Clear cell sarcoma arising from the iliac wing: case report

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Abstract

Clear cell sarcoma (CCS) is aggressive, slow growing tumor, arising from tendons, aponeuroses, and fascial structures. CCS compromises only 1% of soft tissue sarcomas. CCS is characterized by a high rate of local recurrence and distant metastasis. CCS is commonly located in extremities, and less likely to arise in the trunk with only rare cases found in pelvis or abdomen. Here we describe a case of clear cell sarcoma, in which it develops from the iliac wing with distant pulmonary and liver metastasis. We discuss and review the clinicopathologic features of CCS include: structural and microscopic characteristics, prognosis factors, management, and outcome.

INTRODUCTION

Clear cell sarcoma (CCS) of soft tissues—renowned as malignant melanoma of soft parts—is first found by Enzinger in 1965.[1] CCS is a gradually growing firm tumor, but is more aggressive compared to other soft tissue sarcoma.[2] Often it can be painless and does not give suspicious symptom at presentation. CCS has a distinct tendency for late distant metastasis. Incidence of local recurrence after surgical treatment is relatively high.[1] With this in account, the overall prognosis of patients with CCS is poor.

CCS compromises only 1% of soft tissue sarcomas.[1] In addition, soft tissue sarcomas roughly comprise 1% of all malignancy, which make CCS extremely rare.[3] CCS mainly evolves from tendons, aponeuroses, and fascial structures of young adults. CCS is commonly located in extremities, and less likely to arise in the trunk with only rare cases found in pelvis or abdomen. Here we describe a case of clear cell sarcoma, in which it develops from the iliac wing with distant pulmonary and liver metastasis.

CASE REPORT

A 42- year- old Caucasian male with no significant past medical history presented with a chief complaint of severe left hip pain. Prior arrival to the emergency department, in attempts to avoid a fall, he dug his left foot into the ground to regain balance. While doing so, he felt a sudden onset of left hip pain associated with a mild click. The pain was sharp and shot down to the posterior aspect of his thigh, with the intensity being around 8 out of 10. The pain progressively worsened even with walking. Upon further questioning, the patient did mention he slipped on ice 4 weeks ago. However, he did not go to the emergency department because the pain was tolerable and subsided within a couple days.

At presentation, the patient's vitals were stable. There was a left hip mass that was exquisitely tender to palpation, warm, and erythmatous. Both passive and active movements of the left hip were limited by severe pain. Remainder of the physical exam was negative. CT scan of the chest, abdomen, and pelvis showed a destructive mass in the left iliac wing. The soft tissue component measured 11.6 x 9.5 cm with erosion of the bone displacing the left psoas muscle anteriorly (Fig. 1A). The mass extended from the level of pelvic inlet to the level of acetabulum. No retroperitoneal lymphadenopathy involved. There was a 3.1 x 2.7 cm soft tissue mass in the left lower lobe of the lung near the hilum (Fig. 1B). There was also a 9 mm hyperdense lesion in the left lobe of the liver (Fig. 1C). Biopsy of the left hip mass was indicative of clear cell sarcoma (malignant melanoma of soft tissue). Histological studies showed infiltrating nests of loosely cohesive tumor cells in fibrous stroma with ectactic vessels (Fig. 2A). There was also prominent tumor necrosis with mitosis, and the large polygonal tumor cells contain prominent nucleoli with abundant pale amelanotic cytoplasm (Fig. 2B). Immunohistochemistry stain showed tumor cells were positive for S-100 and HMB-45 (Fig. 2C & 2D). This patient was at the stage T4N0M2 of CCS. The patient received radiotherapy and combination adjuvant chemotherapy without surgical excision due to deep tumor in iliac wing with distant metastasis.

Figure 1

Figure 1: CT scan of chest, abdomen, and pelvic. (A) A soft tissue mass localized in the iliac wing with erosion of the bone displacing the left psoas muscle. The soft tissue component measured 11.6 x 9.5 cm (arrow). (B) A 3.1 x 2.7 cm soft tissue mass (arrow) in the left lower lobe of the lung near the hilum. (C) A 9 mm hyperdense lesion (arrow) in the left lobe of the liver.

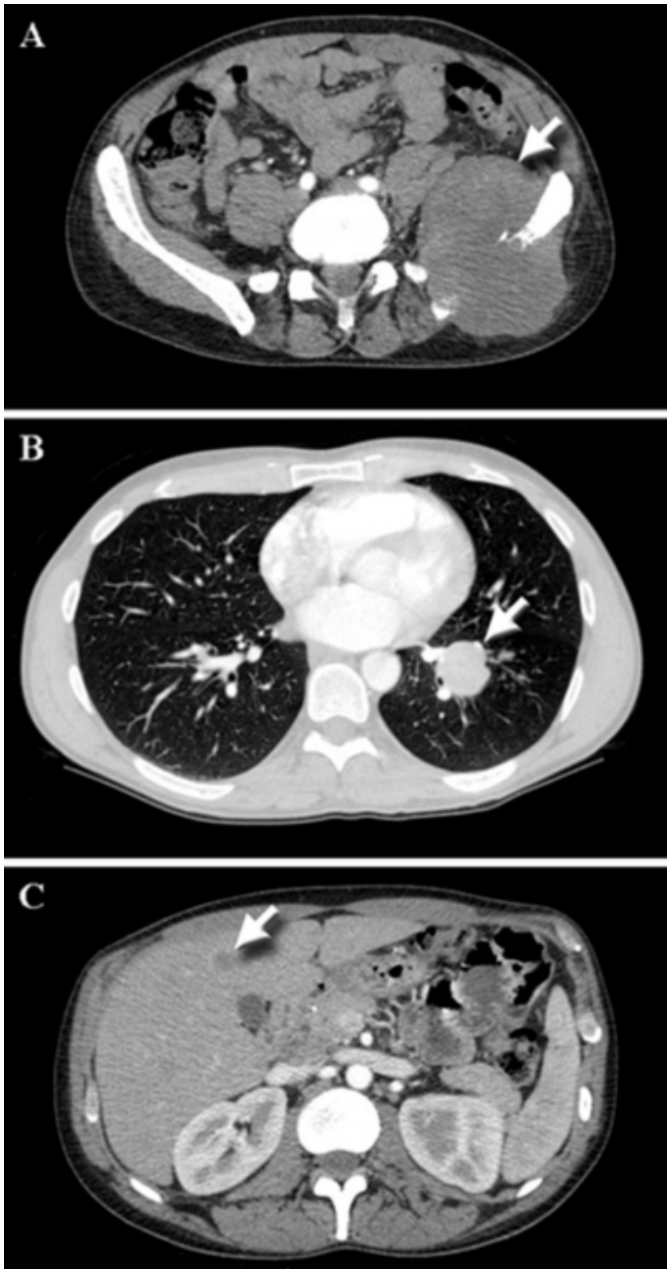
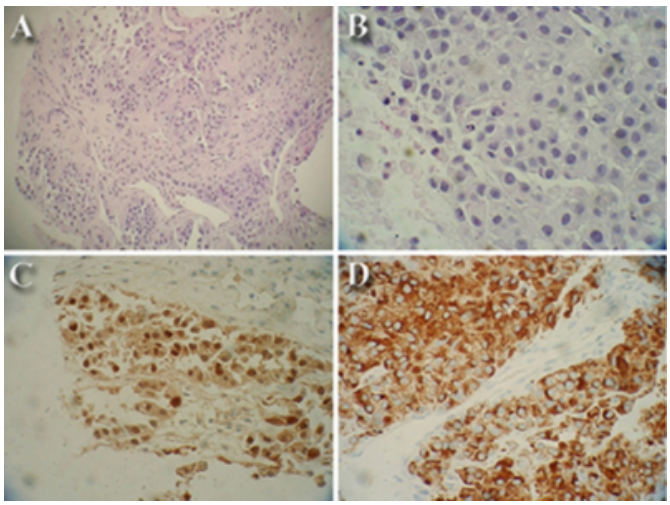


Figure 2

Figure 2: Clear cell sarcoma tissue sections. (A) Infiltrating nests of loosely cohesive tumor cells in fibrous stroma with ectactic vessels. (B) Tumor cells with prominent nucleoli, and prominent tumor necrosis with mitosis. (C) Positive S100 with nuclear and cytoplasmic staining. (D) Positive HMB45 with granular cytoplasmic staining.



DISCUSSION

Clear cell sarcoma largely affect young adults between 20 to 40 years old, but it could transpire in other ages.[4] CCS is more frequently found in Caucasians compared to African Americans or Asians.[5] The cellular origin where CCS arises from is indefinite. However, the tumor cells of CCS have some similar characteristic of melanocyte progenitors. Ideally, CCS emerges from the aberrant neural crest in early development.[6] In such hypothesis, the progenitor cells which did not migrate to their ultimate destination during embryological development, lingers in the soft tissues and develops into CCS.[6]

Histological examination often shows infiltrating nests of monotonous tumor cells in fibrous stroma comprising large polygonal tumor cells with prominent nucleoli and abundant pale amelanotic cytoplasm. Furthermore, CCS may show prominent tumor necrosis with mitosis. In immunohistochemical studies, CCS is positive for S100 in nuclear and cytoplasmic staining. S-100 is a protein that arises from neural crest derived cells.[5] HMB45 is also perceived in the granular cytoplasmic staining of CCS. One difficulty in diagnosing CCS is because it shares some similar histological characteristics as cutaneous melanoma. Therefore, it can be difficult to differentiate by histological examination. However, with clinical presentation and new real-time polymerase chain reaction (PCR) studies, CCS and cutaneous melanoma can be differentiated. First, CCS is

discriminated from cutaneous melanoma by the anatomic location and clinical presentation.[6] If a tumor locates in deep subcutis and there is no history of cutaneous melanoma, the results would be dominated by CCS. Whereas a primary cutaneous melanoma is present, then the findings favor melanoma as a diagnosis. Secondly, the translocation of t(12;22)(q13;q12) is unique to CCS.[6,7] This translocation results from the fusion of the EWS gene on 22q with the ATF1 gene on 12q. The sensitivity and specificity of detecting the fusion products in CCS are 93% and 100%.[7]

Survival data from different studies shows that the 5-year survival is less than 50%.[8] Survival rate of CCS depends on many different aspects. In the study of Kawai et al, major prognostic factors for patient's survival include: tumor depth, tumor size, TNM classification, and sex. With the superficial location of a tumor, the 5-year survival rate is 80% vs. 29% in deep tissues.[8] Worse outcomes are also observed with increasing tumor size. Patients with tumor size greater than 5 cm will have a 28% 5-year survival where a tumor size less than 5 cm will have a 71% 5-year survival rate.[8] Additionally, as TNM stage increases, the survival rate will be decreased. Kawai et al mentions that sex also influences on patient's survival. Women have higher survival rate compared to men (73% vs. 36% 5-year survival rate).[8] In the current literature, there is not any explanation why women have higher survival rates than men.

The current management strategy of CCS varies between studies. Indeed, finest treatment is skeptical. Jacobs et al suggests surgical excision as the primary treatment. Radiotherapy and traditional adriamycin-based chemotherapy have had no significant influence on CCS.[4] Even after surgical excision of CCS, recurrence of CCS is relatively high with 84% incidence.[1,9] In the study of Enzinger, the average time of recurrence is 1 year, but Tsuneyoshi et al showed an average time of recurrence of 6 months.[1,9] Either 1 year or 6 months, the recurrence rate is quiet high. Therefore, a single parameter such as surgical excision, radiotherapy, or chemotherapy is questionable for enhancing the survival rate.

The recent studies have shown adjuvant therapy to prolong survival rates and diminish recurrence of CCS. In the study of Deenik et al, patients with surgical excision and adjuvant radiotherapy have no recurrence of CCS for up to seven years ($P = 0.036$).[5] However, patients with only surgical excision would developed local recurrence, lymph node metastasis, or distant metastasis as early as 1 year. Beside adjuvant radiotherapy, adjuvant chemotherapy also has an impact on recurrence of CCS. Instead of using a single chemotherapy, a newer study uses chemotherapeutic regimen including doxorubicin, cisplatin, and caffeine-assisted chemotherapy. Indeed, this chemotherapeutic regimen improves the 5-year survival rate and decreases recurrence. With a chemotherapeutic regimen, the 5-year survival rate is 66% compare to no chemotherapy, which is only 22% ($P = 0.032$).[8] According to the literature, cisplatin has a notable effect on bone sarcomas, but there is no information showing cisplatin activity against CCS. Certainly, Kawei et al results showed cisplatin has an effect on CCS. Therefore, cisplatin is one of the drugs used in a chemotherapeutic regimen. Additionally, caffeine is also used as assisted chemotherapeutic regimens. Many studies have shown caffeine has some influence on various types of musculoskeletal sarcomas.[10] Caffeine inhibits DNA repair, which boosts cytocidal activity of anticancer drugs and radiation.[10]

In conclusion, CCS is rare tumor, which is highly aggressive with high incidence of local recurrence and distant metastasis. Therefore, the overall prognosis for patients with CCS is poor. Early detection of the tumor and surgical removal would favor a better prognosis. However, the clinical features of CCS are not specific due to the paucity of symptoms, which make it difficult to diagnose. In terms of treatment, primary treatment is still surgical excision of the tumor plus adjuvant radiotherapy and chemotherapy, which improves patient's survival rates and reduces recurrence. In future studies, it would be promising to establish tests for early detection of the tumor and also to determine the finest therapeutic treatment for CCS, especially the use of biological therapies and their effects on CCS.

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