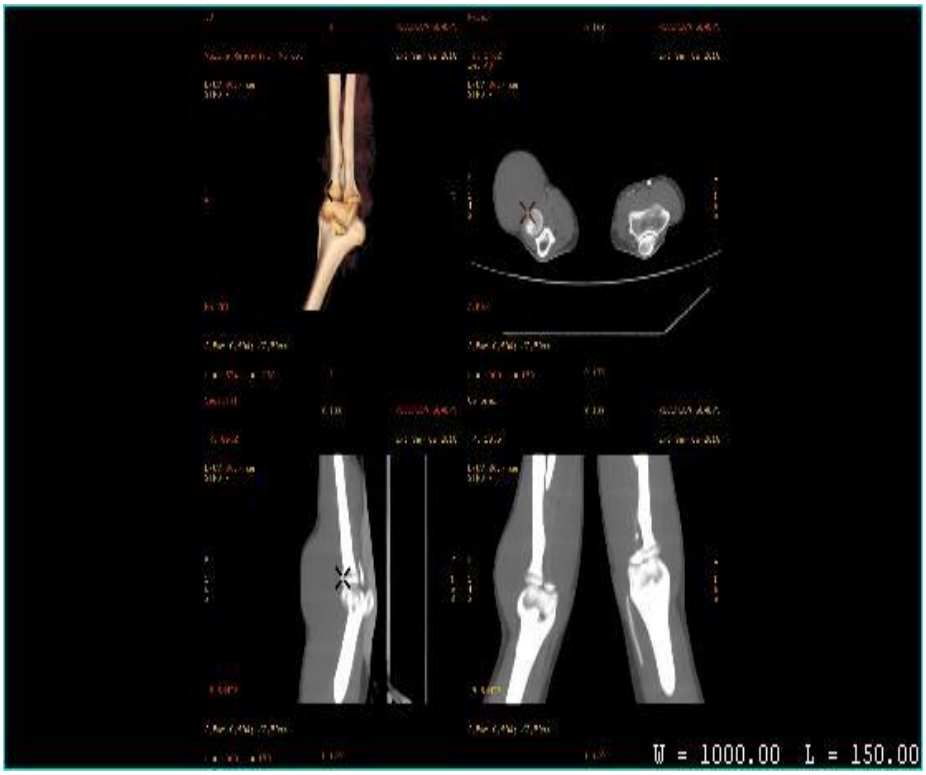

Figure 6: Axial, reformatted, and 3-D computed tomography of the elbow joint in the bone window showing normal adjacent osseous outlines (*).

Ethical issues

The informed consent of the patient for publication was obtained and the case report was conducted in compliance with the guidelines of the Helsinki Declaration on biomedical research in human subjects

Discussion

GCTST is a rare distinct entity occurring primarily in the soft tissues with similar histological features to the giant cell tumour of the bone (GCTB).2 There are few case series and case reports describing the clinical and cytomorphological features of this entity. In Nigeria, Asuquo et al –working in Calabar (2013), documented a case of a giant cell tumour of soft tissue of the finger in a 52-year-old male.[4] This case- though a different location- has the same symptomatology, imaging, and histological findings as the index case. More importantly, Salm and Sissons described the first case report in 1972 and coined the term "Giant-cell tumors of soft tissues.[5]

Thereafter, in 1972, Guccion and Enzinger reported a more aggressive form of this lesion in a case series of 32 cases and proposed that they were related to malignant fibrous histiocytoma.[6] Folpe et al classified it into two distinct forms on the bases of histological appearances using nuclear atypia, pleomorphism, and mitotic activity of the neoplastic components.[7] They also proposed the term 'giant cell tumour of soft tissue of low malignant potential" (with little or no mitotic activities, as well as nuclear atypia).[7]The index case was consistent with this category of low malignant potential as no mitotic activities, pleomorphism, necrosis, or nuclear atypia was detected on histopathology examination. The unpredictable nature of the tumour makes it important to undertake tumour free marginal excision biopsy as a treatment option; and maintain post-excision follow-up as the biology of the tumour has not been completely unraveled.[4] These protocols were observed for our patient. Oliviera et al in a study of 22 cases, reported rare malignant changes with metastasis to the lungs and parotid gland.[8] In this case, the patient's chest x-ray was normal and also no evidence of malignant transformation was noted on both imaging and histopathology findings. The tumour affects mainly adults of both sexes with an age range of 5-80 and a median age of 43 years.[8] This index patient falls within the reported age bracket.

The GCTST is usually peri-articular, well-circumscribed, non-encapsulated, and subcutaneous or intramuscular.[9] The Index patient had a periarticular (elbow joint) lesion of the upper limb as demonstrated in Figure 1. The GCTST is mainly found in the lower limb, the trunk, the upper limb, the head, and neck.[3] Other uncommon sites documented include breast, mediastinum, skin, ovaries, and intracerebal1. A review by Chand et al documented the commonest site as the upper limb[10]. This is in contrast with other works of literature cited but in keeping with our patient whose lesion was on the lateral aspect of the left elbow joint.[8]

GCTST commonly presents clinically as a painless, firm, well-defined mass that does not attach to muscle, tendon, or bone.[4] These clinical findings are in keeping with the clinical features of our index case except that in our index case, the mass was attached to the underlying muscle. Mokrani et al (2017) also reported a case of GCTST with attachment to the underlying muscle. In addition, our patient also presented with weakness of the left thumb, index, and middle finger with loss of thenar eminence-which was proposed due to the mass effect on the adjacent median nerve. According to Chand et al, none of the 7 cases studied were suspected clinically, as their presentations were similar to other soft tissue masses.[10]

Imaging evaluation of this tumour is however not diagnostic. Plain radiographs, ultrasound, and magnetic resonance imaging (MRI) are among the modalities used by authors of different case reports. Asuquo et al asserted that a plain radiograph was adequate to evaluate bony involvement of the tumour.[4] Ultrasonography was used by Sang BA et al (2008) to describe cystic degeneration in a case of giant cell tumour of soft tissue showing hypoechoic cystic part and hyperechoic solid part; there was also no significant vascular flow in Colour Doppler study.[11] The index patient, in contrast, revealed heterogeneous echo mass in ultrasonography with significant vascular flow in Colour Doppler. Magnetic resonance imaging of GCTST shows hypointensity in both T1 and T2 weighted images and may show a blooming effect in gradient recall echo (GRE) imaging if degenerative changes (haemorrhagic or calcifications) are present.[4,11] The MRI was not obtained from this patient. A computed tomography scan was obtained and showed an enhancing mass with attachment to the brachioradialis and showed no evidence of osseous affectation shown in Figures 5 and 6. This in keeping with other reports which also documented the absence of bony affectations.[1,3,4,8]

The definitive diagnosis was established by histopathology examination which was described as demonstrating

osteoclastic mononuclear or multinucleated giant cells in a richly vascularised or myxoid stroma.[1,4] In addition, immunohistochemistry is not necessary for diagnosis; it may, however, be done to provide further information regarding the tumour.[1] The immunohistochemistry features are similar to that of the giant cell tumour of the bone (GCTB): shows positive stain for CD68, vimentin, tartrate-resistant acid phosphatase (TRAP), cytokeratin, and smooth muscle actin. [12,13] Immunohistochemical analysis was not done in this case.

Treatment of GCTST is by surgical excision of tumour-free margins. [1,4] Mokrani et al used biphosphonate (zoledronic acid) in a similar tumour in the right elbow with an intra-articular extension which makes it inoperable, and they achieved good results within 8 months.[1] They proposed this medical management or combination with surgery for cases of GCT-ST that are not amenable to complete surgical excision. The tumour in our patient did not show intra-articular extension and was completely excised. The patient is currently on monthly follow-up. She has shown remarkable improvement from the weakness of the left thumb, index, and middle finger. Finally, the primary mesenchymal tumour must be interpreted with caution through histopathology examination to rule out mimickers and optimize patient qualitative care.[14]

CONCLUSION

The giant cell tumour of the soft tissue (GCT-ST) is a slow-growing, painless soft tissue mass that shares many features with its bony counterpart. It is treated by surgical excision of tumour-free margins; it may sometimes recur, and rarely undergo malignant transformation. In all the literature reviewed, there is no clinical or imaging feature to differentiate it from other soft tissue masses. It is important to consider it in differentials of soft tissue masses.

Conflict of interest: We have no conflicts of interest to disclose.

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Abbreviations:

Giant cell tumour of the soft tissue (GCT-ST

Tartrate-resistant acid phosphatase (TRAP

Magnetic Resonance Imaging: MRI

Giant cell tumour of the bone (GCTB

Haematoxylin and eosin (H&E).

World Health Organization (WHO

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