CASE REPORT

Primary parapharyngeal and skull base synovial sarcoma in a 13-year-old boy with neurofibromatosis radiologically misdiagnosed as a benign lesion

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SUMMARY

Synovial sarcoma is a rare form of malignant tumour and accounting approximately for 8% of all soft tissue sarcomas. Head and neck synovial sarcomas are uncommon and parapharyngeal space involvement is extremely rare. We report a case of synovial sarcoma in the parapharyngeal space of a 13-year-old boy with a history of neurofibromatosis presented with odynophagia, ptosis and left submandibular mass. The lesion extended from retrostyloid parapharyngeal space to the skull base and foramen jugular superiorly. The first clinical and radiological impressions were carotid jugular related tumours such as schwannoma and paraganglioma.

BACKGROUND

Synovial sarcoma is one of the soft tissue sarcomas that occur near the large joints of arms and legs. These tumours were reported to appear in unusual areas such as brain, prostate, heart, head and parapharyngeal space rarely.¹ Its name was initially introduced in the 20th century by some researchers for its similarity to some tumours arising from synovial cells but indeed the neoplastic cells in this tumour originate from undifferentiated mesenchymal cells.² Synovial sarcomas represent about 8% of all soft tissue sarcomas most commonly in the young patients and about 15–20% of cases occur in adolescents and young adults. Males are affected more often than females and only 3–10% of synovial sarcomas exist in head and neck region, particularly in pharynx and parapharyngeal space.³ Infrequency of parapharyngeal space synovial sarcomas cause delaying of diagnostic and treatment difficulties. We report a synovial sarcoma of the left parapharyngeal space in a 13-year-old boy with a history of neurofibromatosis of which the first clinical and radiological differential diagnosis was related to benign tumours, such as schwannoma and paraganglioma. Hence, despite the rarity of synovial sarcoma in this area and in cases with neurofibromatosis we must consider it in differential diagnosis to prevent inappropriate surgery.

CASE PRESENTATION

A 13-year-old boy came to our otolaryngology clinic with swelling, dysphagia, weight loss, otalgia, odynophagia, anhidrosis and pain in his left neck.

Figure 1 Ptosis of the left eye.

On general inspection he was looking younger than his real age and had a ptosis in his left eye (figure 1). On physical examination there was a palpable non-mobile mass M 2×2 cm in the left submandibular area with a soft tissue consistency. His parents explained that the lesion started growing since 7 months and became larger in the period of time. His first symptom was otalgia but ptosis began 2 months later, after which odynophagia, hoarseness and vomiting started. Also the history of aspiration was taken.

INVESTIGATIONS

Using spiral CT scan with contrast of the neck, a round soft tissue mass lesion M 30×33×41 mm relatively homogenous and well-defined margin in the left retrostyloid parapharyngeal space was verified. The tumour was centred at the bifurcation of the left carotid artery, which caused splaying of the left internal and external carotid artery that extended to the base of the skull superiorly. The tumour also compressed the left jugular vein without evidence of invasion in the vein or in other cervical neck soft tissues (figure 2A). We did not identify any calcification in the content of the tumour. In our study noticeable enlargement of lymph nodes were not seen. Based on the imaging data differential diagnosis includes paraganglioma (glomus caroticum type and glomus vagal type), schwannoma and neurofibroma of the cervical sympathetic chain. On CT scan of the thorax with contrast an extrapleural soft tissue mass lesion M 7×11 mm in the posterior mediastinum of the left hemithorax was discovered and a right para vertebral soft tissue mass lesion abutting superior thoracic vertebrae was detected as well. Mediastinal structures appeared normal in size and configuration and there was no evidence of lymphadenopathy. No space occupying lesion was discovered

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Figure 2 (A) Contrast CT scan demonstrates round soft tissue mass lesion M 30×33×41 mm relatively homogenous with well-defined margin in the left retrostyloid parapharyngeal space. (B) Contrast CT scan demonstrates protrusion of soft tissue from neural foramens of sacrum (dumbbell shape) of which asymmetry in diameters should be noted.

throughout both lungs. CT scan of abdomen was within reference limits but CT scan of the pelvis revealed protrusion of soft tissue from neural foramens of sacrum (dumbbell shape) that were asymmetrical in their diameters in keeping with neurofibroma (figure 2B). Surgery confirmed the tumour was located in the retrostyloid parapharyngeal space extending to the base of skull and foramen jugular in which it dissected from the carotid jugular and hypoglossal nerve. The received specimen consisted of multiple pieces of cream-brown-coloured tissues

measuring 7×6×3 cm. Cut surface was cream-grey coloured with a whorled pattern. Microscopic examination revealed tumoural lesion composed of neoplastic spindle cells which had oval-to-spindle shape nuclei arranged in fascicles and diffuse pattern with some large atypical nuclei and mitotic figures. Between the neoplastic cells the stroma was rich in interconnecting vascular channels (figure 3A,B). Areas of necrosis with hyalinisation were notable. The histopathological findings were compatible with monophasic synovial sarcoma but for definitive

Figure 3 (A) Fascicles of spindle neoplastic cells with mitotic figures (H&E ×20). (B) Interconnecting blood channels throughout the tumour (H&E ×20).

Figure 4 (A) By immunohistochemistry, neoplastic cells were positive for CKAE1/AE3 (objective $\times 20$). (B) Neoplastic cells strongly positive for vimentin (objective $\times 40$). (C) Positive reactivity of neoplastic cells for CD99 (objective $\times 40$). (D) Neoplastic cells are positive for EMA (objective $\times 20$).

diagnosis especially differentiation from malignant peripheral nerve sheath tumour (MPNST) that could be seen in patients with neurofibromatosis immunohistochemical staining was performed. Neoplastic cells were positive for CKAE1/AE3, CD99, EMA, vimentin and were negative for chromogranin, desmin, CD20, CD45 and S-100 protein (figure 4A–D). Based on H&E and immunohistochemistry findings synovial sarcoma was confirmed.

DIFFERENTIAL DIAGNOSIS

In patients with a history of neurofibromatosis which is presented by neck and parapharyngeal mass, although benign tumours such as schwannoma, neurofibroma and paraganglioma are placed in the first differential diagnosis malignant spindle cell sarcomas such as malignant nerve sheath tumour (which is mostly seen in neurofibromatosis type 1) and rarely synovial sarcoma should be considered in main list. For the differentiation of these tumours immunohistochemical studies must be conducted.

TREATMENT

The patient received chemotherapy (ifosfamid 2 g plus adriamycin 25 g intravenous, three times daily for six courses with 20-day interval supported by granulocyte colony-stimulating factor injection) and then received radiotherapy.

OUTCOME AND FOLLOW-UP

After surgical resection followed by chemotherapy and radiotherapy the conditions of ptosis, odynophagia and hoarseness of the patient improved. He is now in a good condition without recurrence (11 month after initial presentation).

DISCUSSION

Synovial sarcoma is a rare form of cancer that originates mostly from the para-articular spaces of extremities.³ It is an uncommon sarcoma accounting for about 8% of all soft tissue sarcomas of which less than 10% arise from head and neck region. In literature reviews 70–80% of the parapharyngeal tumours were reported benign and 20–30% were malignant.¹ The most benign tumours of this area are benign neurogenic and salivary gland neoplasms such as pleomorphic adenoma.¹ Synovial sarcomas in the head and neck region are rare and less than 150 cases were reported. Among them parapharyngeal synovial sarcomas were extremely rare with a few cases reported.^{1–11} Synovial sarcoma cells are derived from primitive mesenchyme with no synovial association. Patients with synovial sarcoma have a chromosomal translocation of t(x: 18) (p11.2; q11.2) which results in the fusion of the SYT gene on chromosome 18 with either SSX1 (two-thirds of the cases) or SSX2 (other third) on chromosome. It affects men more than women with a ratio of 1.2:1. In literature reviews we found out most patients with synovial sarcomas suffer from mass effect and pain owing to invasion or compression of adjacent tissues.^{1–11} Neoplastic cells of synovial sarcoma originate from undifferentiated mesenchymal cells and have a tendency to occur in three ways: first, the biphasic type composed of sarcomatous area in which spindle cells are arranged in whorled and fascicles admixed with epithelial-like cells forming glandular and solid nests pattern; second, the monotonous type which is totally composed of spindle cells arranged in fascicles and can be mistaken for other spindle cell tumours such as MPNSTs most likely seen in patients with neurofibromatosis; and the third type is a poorly differentiated one that has atypical cells, greater degree of

cellularity and mitotic activity.⁶ Immunohistochemically neoplastic cells are strongly positive for EMA, CK7, CK14, CKAE1/AE3, CEA, vimentin and occasionally S-100 protein.⁹ Significant number of cases show positive reaction to CD99 which is negative in MPNSTs. Our case had a positive reaction to EMA, CK7, CKAE1/AE3, vimentin and CD99. One of the differential diagnosis of our case was MPNST but the immunohistochemical studying ruled out the diagnosis because of its negative reaction to CD99 in MPNST cells. MPNST usually occurs in the parapharyngeal space and the neoplastic cells of this tumour show much greater atypia in comparison with synovial sarcoma cells and have a more S-100 protein immunohistochemical reactivity than in synovial sarcoma. In contrast CK positivity is more limited than that of synovial sarcoma.¹² Synovial sarcoma may present in areas of calcification, hyalinisation and metaplastic osseous metaplasia.⁷ The differential diagnosis of monomorphic spindle cell tumours include fibro sarcoma (usually arising in dermatofibrosarcoma protuberance, monophasic synovial sarcoma, MPNST and solitary fibrous tumour. The absence of CD34 expression is helpful in distinguishing monophasic synovial sarcomas from malignant solitary fibrous tumours and MPNSTs. Malignant nerve sheath tumours occur in second to fifth decade of life for sporadic ones, and third to sixth decade in NF1-related tumours.¹² Retropharyngeal and parapharyngeal spaces are involved by synovial sarcoma especially along the bifurcation of carotid artery and exhibit as neck masses.⁴ The first clinical signs and symptoms of our case were ptosis and submandibular mass compared with other case reports, almost all of them demonstrated neck masses and airway obstructions.^{4–6} Definitive treatment guidelines and protocols have not been published clearly but wide surgical margin resection combined with chemoradiotherapy have been introduced as the treatment of choice.^{1 2 11}

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Learning points

- ▶ Although in patients with neurofibromatosis the most common malignant spindle cell tumour is malignant nerve sheath tumour, other spindle cell sarcomas such as synovial sarcoma should be considered in differential diagnosis.
- ▶ Patients with ptosis, hoarseness, odynophagia and neck masses might assume the condition to be malignant tumour rather than benign; the treatment planning should be based on the differential diagnosis.
- ▶ Multiple neurofibromatotic neoplasms may appear in different sites such as pelvic, mediastinum and neck; hence once such clinical signs and symptoms develop, treatment and follow-up should be considered seriously.

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