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Case Report

A rapidly advancing intraosseous angiosarcoma masquerading as an infected pathological periprosthetic fracture: a case report

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ABSTRACT

We present a case of a rapidly progressive angiosarcoma that presented initially as a pathological fracture in our institution after a fall. Mdm A, a 74-year-old Chinese lady initially presented with non-specific thigh pain prior to an unwitnessed fall, following a recent bipolar hemiarthroplasty 3 months before current presentation. Blood markers were grossly within acceptable limits and computed tomography (CT) scan revealed displaced greater and lesser trochanteric periprosthetic fractures with subsidence of femoral stem, and findings suggestive of intramuscular haematomas. She subsequently turned septic on day of planned surgery for a revision arthroplasty with markedly raised inflammatory markers. Revision surgery was postponed, with repeat imaging noting evolving fluid collections suspicious of an infected prosthetic joint infection (PJI). Joint washout for presumptive PJI performed 1-week later yielded negative histopathology and cultures. She developed respiratory compromise a few days later. CT-thorax revealed bilateral pleural effusions with small spontaneous haemo-pneumothoraces which again yielded negative cultures and cytology. Eventually a repeat CT-hip 1-month post admission showed new soft tissue lesions in the superficial muscle layers. Biopsies performed returned as intermediate grade angiosarcoma with positive CD31 and ERG stainings. This is the first case study to describe an aggressive metastatic angiosarcoma mimicking a PJI on initial presentation. Angiosarcomas are very rare and presentations may also be highly varied. Diagnosis of angiosarcoma may be made difficult by the absence of clear lesions to biopsy, as in this particular case. A high clinical suspicion of a pathological periprosthetic fracture is needed when diagnosing patients who present atypically for PJIs.

Keywords: Angiosarcoma, Prosthetic joint infection, Musculoskeletal tumours, Periprosthetic fracture, Hypervascular lesions

INTRODUCTION

Angiosarcomas are rare aggressive malignant vascular tumours that account for <3% of adult soft tissue sarcomas, with limited treatment options and poor prognosis.[1,2] They mainly affect the skin and soft tissues involving the head and neck in about 60% but may more rarely present as intraosseous variants, with <1% incidence as primary bone angiosarcomas.[3]

Angiosarcomas have a predilection for males occurring more commonly at 50-70, and in the scalp.[2,3] Risk factors may include prior radiation at tumour origin site, chronic lymphoedema and certain familial syndromes.[2-4]

Given the wide range of sites angiosarcoma may affect, presentation is also widely varied. Soft tissue angiosarcomas may present as moderately enlarging masses.[5] Intraosseous angiosarcomas mainly present with pain in the affected region, pathological fractures in approximately 10%, and majority with distant metastases at initial presentation, most commonly involving the lungs and lymph nodes are mainly treated with surgery, chemoradiotherapy, both or palliation.[2,5,6] However,

literature on treatment modalities and effectiveness of each and outcomes are highly limited in view of its rarity.

This is the first case to describe presentation and outcome of an aggressive metastatic intraosseous angiosarcoma in an elderly female with initial presentation of a periprosthetic fracture mimicking prosthetic joint infection (PJI). There is limited literature on angiosarcomas, with few case studies on its widely varied but delayed presentations but do not describe the similarities in presentations between angiosarcoma and PJI, but do not describe the similarities in presentations between angiosarcoma and PJI.[7-9]

CASE REPORT

Mdm A, a 74-year-old lady first presented post-low-energy fall from standing height, with a displaced Garden's IV left neck of femur fracture (Figure 1).

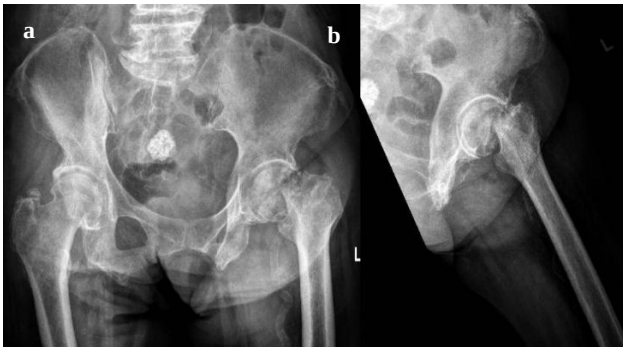

Figure 1: (a) AP view of pelvis and (b) hip XR following fall, showing a left neck of femur fracture preoperatively.

All investigations were normal except a slightly low haemoglobin 11.3 g/dl (reference: 11.5–15). She underwent left hip uncemented bipolar hemiarthroplasty uneventfully, thereafter discharged to a rehabilitation step-down facility with good outcomes (Figure 2).

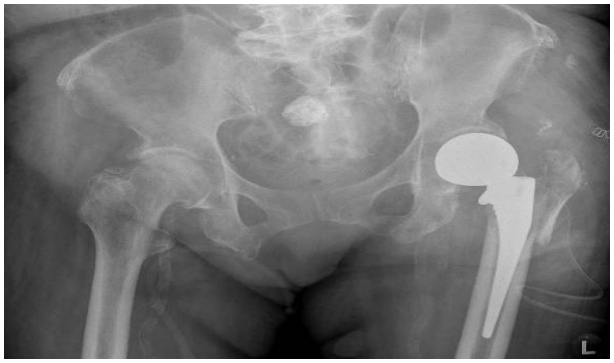

Figure 2: AP view of XR pelvis on post-operative day 1 of the patient's uncemented left bipolar hemiarthroplasty.

She was readmitted 3-months later with few days of non-specific thigh pain prior to an unwitnessed fall. She denied constitutional symptoms. Investigations showed low haemoglobin (10.3 g/dl), elevated C-reactive-protein (36 mg/l), but normal total white counts. Imaging showed displaced lesser and greater trochanteric periprosthetic fractures with subsidence of the femoral stem, and intramuscular hyperdense lesions suggestive of haematomas.

She was initially planned for revision arthroplasty but turned septic on morning of surgery. Surgery was aborted and septic workup returned positive blood and urine cultures for *Klebsiella pneumoniae* and *Escherichia coli* respectively. Inflammatory markers remained high despite antibiotics. CT-thorax, abdomen, and pelvis failed to localise any organized collection, however noted rim-enhancing intramuscular lesions, possibly evolving haematomas versus multifocal abscesses (Figures 3-5).

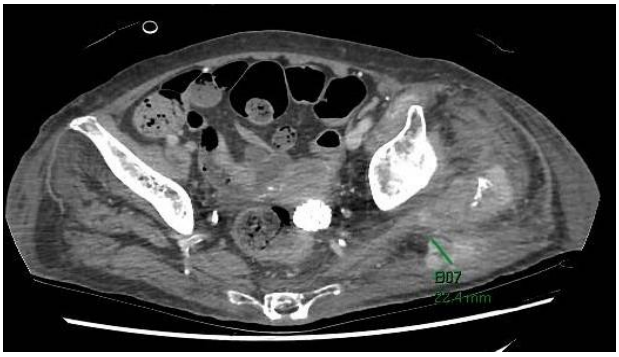

Figure 3: Axial cut of non-contrasted CT pelvis showing the first hyperdense lesion at the left anterio-lateral hip measuring 41.1 mm in diameter (07 August 2024).

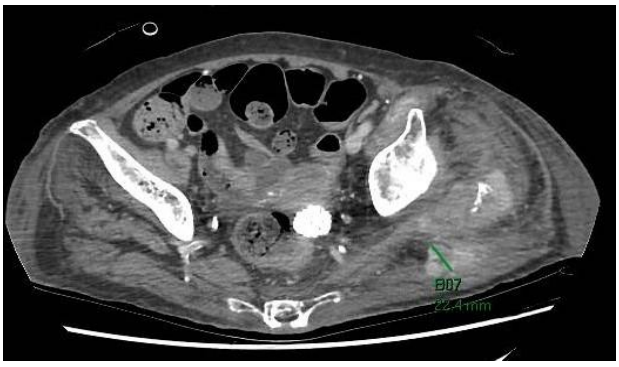

Figure 4: Axial cut of non-contrasted CT pelvis showing the second hyperdense lesion in the left posterior hip measuring 22.4 mm in diameter (07 August 2024).

Lung bases showed bilateral pleural effusions. Infectious diseases and respiratory advices were sought. Primary working diagnosis was fulminant hip infection with septic emboli to lungs with recommendation for a hip washout to reduce infective load.

Hip washout with modular components change was planned. The gluteus maximus was split gently with a finger. A sudden gush of bloody material was seen, turning to be profuse bleeding rather than a hip collection. The visualised hip joint was clean with no overt purulent or necrotic tissue. A drain placed during closure continually drained large bloody output, warranting urgent angioembolization by interventional radiology (IR), showing extensive aberrant vessel formation with active bleed in one of the superior gluteal artery (SGA) branches, possibly a hypervascular region in response to infective aetiology (Figure 6).

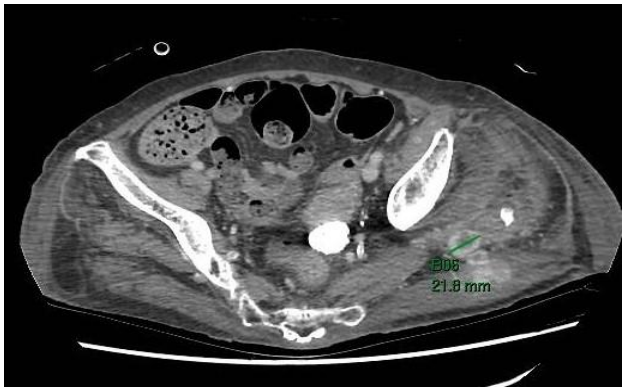

Figure 5: Axial cut of non-contrasted CT pelvis showing the third hyperdense lesion in the left posterior hip measuring 21.8 mm in diameter (07 August 2024).

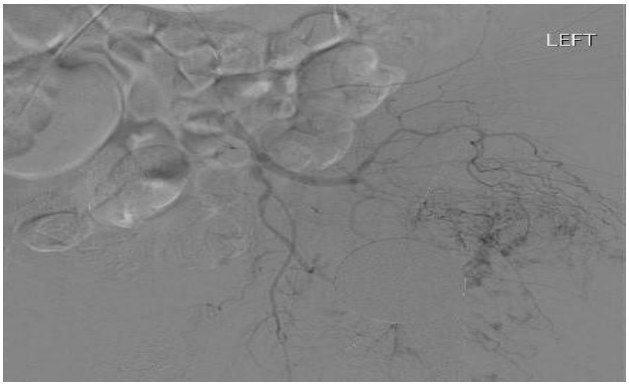

Figure 6: Digital subtraction angiography of gluteal vessels before embolisation showing hypervascularity and blush suggestive of an active bleed.

Tissue, fluid cultures, and histology obtained intraoperatively were negative.

Despite appropriate wound-healing progress, repeated hip X-rays showed progressing bony destruction. She remained clinically stable for a few days before developing acute respiratory distress with rapid deterioration. Lung imaging showed bilateral pleural effusions and small spontaneous pneumothoraces (Figure 7).

Bilateral chest tubes were inserted, and pleural fluid sent for cultures and histology all returned negative. Pleural cytology showed rare atypical cells with negative BER, EP4, TTF1 stains. The chest drains subsequently drained blood 1-week post-insertion. Repeat CT-thorax showed pseudoaneurysm at the 11th right intercostal artery (RIA) which IR attempted embolisation, but failed to stop the continual draining of blood (Figure 8).

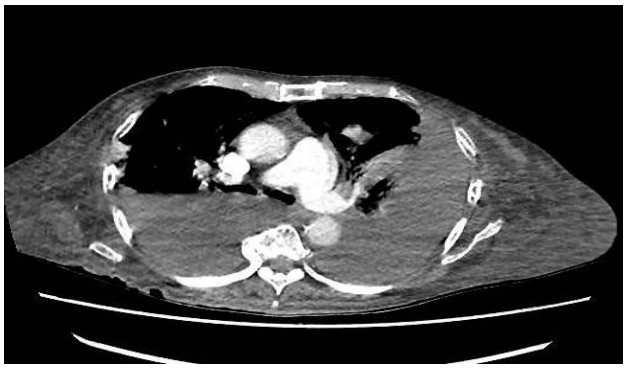

Figure 7: Axial cut of contrasted CT scan thorax showing bilateral haemothorax.

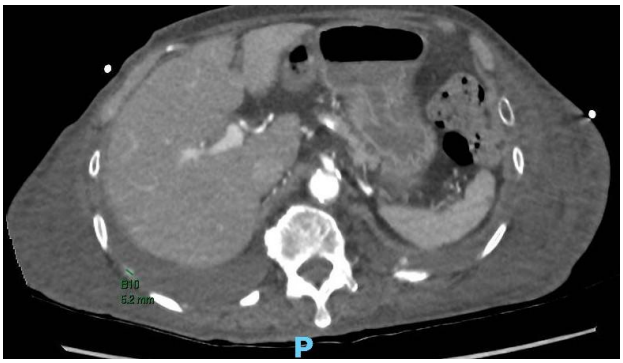

Figure 8: Axial cut of repeat CT thorax showing psuedoaneurysm of R intercostal artery at 11th rib.

A repeat CT-hip revealed new soft tissue lesions in the superficial muscle layers (Figure 9) which were biopsied.

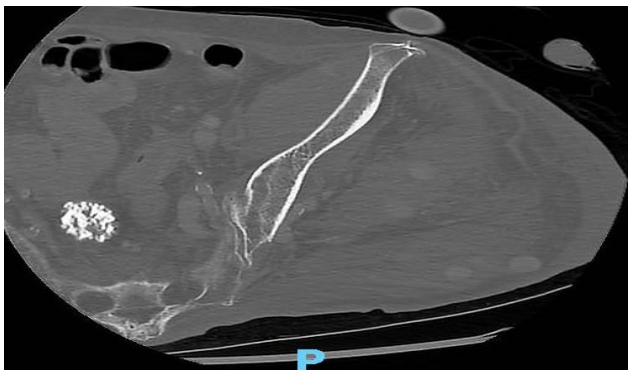

Figure 9: Axial cut of contrasted-CT hip showing multiple hyper-enhancing lesions in the left hip.

Histology returned as intermediate-grade angiosarcoma, with positive CD31 and ERG-stainings. Radiological diagnosis was revised to an aggressive metastasizing hypervascular soft tissue tumour, possibly an angiosarcoma (Figure 10).

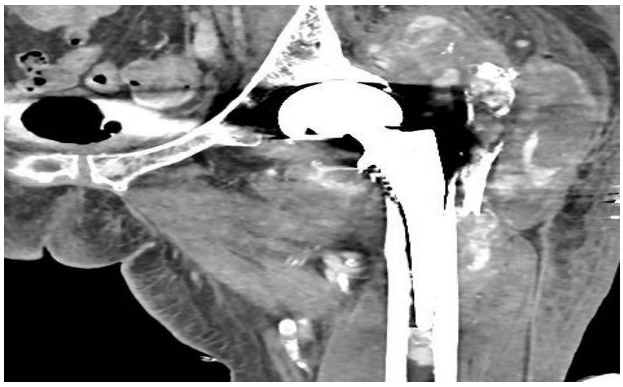

Figure 10: Coronal cut of final CT scan showing a small intramedullary enhancing focus near the tip of the femoral implant.

The patient demised shortly after histological diagnosis was achieved.

DISCUSSION

Our patient initially presented with fever and positive cultures on the background of a previous bipolar hemiarthroplasty on the same side, leading to the red herring of a PJI and thus, implementing management per standard PJI protocol. The non-specific nature of our patient's presentations led to the inability to confidently differentiate either.

6% of patients who presented with PJI had positive cultures of *S. aureus* and MRSE *S. epidermidis* while culture-negative PJIs may be seen in up to 42.1%.[10] Risk factors include: Preoperative CRP levels, higher BMI, prolonged surgery time and malignancy.[11] There is no conclusive association between presence of orthopaedic implants and angiosarcoma.[12] There is also no gender predilection except cutaneous lesions, and generally affect older individuals above 60.[3] Apart from our patient being in the higher-risk age group, there were no other overt suspicious features to suggest the presence of a pathological tumour as the cause of the periprosthetic fractures. Our patient also yielded negative cultures from the hip and did not exhibit risk factors for PJI despite a fever spike and positive blood and urine cultures, however discordant to common organisms found in PJI. Thus, PJI could not be definitively ruled out.

Multiple different combinations of diagnostic markers have been used to define PJI, but there has been no clear "gold standard" in terms of laboratory investigations.[12] In contrast, laboratory markers in angiosarcoma may present raised eosinophils, and biochemical markers which can differentiate angiosarcoma from other mimics including other vascular tumours especially haemangiomas.[9,13] CD31 - the most sensitive marker - and factor VIII, are the best diagnostic markers.[8]

Contrasted-CT findings of angiosarcoma may manifest as irregular, enhancing soft-tissue masses with calcifications. More advanced cases may see underlying bone or adjacent solid organ invasion.[3] There is suggestion that in a patient above 40, a femoral or well-defined osteolytic lesion >4c m with local cortical destruction and minimal periosteal reaction in contiguous bones may raise suspicion of a malignant vascular tumour.[14] In contrast, CT findings of distended joint capsule and fluid collections surrounding the soft tissues of the hip implant are highly suggestive of PJI.[10] In cementless hips like our patient, peri-prosthetic fractures could also be indicative of a PJI.[15] CT findings in our patient were highly non-specific, showing neither features seen in PJI or angiosarcoma. Lack of constitutional symptoms, persistently negative yield from testing of affected areas and radiological findings of periprosthetic fractures also made it difficult to differentiate a PJI from angiosarcoma.

As metastatic angiosarcoma most commonly spreads to the lungs first, suspicion should have been raised for a likely malignancy.[6] In addition, our patient's CT-thorax was concordant to the findings in angiosarcoma, and her alveolar haemorrhage likely explained the bloody chest drain output. Common CT-thorax findings of metastatic angiosarcoma include ground glass changes relating to alveolar haemorrhage, pneumothoraces and pleural effusions.[16] In contrast, CT thorax findings of septic emboli usually include peripheral nodular lesions.

In view of the rarity of angiosarcomas, they are also rarely aspirated for cytological testing with few case reports documenting its typical features. However, histopathological testing remains the highest probability for diagnosing an angiosarcoma.

In a study by Geller et al, 2 of 26 angiosarcoma cases showed "atypical cells" on cytology, with the most common presentation that of abnormal mitoses with epithelioid and vasoformative features, notably erythrophagocytosis.[17] Our patient's first histological testing from pleural fluid showed atypical cells, which should have raised suspicion for further investigation. The hypervascular region initially seen on the angiogram in the SGA and the pseudoaneurysm at the 11th RIA could have also been biopsied and sent for cytological diagnosis earlier in view of its incongruence to presentation of a PJI. The presence of various hypervascular regions appearing within a short time frame in our patient should have prompted suspicion on a vascular origin with further investigation and evaluation of these lesions.

Reported rates of advanced/metastatic disease at presentation ranges 16-44%, and overall disease specific survival is approximately 30-40%.[18] Even in localised angiosarcoma with treatment, 5-year-survival lies at 53% while median survival with metastatic disease is 10 months.[19] Age (<50 years), tumor size (<5 cm),

multimodal treatment and low/moderate mitotic counts were significant for survival.[20] Unfortunately, our patient demised shortly after diagnosis and was not amenable to subsequent treatment. While our patient may have benefitted from treatment if it were identified earlier, the rapid progression coupled with the non-specific presentation limited diagnostic and therapeutic windows for our patient.

CONCLUSION

Diagnosing angiosarcoma is extremely challenging, made worse by its rarity and lack of sufficient literature, and presence of other distracting conditions. This case report may provide deeper understanding of intraosseous angiosarcoma and its presentation which may mimic PJIs, and raises awareness on the narrow timeline of its course. Earlier repeated histological testing is suggested when presenting with multiple hypervascular growths atypical for PJI, especially when presenting with a rapidly deteriorating cascade following a relatively trivial insult. A high index of clinical suspicion is warranted for earlier preliminary investigations to guide diagnosis, treatment and subsequent prognosis.

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REFERENCES

1. Cao J, Wang J, He C, Fang M. Angiosarcoma: a review of diagnosis and current treatment. Am J Cancer Res. 2019;9(11):2303-13.
2. Chan JY, Tan GF, Yeong J, Ong CW, Ng DYX, Lee E, et al. Clinical implications of systemic and local immune responses in human angiosarcoma. NPJ Precis Onc. 2021;5(1):11.
3. Gaballah AH, Jensen CT, Palmquist S, Pickhardt PJ, Duran A, Broering G, et al. Angiosarcoma: clinical and imaging features from head to toe. Br J Radiol. 2017;90(1075):20170039.
4. Chen TW, Pang A, Puhaindran ME, Maw MM, Loong HH, Sriuranpong V, et al. The treatment landscape of advanced angiosarcoma in Asia—A multi-national collaboration from the Asian Sarcoma Consortium. Cancer Sci. 2021;112(3):1095-104.
5. Palmerini E, Maki RG, Staals EL, Alberghini M, Antonescu CR, Ferrari C, et al. Primary angiosarcoma of bone: A retrospective analysis of 60 patients from two institutions. Am J Clin Oncol. 2014;37(6):528-34.
6. Bhaludin BN, Thway K, Adejolu M, Renn A, Kelly-Morland C, Fisher C, et al. Imaging features of primary sites and metastatic patterns of angiosarcoma. Insights Imaging. 2021;12(1):189.
7. Jeyaraman M, Muthu S, Prabhakar M, Jeyaraman N, Agarwal G, Jain R. Primary Angiosarcoma of Humerus – A Case Report and Literature Review. J Orthop Case Rep. 2021;11(5):12-7.
8. Shukla S, Acharya S, Bhola N, Chaudhary M, Borle Mr, Grover M. Central Haemangioma (Intraosseous) of Jaw. J Med. 2012;13(2):222-6.
9. Baliaka A, Balis G, Michalopoulou-Manoloutsiou E, Papanikolaou A, Nikolaidou A. Primary angiosarcoma of bone. A case report. Hippokratia. 2013;17(2):180-2.
10. Romanò CL, Petrosillo N, Argento G, Sconfienza LM, Treglia G, Alavi A, et al. The Role of Imaging Techniques to Define a Peri-Prosthetic Hip and Knee Joint Infection: Multidisciplinary Consensus Statements. J Clin Med. 2020;9(8):2548.
11. Zajonz D, Brand A, Lycke C, Özkurtul O, Theopold J, Spiegl UJA, et al. Risk factors for early infection following hemiarthroplasty in elderly patients with a femoral neck fracture. Eur J Trauma Emerg Surg. 2019;45(2):207-12.
12. Palmerini E, Leithner A, Windhager R, Gosheger G, Boye K, Laitinen M, et al. Angiosarcoma of bone: a retrospective study of the European Musculoskeletal Oncology Society (EMSOS). Sci Rep. 2020;10(1):10853.
13. Murphey MD, Fairbairn KJ, Parman LM, Baxter KG, Parsa MB, Smith WS. From the archives of the AFIP. Musculoskeletal angiomatous lesions: radiologic-pathologic correlation. RadioGraphics. 1995;15(4):893-917.
14. Vermaat M, Vanel D, Kroon HM, Verbeke SLJ, Alberghini M, Bovee JVMG, et al. Vascular tumors of bone: Imaging findings. Eur J Radiol. 2011;77(1):13-8.
15. Vasireddi N, Neitzke CC, Chandi SK, Cororaton AD, Driscoll DA, Sculco PK, et al. Early Periprosthetic Femur Fractures After Primary Cementless Total Hip Arthroplasty: High Risk of Periprosthetic Joint Infection and Subsequent Reoperation. J Arthroplast. 2024;39(4):1083-7.
16. Tateishi U, Hasegawa T, Kusumoto M, Yamazaki N, Iinuma G, Muramatsu Y, et al. Metastatic Angiosarcoma of the Lung: Spectrum of CT Findings. Am J Roentgenol. 2003;180(6):1671-4.
17. Geller RL, Hookim K, Sullivan HC, Stuart LN, Edgar MA, Reid MD. Cytologic features of angiosarcoma: A review of 26 cases diagnosed on FNA. Cancer Cytopathol. 2016;124(9):659-68.
18. Buehler D, Rice SR, Moody JS, Rush P, Hafez GR, Attia S, et al. Angiosarcoma Outcomes and Prognostic Factors: A 25-Year Single Institution Experience. Am J Clin Oncol. 2014;37(5):473-9.
19. Liu K, Layfield LJ. Cytomorphologic features of angiosarcoma on fine needle aspiration biopsy. Acta Cytol. 1999;43(3):407-15.
20. Naka N, Ohsawa M, Tomita Y, Kanno H, Uchida A, Myoui A, et al. Prognostic factors in angiosarcoma: A multivariate analysis of 55 cases. J Surg Oncol. 1996;61(3):170-6.

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