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CASE REPORTS

# Vertebral Synovial Sarcoma – Onset with Spinal Cord Compression Syndrome. Case Report

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## Rezumat

Sarcoamele sinoviale (SS) sunt rare. În timp ce >80% se dezvoltă la nivelul părților moi, și al extremităților, <5% apar la nivelul coloanei vetrebrale, mediastin, cap și gât și retroperitoneal. Metastazele de SS nu sunt rare, apar cu predilecție în plămân, la nivel osos, hepatic.

Prezentăm cazul unui pacient în vârstă de 65 de ani diagnosticat în VII. 2015 cu SS vertebral localizat la nivelul coloanei vetebrale toracale, T7-T10, complicat cu sindrom de compresiune medulară, prezentat în Serviciul Neurochirurgie al Spitalului Clinic Județean de Urgență „Sf. Ap. Andrei" Galați, unde s-a practicat ablație subtotală (laminectomie decompresivă cu biopsie). Examenul histopatologic (HP) a evidențiat sarcom sinovial, confirmat de testele de imunohistochimie (IHC). Postoperator, scintigrafia osoasă a evidențiat multiple determinări secundare osoase. Tratamentul a inclus radioterapie externă (RTE), chimioterapie, bisfosfonați. Pacientul a rămas paraparetic după intervenția chirurgicală și RTE, iar la 12 luni de la diagnostic nu se decelează determinări secundare viscerale. Pacientul este în viață cu determinări secundare multiple osoase cu IP=3 (ECOG), în tratament cu bifosfonați. Pentru a diagnostica sarcomul sinovial este necesara confirmarea histological deoarece este dificil de diferentiat leziunile specifice sarcomului sinovial de alte leziuni ale țesuturilor moi.

Excizia formațiunii tumorale prin laminectomie se însoțește de o rată crescută a recidivelor locale, de 60-90% la 2 ani de la tratamentul chirurgical.

SS reprezintă o provocare în diagnostic și tratament. Tratamentul este multimodal și cuprinde chirurgie, RTE, chimioterapie.

Datorită numărului limitat de cazuri publicate în literatura de specialitate, rezultatele pe termen lung ale SS cu localizare vertebrală sunt difícil de cuantificat.

**Cuvinte cheie:** sarcom sinovial spinal, metastaze osoase, tratament, radioterapie

## Abstract

Synovial sarcomas (SS) are infrequent. While more than 80% occur at the level of the soft tissues and extremities, less than 5% occur in spine, mediastinum, head/ neck and at the retroperitoneal level. SS metastases are not rare; they predominantly occur at the level of lungs, bones and liver.

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The paper presents the case of a 65-year patient diagnosed in July 2015 with vertebral SS localised at the level of thoracic spine, T7-T10, complicated with spinal cord compression syndrome, who presented at the Neurosurgery Service of the Emergency County Hospital "Sf. Apostol Andrei" of Galati, where he underwent subtotal ablation (decompressive laminectomy with biopsy). Histopathology (HP) indicated synovial sarcoma, which was confirmed by the immunohistochemistry tests (IHC). Post-surgery, bone scintigraphy highlighted many secondary bone developments. The treatment included external radiotherapy (RTE), chemotherapy, biophosphonates. The patient remained paraparetic after surgery and RTE, and, twelve months after his being diagnosed, there are not any secondary visceral developments distinguished. Chemotherapy (CMT) was undergone by using Doxorubicin and Ifosfamide (1 cycle), the patient refusing cytostatic medicine afterwards. The patient lives, with multiple secondary bone developments, ECOG score: 3, undergoing biophosphonate treatment. In order to define the diagnosis of synovial sarcoma it is necesary to have histologic confirmation because it is difficult to differentiate SS lesion from other soft tissue tumors.
The excision of the tumoral formation by laminectomy is followed by an increase in local relapses (60-90%) within two years after surgery.
SS represents a challenge in both diagnostic and treatment. The latter is multimodal and entails surgery, RTE and chemotherapy.
Due to the limited number of cases published in the literature, the long-term results of the vertebral SS are difficult to quantify.

**Keywords:** spinal synovial sarcoma, bone metastases, treatment, radiotherapy

## INTRODUCTION

Synovial sarcomas (SS) are rare. Less than 5% occur in spine, mediastinum, head and neck and at the retroperitoneal level and in approximately 85% of the cases occur at the level of the soft tissues and extremities. SS metastases are not rare, they occur predominantly at the level of lungs, bones and liver. Standard treatment consists in surgery, ideal, in large excision with negative margins, R0 (when is possible). For unresectable tumors, the therapeutic options include CMT and/or RTE[2].

## CASE REPORT

We present the case of a 65-year patient hospitalized in July 2015 in Neurosurgery Service of the Emergency County Hospital "Sf. Apostol Andrei" of Galati with paraparesis suddenly installed, sphincter incontinency and spinal cord compression syndrome level T7-T8. Computed tomography exam (CT) at the thorax level evidenced an expansive, iodophilic, hypodense formation T7-T9, non-homogenous with lytic phenomena and compressive on spinal channel. It is also worth mentioning that the disease started suddenly, in conditions of apparent health.

In the Neurosurgery Service of Emergency County Hospital "Sf. Apostol Andrei" of Galati the decompressive laminectomy and the biopsy of a tumoral formation at the T7-T10 level were performed. Due to tumoral expansion, subtotal resection was performed. Post-surgical evolution was favourable. The hematologic and biochemical constants are within normal ranges, except for ESR=115 mm/h. It was suspected a prostate tumour with secondary lesions, M1OSS, infirmed by HP tests; PSA=2.04ng/ml.

Histopathology reveals synovial sarcoma (Figure 1. a, b, c, d). It were recommended immunohistochemical tests, which revealed: CK (AE1/AE3) – negative, EMA-positive with isolated cells, SMA- negative, PS100- positive with isolated cells, MUC4- negative, CD99 – locally positive.

Two months after surgery, the patient presents to Oncology with severe bone pain, neurologic deficit and paraparesis for clinical-biological re-evaluation. ECOG score 3 upon admission. The comprehensive examination for the assessment of the local-regional expansion and at the distance included bone scintigraphy, CT scan – head, thorax, pelvic and abdomen.

**Bone scintigraphy** has revealed multiple points of hypercaptation of radiotracer, suggestive of multiple secondary bone developments: ribs, stern, thoracic spine, right femur diaphysis, scapulo-humeral, knee and left tibio-tarsal joints (Figure 2). It was recommended cerebral, thorax and abdominal CT scans which indicated:

**Cerebral CT scan** reveals an expansive hypodense iodophile formation, axial diameters 30/21 at the level of the right bone plate on which lytic phenomena exert with imprint on the right adjacent parietal cervical tissue. Right lytic lesions with 13 mm diameter, left frontal with 18 mm diameter and some newer ones disseminated at the level of the entire cranial bone structure, suggestive of expansive formations, hyperdense, intra/extra-neuraxial, supra/infratentorial.

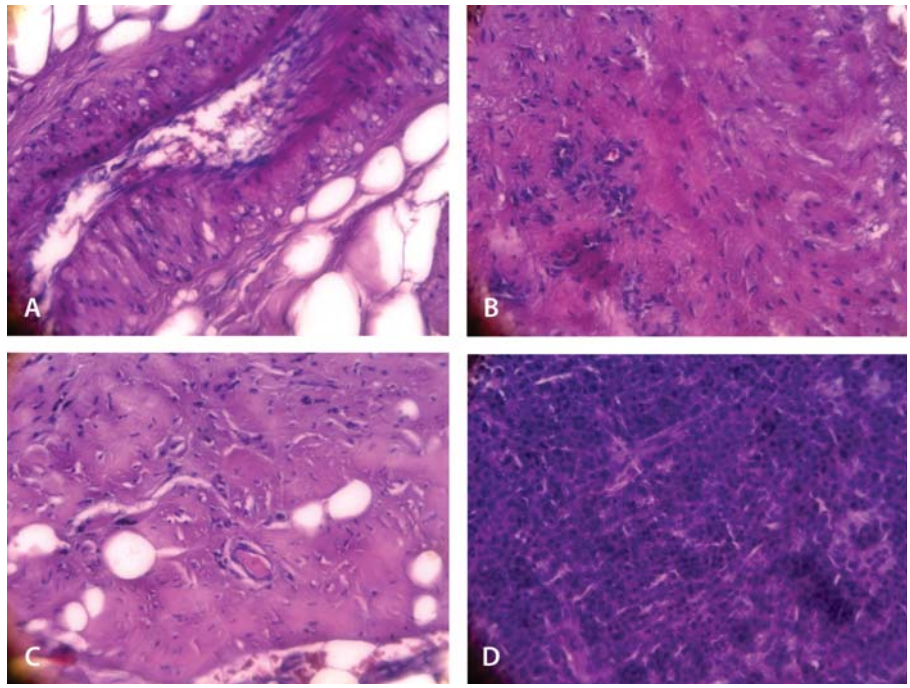


**Figure 1A, B, C, D.** Histopathological images of synovial sarcoma. HE staining. Image at ×100.

**Thorax + abdomen CT scan** indicates at the thoracic level – microfibonodular lesion basal posterior bilateral, left pleural effusion 15 mm thick. At the abdominal-pelvic level – liver with no secondary developments, homogenous structure. Lytic lesions distributed at the level of the thoracic, lumbar, sacral and pelvic bone structure. Iodophilic soft tissue mass localised at the level of the left paraspinal muscle with 45 mm in diameter. Disseminated costal lytic lesions.

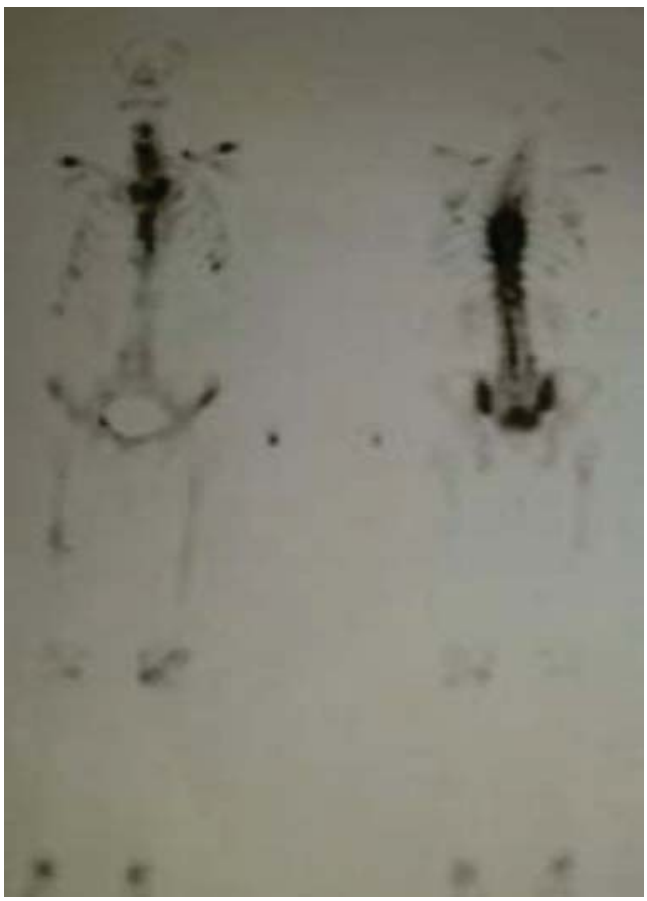

**Figure 2.** Bone Scintigraphy.

Clinically, paraparesis holds. Following the decision of the multidisciplinary diagnostic team, the first chemotherapy cycle is initiated with Doxorubicin and Ifosfamide and biophosphonates–zoledronic acid 4 mg.

In October 2015 he is readmitted to hospital with severe pain at the level of dorsal spine and it is decided by the multidisciplinary team to undergo RTE with palliative purpose and biophosphonate treatment. The patient undergoes external radiotherapy (RTE) with palliative purpose on the T6-T7-T8-T9-T10 region in DT=30 Gy10 fr/2 weeks. A second degree antialgic treatment, corticotherapy is also administered.

In December 2015 he is readmitted to hospital with cephalalgia, high intracranial pressure syndrome (HIC), walking disorder, pain at the level of the right coxofemoral joint, affected general health, haematologically balanced, apyretic.

The medical assessment by ultrasound indicates micro-nodular liver, hyperechoic nodule of 13 mm at the third segment level, calculous cholecystitis. Biologically, the patient presents secondary anaemia, (Hb=10.4 mg/dl), biochemical constants within normal ranges.

The **cranial radiogram** undergone indicates multiple spherical and ovoid radiotransparent images in various sizes at the level of the cranial bone, which were

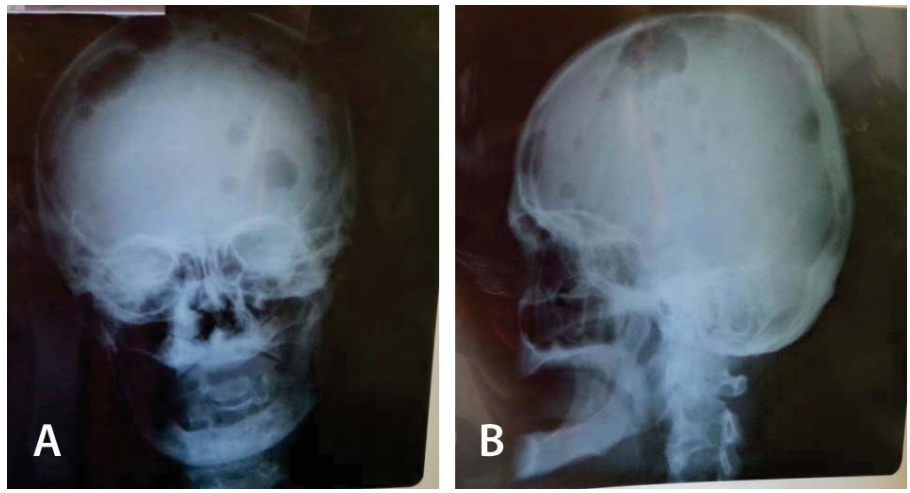


**Figure 3.** Cranial radiogram - multiple spherical and ovoid radiotransparent images in various sizes at the level of the cranial bone.

also revealed by the cranial CT-scan of October 2015 (Figure 3 A, B).

Cerebral depletive treatment is administered with Mannitol 20%, corticotherapy and RTE is performed in DT=20Gy/5 fr./ 5 days, d/fr=400 cGy for the secondary lesions at the level of the cranial bone. Also, RTE is performed in the right femoral head region DT=20Gy/5 fr./7 days, d/fr=400 cGy. Osteoclast inhibitors are administered.

The patient and his family refuse further CMT administration and he continues the biophosphonate treatment.

In June 2016 he is readmitted to hospital with generalised bone pain. Clinically, paraparesis still holds, ECOG 3, haemodynamically balanced. Spine control CT scan with intravenous contras was performed and indicates multiple moderately iodophile osteolytic formations at the dorsal-lumbar level. At the level of the T7-T9 there is a significant change of structure with non-iodophile osteolytic formations and osteosclerosis, the reduction of the AP diameter of the medullary channel at T8 level by minimum 14 mm, without interruption in the posterior contour of the vertebra at this level. No pathological contrast enhancement at the level of the medullary channel. Right-posterior laminectomy at the T7-T10 level, without lung secondary lesions (Figure 4, a, b, c, d, e, f, g).

Haematological and biochemical constants within normal ranges, except for Hb=8.9 mg/dl and Leukocytes=3700/mm$^3$ rebalanced with 1 unit resuspended erythrocyte concentrate. RTE is performed in the left tibio-tarsal region, DT=20Gy/5fr/5 days, D/fr.=400cGy.

At present, twelve months since his being diagnosed, the patient presents functional impotence, ECOG 3, and undergoes treatment with osteoclast inhibitors and antialgic treatment second degree, tramadol, corticotherapy. No further visceral secondary developments.

## DISCUSSIONS

Synovial sarcoma (SS) is an aggressive malignant neoplasm of soft tissue which frequently occurs in the large joints of the upper and lower extremities in young adults, with a peak incidence in the third decade. Approximately, 30% of cases occur before the age of 20, and 90% before 50[1,2]. In our case, the patient exceeded this age, being 66 years old.

Synovial sarcomas account for 7-10% of all soft-tissue sarcomas and less than 1% of all malignancies[3,4]. Although the synovial sarcoma denomination suggests a synovial histological origin, less than 5% cases originate in joints. Etiology is unknown, apparently it is an epithelial phenotype[3].

The anatomical distribution of synovial sarcomas is well documented, with 85% located in the extremities[5], up to 5% of these tumours are encountered in the body axis including the spine, mediastinum, retroperitoneum, and head/neck regions[3] and just 3% located in the head and neck region[6]. Fang, et al[7] confirmed the low incidence of synovial sarcoma in the spine in their review of 191 cases.

Puffer et al. published in 2011 a report of 3 cases and a review of 14 cases of spinal SS published in special literature since 1986. Of these 17 patients with spinal SS, 10 were within the paraspinal musculature (with most having foraminal extension), 3 were intradural and associated with spinal nerve roots, 2 were metastatic lesions (one to bone, the other intramedullary), 1 was intraspinal epidural and 1 was a bony/lytic lesion. The affected spinal sites were cervical in 4 cases, dorsal in 7 cases, lumbar in 6 cases[3].

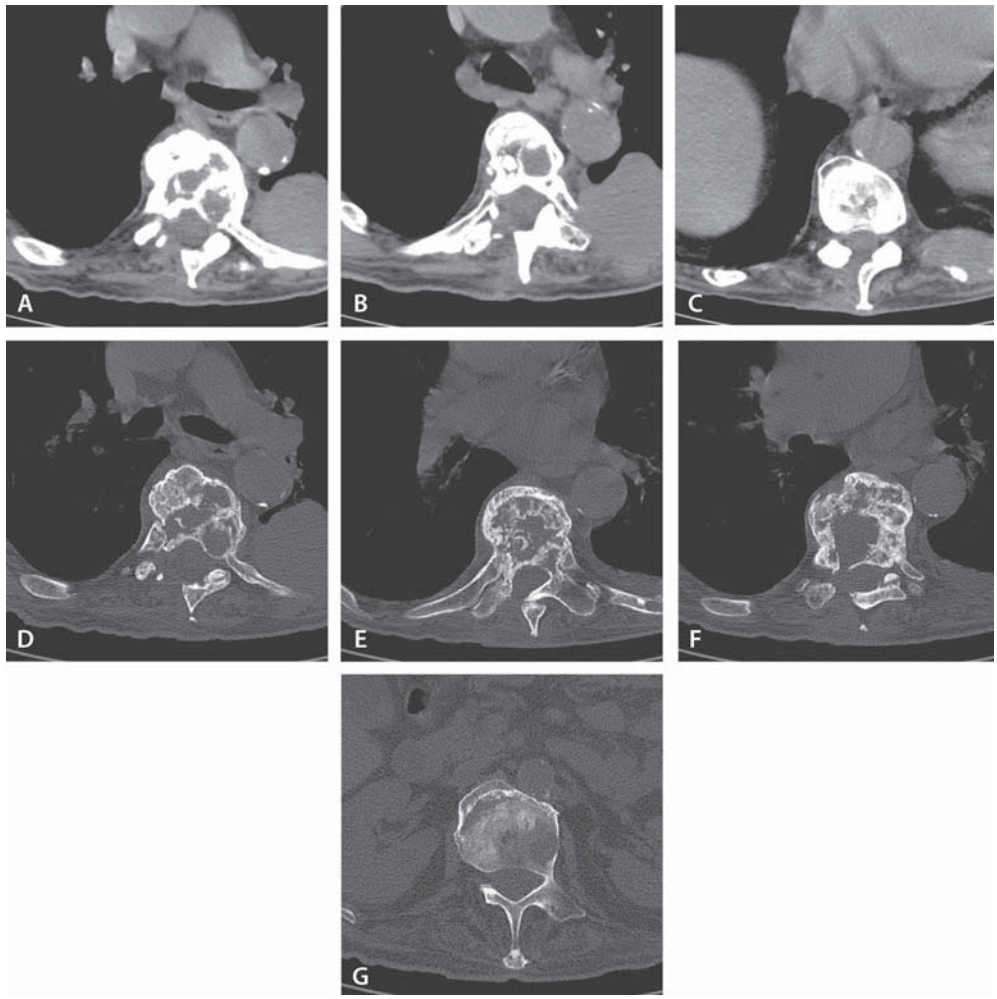


**Figure 4A, B, C, D, E, F, G.** Spine CT scan. Significant change of structure with non-iodophile osteolytic formations and osteosclerosis at T7-T9 level, reduction of the AP diameter of the medullary channel at T8 level by minimum 14 mm, without interruption in the posterior contour of the vertebra at this level. Right-posterior laminectomy at the T7-T10 level.

The non-specific nature of the symptoms may initially be interpreted as more commonly encountered soft tissue entities such as bursitis and myositis[8]. Synovial sarcoma of the spine is quite uncommon and early diagnosis may be difficult without advanced imaging[8]. SS appears as a well demarcated, hypodense mass with homogenously or heterogeneously enhancement, on CT imaging, making it easy to confuse with other benign or malignant tumours[4]. For detecting SS, MRI has proven to be the superior modality, comparative with CT imagining.

SS is associated with a balanced reciprocal translocation t(X: 18) (p11:q11). SS presents in a variety of histopathological forms, from monophasic, being uniformly comprised of spindle cells, to biphasic, with epithelial and spindle cell components[2,9,10].

Due to histological variety, SS can be mistaken for numerous other mesenchymal or non-mesenchymal tumours, making immunohistochemical and molecular studies important in achieving the correct diagnosis[11].

At the molecular level, it has been reported that microRNAs (miRNAs) can play an important role in the cancero-genesis of some neoplasia, and when deregulated, depending on their mRNA targets, they may act to down regulate tumour suppressor genes and give a growth advantage to tumour cell lines[12].

The overexpression of a microRNA, miR-183 act like oncogene own regulation of EGR1 translation, a tumour suppressor that is correlated strongly with tumour formation and transformation processes when its levels are depleted[13].

Synovial sarcomas are usually treated aggressively with wide excision with negative margins, (when is possible) often including removal of adjacent muscle groups and even total amputation[1,14]; a 5 cm margins define a negative margin, but in many cases this would encompass the critical structures such spinal cord[3]. Surgery is followed by radiotherapy, chemotherapy or

both to help control metastasis[15]. In study of Carrillo and Rodrigues is mentioned a high rate of local recurrence between 60-90% after limited excision, in the first 2 years after surgery[16].

Adjuvant radiotherapy may decrease the local recurrence rate. Chemotherapy agents, Doxorubicin and Ifosfamide, are used in the treatment of soft tissues sarcomas. High dose Ifosfamide has been associated with increased disease free survival in adult patients with high-risk primary SS[17].

Local recurrence occurs in up to 50% of cases, usually within 2 years although some studies have shown the 5 year local and distant recurrence rates to be 12% and 39%, respectively[9,18]. Metastatic recurrence is determined by tumour grade, tumour size (>5 cm) and histopathology[19]. The main relapse causes are lung and bone metastases which occur in the first 2 years from treatment. Other metastases sites are liver and regional lymph nodes metastases which can occur in 20% of cases.

Our patient developed bone metastases for which radiotherapy and bisphosphonates was performed and he is still alive at 12 months from diagnosis.

A 10 years survival rate of 43-63% was shown in patients with favourable prognostic factors (SSX2 involved fusions and calcifying variants).

Synovial sarcoma is an uncommon malignant soft tissue tumour, which rarely metastasizes to the spine and remains one of the most aggressive soft-tissue sarcomas, despite improvements in staging, surgical technique, and adjuvant therapies[20].

## CONCLUSION

SS is problematic both in terms of diagnostic and treatment. Establishing the diagnostic is difficult. Though rare, vertebral synovial sarcomas often metastasise. The main therapeutic means is surgery with negative resection margins, whenever possible, and unless the critical structures are affected. During multimodal treatment, radiotherapy and chemotherapy may determine improvements in the survival rate.

**Conflict of interests:** The authors declare that there is no conflict of interests regarding the publication of this paper.

**Author contribution:** All authors contributed equally to this work.

## References

1. Fisher C, deBruijn DR, Geurts van Kessel A. Synovial sarcoma. In: Fletcher CD, Unni KK, Mertens F, editors. Pathology and Genetics of Tumours of Soft Tissue and Bone. Lyon: IARC Press; 2002. pp. 200–4.
2. Sultan I, Rodriguez-Galindo C, Saab R, Yasir S, Casanova M, Ferrari A. Comparing children and adults with synovial sarcoma in the Surveillance, Epidemiology, and End Results program, 1983 to 2005: An analysis of 1268 patients. Cancer. 2009;115:3537–47.
3. Ross C. Puffer, David J. Daniels, Caterina Giannini, Mark A. Pichelmann, Peter S. Rose, and Michelle J. Clarke. Synovial sarcoma of the spine: A report of three cases and review of the literature. Surg Neurol Int. 2011; 2: 18.
4. Rangheard AS, Vanel D, Viala J, Schwab G, Casiraghi O, Sigal R: Synovial sarcomas of the head and neck: CT and MR imaging findings of eight patients. Am J Neuroradiol 2001, 22:851-857.
5. Shmookler BM, Enzinger FM, Brannon RB: Orofacial synovial sarcoma. A clinicopathologic study of 11 new cases and review of the literature. Cancer 1982, 50:269-276.
6. Pai S, Chinoy RF, Pradham SA, D'Cruz AK, Kane SV, Yadav JN: Head and neck sarcomas. J SurgOncol 1993, 54:82-86.
7. Fang Z, Chen J, Teng S, Chen Y, Xue R: Analysis of soft tissue sarcomas in 1118 cases. Chin Med J 2009, 122(1):51-53.
8. Stephen M Foreman, Michael J Stahl. Biphasic synovial sarcoma in the cervical spine: Case report. Foreman and Stahl Chiropractic & Manual Therapies 2011, 19:12. http://chiromt.com/content/19/1/12.
9. Rangheard AS, Vanel D, Viala J, Schwaab G, Casiraghi O, Sigal R. Synovial sarcomas of the head and neck: CT and MR imaging findings of eight patients. AJNR Am J Neuroradiol. 2001;22:851–70.].
9. Fisher C. Synovial sarcoma. Ann DiagnPathol. 1998;2:401–21.
10. Suh SI, Seol HY, Hong SJ, Kim JH, Kim JH, Lee JH, Kim MG: Spinal epidural synovial sarcoma: a case of homogeneous enhancing large paravertebral mass on MR imaging. Am J Neuroradiol 2005, 26:2402-2405
11. Jang JW, Lee JK, Seo BR, Kim SH. Synovial sarcoma of the posterior neck: A case report and review of literature. J Korean Neurosurg Soc. 2010;47:306–9.
12. Calin GA, Groce CM. MicroRNA signatures in human cancers. Nat Rev Cancer. 2006;6:857–66.
13. Sarver AL, Li L, Subramanian S. MicroRNA miR-183 functions as an oncogene by targeting the transcription factor EGR1 and promoting tumor cell migration. Cancer Res. 2010;70:9570–80.
14. Margo JN, Langeard M, Lebreton M: Synovial sarcoma with cervicopharyngeal expression. Ann Otolaryngol Chir Cervico fac 1985,102:115-118
15. Wu JW, Kahn SJ, Chew FS: Paraspinal synovial sarcoma. AJR 2000, 174:410.
16. Carrillo R, Rodriguez-Peralto JL, Batsakis JG: Synovial sarcoma of the head and neck. Ann OtolRhinolLaryngol 1998, 107:1080-1085.
17. Eilber FC, Brennan MF, Eilber FR, Eckardt JJ, Grobmyer SR, Riedel E, et al. Chemotherapy is associated with improved survival in adult patients with primary extremity synovial sarcoma. Ann Surg. 2007;246:105–13.
18. Lewis JJ, Antonescu CR, Leung DH, Blumberg D, Healey JH, Woodruff JM, et al. Synovial sarcoma: A multivariate analysis of prognostic factors in 112 patients with primary localized tumors of the extremity. J Clin Oncol. 2000;18:2087–94.
19. Zagars GK, Ballo MT, Pisters PW, Pollock RE, Patel SR, Benjamin RS, et al. Prognostic factors for patients with localized soft-tissue sarcoma treated with conservation surgery and radiation therapy: an analysis of 1225 patients. Cancer. 2003; 97(10):2530-43.
20. Baptista AM, Camargo OP, Croci AT, Oliveira CR, Azevedo Neto RS, Giannotti MA, et al. Synovial sarcoma of the extremities: prognostic factor for 20 nonmetastatic cases and a new histologic grading system with prognostic significance. Clinics (Sao Paulo). 2006; 61(5):381-6.