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Cystic Ancient Schwannoma of the Left Thigh: A Rare Presentation in a Middle-Aged Female

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ABSTRACT

Background: Schwannomas are benign peripheral nerve sheath tumors that rarely present with cystic degeneration. Their occurrence in the thigh with attachment to the sciatic nerve is uncommon and can pose a diagnostic challenge.

Case Presentation: We report the case of a 53-year-old female with a progressively enlarging, painful swelling over the left thigh for three months. MRI demonstrated a multiloculated cystic lesion in the intermuscular plane of the posteromedial thigh. Excision biopsy revealed a reddish-blue cystic mass attached to the sciatic nerve, measuring 6×5 cm. Histopathological examination confirmed the diagnosis of ancient schwannoma with cystic changes, with free circumferential margins. The patient had an uneventful postoperative recovery and remains under follow-up.

Conclusion: Ancient schwannomas, though benign, may mimic malignant tumors due to their atypical imaging features and cystic degeneration. Careful surgical excision with nerve preservation remains the mainstay of management.

Keywords: *Ancient Schwannoma, Sciatic Nerve, Cystic Degeneration, Peripheral Nerve Tumor, Thigh Mass*

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1. INTRODUCTION

Schwannomas, also known as neurilemmomas, are benign encapsulated tumors arising from Schwann cells of the peripheral nerve sheath. They account for approximately 5% of all benign soft tissue tumors and can occur in any part of the body where peripheral nerves are present. These tumors are usually solitary and slow growing, with a predilection for the head, neck, and flexor surfaces of the extremities. Involvement of the sciatic nerve or its branches in the thigh is relatively uncommon, making such cases clinically significant.[1,2]

Most schwannomas present as painless, gradually enlarging swellings. However, when the lesion compresses adjacent nerves, patients may experience pain, paresthesia, or radiating discomfort, as seen in our case. Long-standing schwannomas may undergo degenerative changes, including cystic necrosis, hyalinization, calcification, hemorrhage, and nuclear atypia. These changes give rise to the term *ancient schwannoma*, first described by Ackerman and Taylor in 1951. Despite its worrisome histological appearance, ancient schwannoma remains benign and is not associated with malignant transformation.[3,4]

Radiological evaluation plays a crucial role in the diagnosis of schwannomas. MRI typically demonstrates a well-defined, encapsulated lesion with heterogeneous signal intensities. However, in the case of ancient schwannomas with cystic changes, the imaging characteristics may mimic malignant soft tissue tumors, thereby complicating the preoperative diagnosis.[5,6]

Surgical excision is the treatment of choice. Complete removal of the tumor with preservation of the parent nerve usually results in excellent outcomes. Histopathological examination is essential to confirm the diagnosis and to differentiate ancient schwannomas from malignant peripheral nerve sheath tumors (MPNSTs).

Given the rarity of cystic ancient schwannomas arising in the thigh, especially those attached to the sciatic nerve, documentation of such cases is important. This report presents a case of a middle-aged female with a cystic ancient schwannoma of the left thigh, highlighting the clinical presentation, radiological features, surgical findings, and histopathological confirmation.

2. CASE REPORT

A 53-year-old female came to general surgery OPD with complaints of swelling over the left thigh for past 3 months. The patient was apparently normal before 3 months after which she noticed a swelling in the left thigh , insidious in onset initially small in size gradually progressed to attain the current size.

H/o pain present

Pricking type , radiating towards the left foot.

No h/o fever/trauma/discharge from the swelling

No h/o ulcer over the swelling.

No h/o loss of sensation/restriction of movements of joints

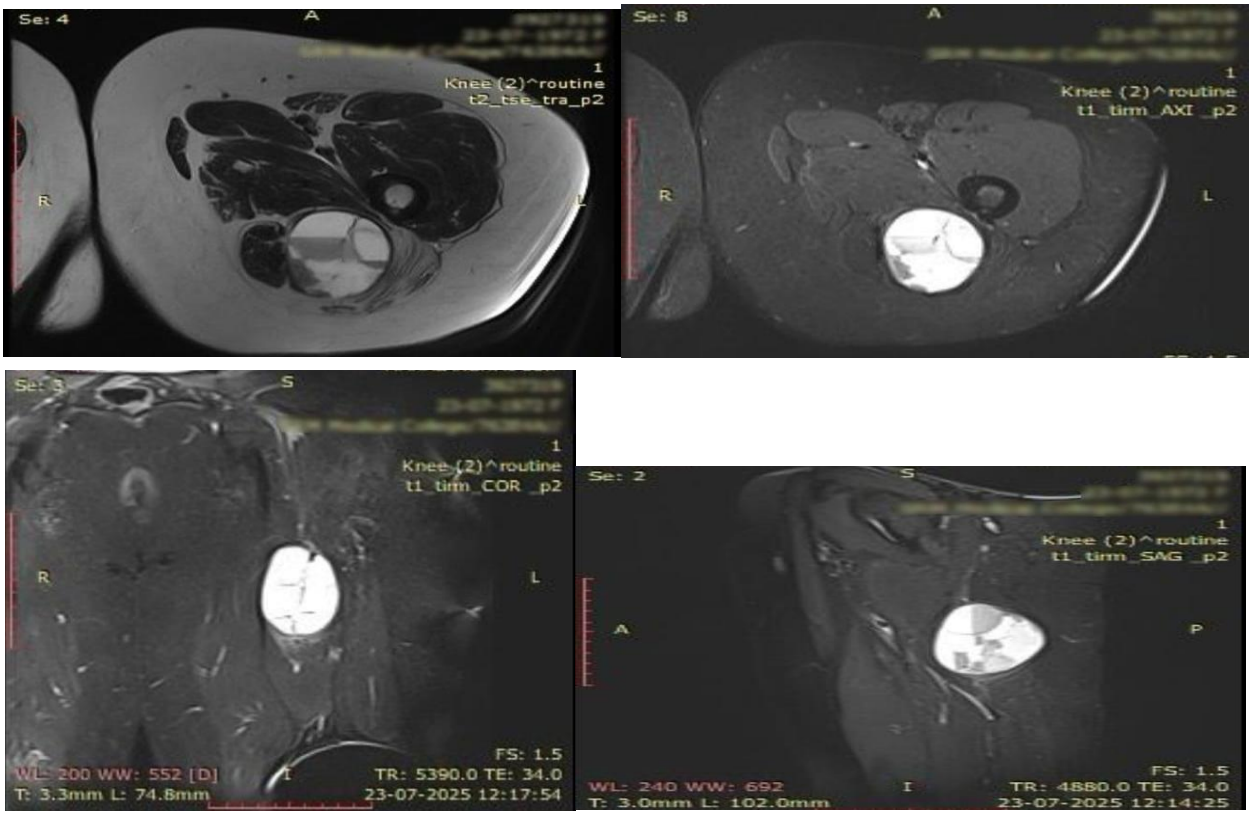
No h/o bonypain/cough with expectoration/hemoptysis/breathlessness/

No h/o abdominal pain /jaundice, No h/o seizures /Visual disturbances/skin pigmentation over the swelling. She is a k/c/o dyslipidaemia for 10yrs and migraine for 10yrs on medication

Local examination revealed

A swelling of size approximately 4×3 cm over the posteromedial aspect of the left thigh, firm in consistency, smooth surface, mild tenderness +, no warmth, plane intermuscular. On putting the muscle to contraction restricted mobility.

MRI Left thigh revealed well defined T2 heterogenous hyperintense, T1 iso to hyperintense Multiloculated cystic lesion in the intermuscular plane of posteromedial aspect of proximal thigh. Fatty atrophy of gluteus maximus likely due to chronic extrinsic compression by the lesion or disuse. (Figure 1 to 4)



First Image (Axial T2-weighted image)

- A well-defined, multiloculated hyperintense lesion is noted in the **posteromedial compartment of the left thigh**.
- The lesion appears bright (hyperintense) on T2 sequence, suggestive of cystic nature.
- Surrounding muscles show normal intensity, except for mild fatty atrophy of the gluteus maximus as described in the MRI report.

Second Image (Coronal section)

- The lesion is elongated, oriented along the long axis of the thigh, measuring several centimeters.
- The bright signal intensity again confirms cystic content.
- The lesion is located in the **intermuscular plane**, without obvious infiltration of adjacent muscles, which supports a benign pathology.

Third Image (Sagittal section)

- The lesion appears multiloculated with internal septations.
- There is no evidence of surrounding bone involvement or aggressive infiltration.
- Its relationship with the sciatic nerve is suggested (posterior aspect abutment as described intraoperatively).

Fourth Image (Axial T1-weighted image with fat suppression)

- The lesion shows mixed signal intensity, predominantly iso- to hyperintense.
- The perilesional fat planes are maintained.
- This pattern (heterogeneous on T1, hyperintense on T2) is consistent with **cystic/degenerative changes in schwannoma**.

Excision biopsy of the swelling was done. Intraoperative findings revealed a predominantly cystic swelling of size 6×5cm reddish blue in colour with an irregular surface . The swelling was between adductor magnus and gluteus maximus, abutting biceps femoris and semitendinosis as well. The posterior aspect of the swelling was seen attached to the sciatic nerve. (fig.5,6 and 7)

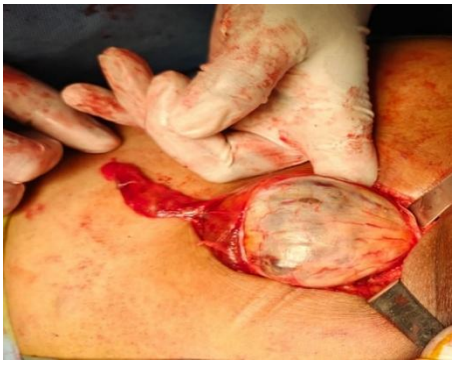


Fig 5(a)

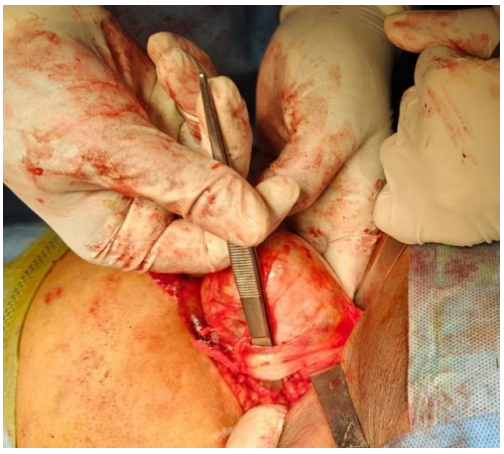


Fig 5(b)

Fig 5 (a) and (b).Intraoperative photo showing the cystic swelling which was adherent to the sciatic nerve below.

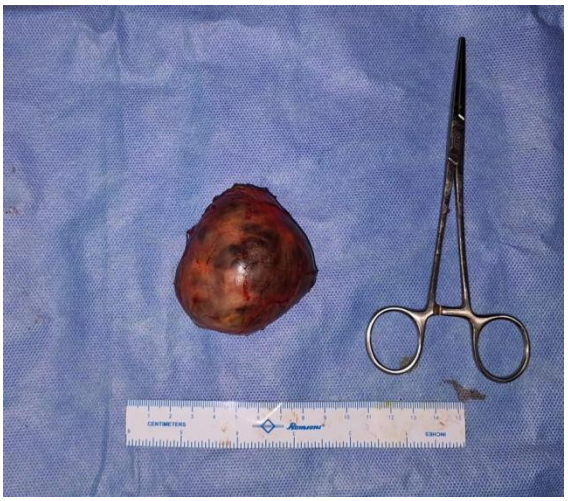


Fig.6.Cyst immediately after excision

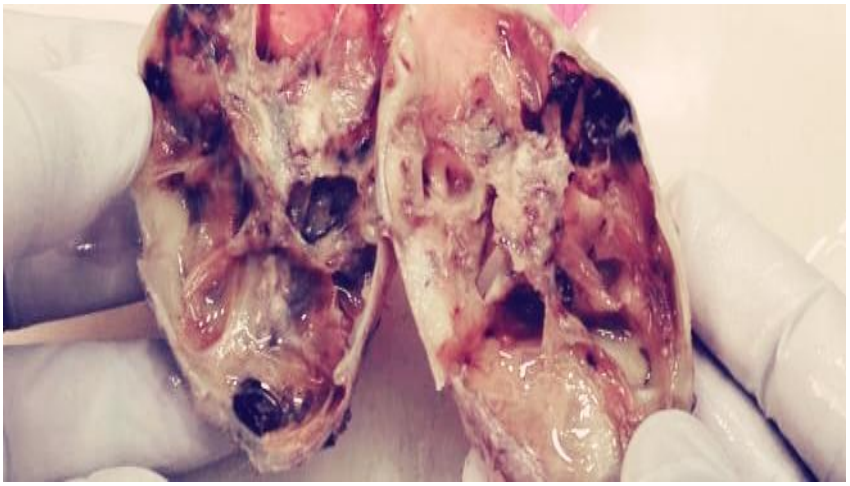


Fig 7.Cutsection of the excised specimen showing prominent cystic spaces.

Histopathology (Figure 8and 9)

HPE revealed features suggestive of ANCIENT SCHWANNOMA with cystic changes - circumferential margin free of tumour. Postoperative period was uneventful. Patient was kept on regular follow up.

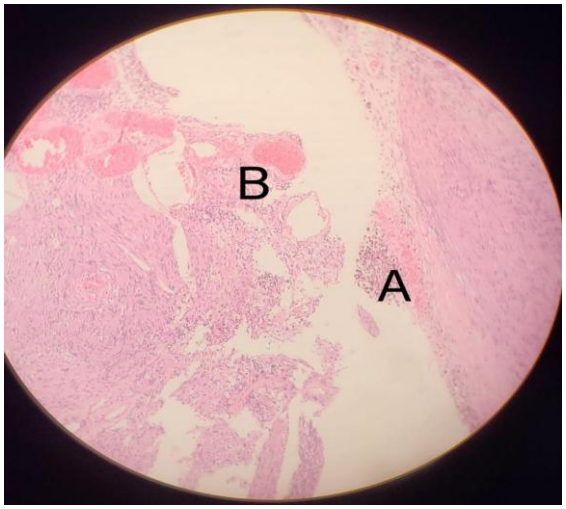


Figure 8- HPE 1 (10 x H&E stained section, low–medium magnification)

A- Hemosiderin laden macrophages

B- Hyalinization of Blood Vessels

Shows spindle-shaped tumor cells arranged in interlacing fascicles. Areas of cystic degeneration with eosinophilic material and degenerative changes are visible. Some regions demonstrate Antoni A (hypercellular) areas with palisading nuclei and Verocay body-like structures, while others show Antoni B (hypocellular, myxoid) areas. Presence of degenerative atypia (nuclear pleomorphism, hyperchromasia) without mitotic activity, which is typical of *ancient schwannoma* rather than malignancy.

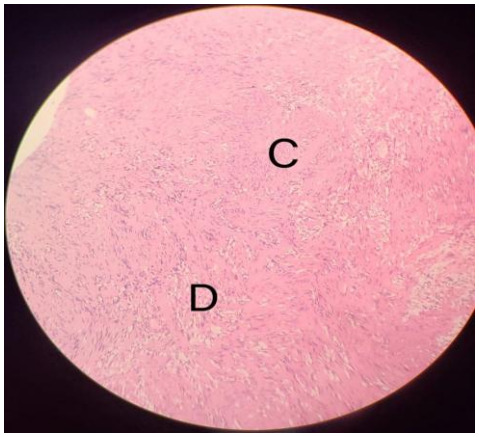


Figure 9- (10x H&E stained section, low magnification)

C- Verrocay Bodies

D- Antoni A

Shows more hypocellular myxoid areas (Antoni B pattern) with loosely arranged spindle cells. Degenerative changes such as hyalinization and cystic spaces are evident. Nuclear atypia with scattered large, hyperchromatic nuclei is seen, but importantly no necrosis or abnormal mitotic activity is present.

Immunohistochemistry

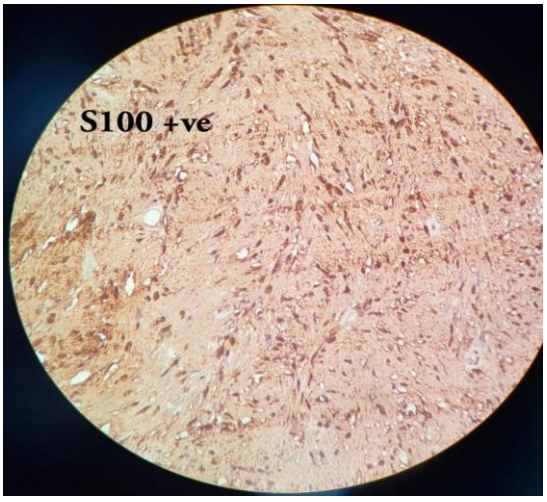


Figure 10 (a)- (Immunohistochemistry: S-100, high magnification)

Shows diffuse nuclear and cytoplasmic positivity for S-100 protein, which is diagnostic for schwannoma as it arises from Schwann cells of peripheral nerves. The uniform brown staining pattern confirms neural crest origin.

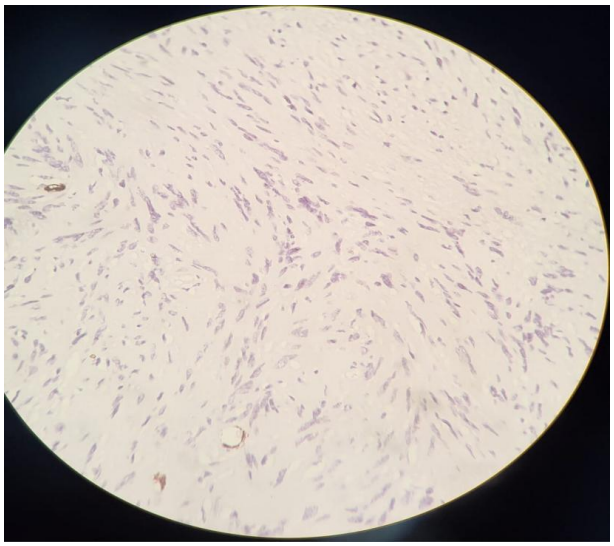


Figure 10 (b)- (Immunohistochemistry, stronger view)

Again shows diffuse S-100 positivity in spindle cells. This strong, diffuse staining is a hallmark of benign schwannoma, distinguishing it from other spindle cell tumors like leiomyoma or malignant peripheral nerve sheath tumor (which show variable or patchy staining).

3. DISCUSSION-

Peripheral nerve sheath tumors (PNSTs) encompass a diverse group of neoplasms arising from the supporting elements of peripheral nerves. The two most common benign forms are schwannomas and neurofibromas**,** with malignant peripheral nerve sheath tumors (MPNSTs) representing their aggressive counterpart. Among these, **s**chwannomas account for nearly two-thirds of all benign PNSTs and are characterized by their encapsulated growth pattern, eccentric relation to the parent nerve, and histopathological hallmark features such as Antoni A and Antoni B areas with Verocay bodies.

Clinically, schwannomas often present as slow-growing, painless masses along the course of peripheral nerves. Neurological deficits are uncommon in early stages due to their eccentric growth, which displaces rather than infiltrates nerve fascicles. In contrast, neurofibromas typically involve the entire nerve, leading to early sensory or motor impairment. Pain or paresthesia may occur in schwannomas when the lesion compresses adjacent neural tissue, as was observed in our case.

Imaging plays a critical role in diagnosis. On MRI, schwannomas typically demonstrate iso- to hypointensity on T1-weighted images and hyperintensity on T2-weighted images, with heterogeneous enhancement post-contrast. Characteristic imaging signs such as the “split fat sign” and the “fascicular sign” aid in differentiating schwannomas from other soft tissue tumors. In addition, the “target sign,” although more common in neurofibromas, may occasionally be present. In the present case, MRI demonstrated well-defined margins and features consistent with a benign nerve sheath tumor, which guided surgical planning.

Histopathology remains the gold standard for definitive diagnosis. Schwannomas exhibit alternating Antoni A (cellular, palisading) and Antoni B (hypocellular, myxoid) areas, along with the presence of Verocay bodies. Immunohistochemistry demonstrates strong positivity for S-100 protein, confirming their neural crest origin. These findings were consistent in our case, reinforcing the diagnosis of schwannoma.

Utomo et al. (2021) reported a case of a long, completely cystic sciatic schwannoma**,** highlighting the difficulty in differentiating such lesions from other cystic tumors of the pelvis and thigh region [7]. In their report, MRI revealed a lesion mimicking a cystic neoplasm, but histopathology confirmed a schwannoma with cystic degeneration. This case emphasizes that even large cystic lesions in the extremities should keep schwannoma as a differential, especially when arising in relation to major nerves.

Similarly, Lim et al. (2017) described a purely hemorrhagic cystic schwannoma located in the intermuscular plane, which radiologically mimicked a soft tissue hematoma [8]. Their findings underscore the diagnostic pitfall in distinguishing hemorrhagic schwannomas from traumatic or vascular lesions. MRI features, such as heterogeneous signal intensities due to blood degradation products, further complicate differentiation. Thus, radiologists and clinicians must be cautious when encountering intramuscular or intermuscular hemorrhagic cystic lesions without clear trauma history.

Adding another dimension to atypical morphology, Korytkowski et al. (2024) reported an ancient schwannoma of the thigh

with extensive degenerative changes, including metaplastic ossification, cartilage formation, and calcification [9]. These findings are consistent with long-standing lesions that undergo secondary changes due to impaired vascularity and chronic growth. Ancient schwannomas, although benign, often mimic malignant sarcomas on imaging due to their irregular calcifications and heterogeneous enhancement. Histopathological confirmation therefore becomes crucial to avoid overtreatment.

When comparing across these atypical variants, a unifying theme emerges: schwannomas can present with extreme morphologic diversity—ranging from cystic to hemorrhagic to calcified degenerative forms—posing diagnostic dilemmas both radiologically and clinically**.** MRI remains the imaging modality of choice, yet it may not always provide definitive diagnosis. Instead, histopathology remains the gold standard**,** with immunohistochemical positivity for S-100 protein serving as a confirmatory marker.[10]

The mainstay of treatment is surgical excision**,** with the goal of achieving complete resection while preserving nerve function. Owing to their encapsulated nature, schwannomas can often be dissected away from the parent nerve without significant deficits. However, intraoperative nerve monitoring is recommended to minimize the risk of iatrogenic injury. Postoperative prognosis is excellent, with very low recurrence rates. Malignant transformation is exceedingly rare in schwannomas, in contrast to neurofibromas associated with neurofibromatosis type 1 (NF1), which carry a higher risk of transformation into Malignant Peripheral Nerve Sheath Tumours.

From a clinical perspective, the recognition of schwannomas is crucial, as they mimic other soft tissue lesions such as lipomas, ganglion cysts, and fibromas. Misdiagnosis may lead to inappropriate management or delay in surgical intervention. A multidisciplinary approach involving radiology, pathology, and surgical expertise ensures accurate diagnosis and optimal outcomes.

4. CONCLUSION

In conclusion, Schwannomas are benign, encapsulated PNSTs with characteristic clinical, radiological, and histopathological features.Although Schwannomas predominantly exhibit a solid architecture ,cystic degeneration is an infrequent histopathological feature, documented in merely 4% of cases [11].The above mentioned case has its highlights exhibiting both predominant macrocystic as well as microcystic changes differentiating it from other types of Schwannomas.Early recognition and complete surgical excision offer an excellent prognosis with preservation of nerve function. Our case underscores the importance of correlating clinical presentation with imaging and pathological findings in the diagnosis and management of these tumors.

REFERENCES

[1] He L, Zhang YJ, He SL, Zhang JR, Wu J, Zhang GF, et al. Sciatic nerve schwannoma complicated by nerve bundle membrane effusion: two case reports and a literature review. Front Oncol. 2022;12:915982. doi:10.3389/fonc.2022.915982

[2] Telera S, Raus L, Vietti V, Pace A, Villani V, Galié E, Freda N, Carosi M, Costantini M. Schwannomas of the sciatic nerve: A rare and neglected diagnosis. A review of the literature with two illustrative cases. Clin Neurol Neurosurg. 2020 Aug;195:105889. doi: 10.1016/j.clineuro.2020.105889. Epub 2020 May 6. PMID: 32422470.

[3] Kumar A, Singh S, Singh RP, Maurya AP, Mukhopadhyay S. Giant Plexiform Schwannoma on the Medial Aspect of the Left Thigh. Cureus. 2023 Dec 7;15(12):e50136. doi: 10.7759/cureus.50136. PMID: 38186416; PMCID: PMC10771346.

[4] Lee YS, Kim JO, Park SE. Ancient schwannoma of the thigh mimicking a malignant tumour: a report of two cases, with emphasis on MRI findings. Br J Radiol. 2010 Jul;83(991):e154-7. doi: 10.1259/bjr/19325350. PMID: 20603402; PMCID: PMC3473686.

[5] Liu, R., Page M., Solheim K., Fox S., & Chang S. M. (2009). Quality of life in adults with brain tumors: Current knowledge and future directions. Neuro Oncology, 11(3):330–9. doi:10.1215/15228517-2008-093.

[6] Baskar,R., Dai, J., Wenlong, N., Yeo, R., & Yeoh, K. W. (2014). Biological response of cancer cells to radiation treatment. Frontiers in Molecular Biosciences, 1(24):1–9. doi:10.3389/fmolb.2014.00024.

[7] Utomo SA, Bajamal AH, Faris M, Ardiansyah D, Lunardhi JH. Long Completely Cystic Sciatic Schwannoma: A Rare Case. Case Rep Oncol. 2021;14(1):561–567. doi:10.1159/000514633. PMID: 33976634; PMCID: PMC8077366.

[8] Lim JH, Shim JC, Yoon BH, Kang YK, Lee KE, Kim HK, Lee GJ, Suh JH. Rare Form of Schwannoma as a Purely Hemorrhagic Cystic Tumor Located in an Intermuscular Plane. Investig Magn Reson Imaging. 2017;21(1):38–42. doi:10.13104/imri.2017.21.1.38.

[9] Korytkowski PD, Kravtsov O, Hariri D, Damron TA. Ancient Schwannoma of the Thigh: Metaplastic

Ossification, Cartilage Formation, and Extensive Calcification. Cureus. 2024;16(2):e53790. doi:10.7759/cureus.53790. PMID: 38465065; PMCID: PMC10923672.

[10] Himmiche M, Benzagmout M, Alami B, Benabdellah IS, Chakour K, Chaoui ME. Giant cystic schwannoma of the cauda equina. Ann Afr Med. 2019 Jul-Sep;18((3)):180–3. doi: 10.4103/aam.aam_61_18.

[11] Wakoh M, Yonezu H, Otonari T, Sano T, Matsuzaka K, Inoue T, Wada N. Two cases of schwannoma with marked cystic changes. Dentomaxillofac Radiol. 2005 Jan;34(1):44-50. doi: 10.1259/dmfr/57066369. PMID: 15709106.