Submandibular Extraskeletal Osteosarcoma: A Case Report

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ABSTRACT

Extraskeletal Osteosarcoma (ESOS) is an extremely rare subtype of osteosarcoma accounting for about 1% of all soft tissue sarcomas1. It is a malignancy capable of osteoid, bone, or chondroid matrix production, located in the soft tissues, and does not have any attachment to bone or periosteum. As a rare entity, there have only been three cases reported to be found in the submandibular area.7,9,10 Review of literature did not reveal any reported cases of head and neck ESOS in the Philippines. We report a case of 70/M diagnosed with ESOS presenting with a gradually enlarging right submandibular mass. He was initially managed by the Otorhinolaryngology and Head and Neck Surgery Service. They performed wide excision of the said mass, the largest dimension of which was approximately 7.5 cm. Histopathology report revealed ESOS with close margins, with no perineural nor lymphovascular space invasion seen. On the basis of its size, its close margins, and its high-grade histology, we irradiated the face and neck (fascio-cervical field) of the patient to 44 Gy, then cone-down to 50 Gy to the low-risk areas, then boost to the gross tumor volume (GTV) with 2 cm margins all around to reach 66 Gy. Expected radiation therapy toxicities such as xerostomia and dermatitis were seen in the patient and managed accordingly. We plan to follow the patient up every three to six months for the next two years, and annually thereafter.

INTRODUCTION

Extraskeletal Osteosarcoma (ESOS) is an extremely rare subtype of osteosarcoma accounting for about 1% of all soft tissue sarcomas.[a] It is a malignancy capable of osteoid, bone, or chondroid matrix production, located in the soft tissues, and does not have any attachment to bone or periosteum. They have a histologic appearance that is hard to distinguish from that of primary osteogenic sarcoma of bone.[b,c]

Several studies have found a male predominance with a degree of 2:1, but some authors have failed to affirm this difference.[d,e,f,g] In a retrospective study of 88 patients, the median and mean age for its prevalence was 59 and 54.6, respectively.[h]

People with ESOS usually present with a gradually enlarging mass, but they can also be asymptomatic. Pain or tenderness has been found in as many as 19% of cases, and duration of symptoms have been found to range from two weeks to twenty-five years, with a median of six months, in a landmark study done by Chung and his colleagues in 1987.[h] They also described the three most common locations for these neoplasms – lower extremities (46.6%), upper extremities (20.5%), and the retroperitoneum (17%). Among all the specific sites, the thigh was the most commonly involved (27.3%), followed by the trunk (11.4%)[d,e,h] Other than their rarity, these tumors have the predilection to be deep-seated, large, and of high grade.[b]

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It has a wide spectrum of histologic features, but the variable amounts of neoplastic osteoid and bone that it contains is the common denominator in this subset of sarcoma. This forms the basis why it can often be confused with several other tumors like malignant fibrous histiocytoma, myositis ossificans, fibrosarcoma, malignant schwannoma, oseteoblastic osteosarcoma, and chondroblastic osteosarcoma.[b,h]

In the same study by Chung et al, two main factors have been implicated in its pathogenesis – history of trauma or injury (12.5%) and prior radiation exposure (5.7%). The main mechanism why or how this is so remains unknown.

Studies on ESOS are mainly retrospective except for that from the Memorial SloanKettering Group, in which the followed up fifteen patients prospectively[b.]

As a rare entity, interesting reported cases include one found in the esophagus[i], and another in the greater omentum[j]. Cases in the head and neck have also been reported[g,k,l,m], but only three have been found in the submandibular area - one in a radiation-exposed human patient[m], another in a young Japanese patient[g], and lastly, in a canine subject[l]. Review of literature did not reveal any reported cases of head and neck ESOS in the Philippines.

CASE REPORT

We report of a 70/M from the Philippines who is known to have Parkinson's Disease (on Levodopa with erratic compliance), controlled asthma (uses Salbutamol inhaler as needed), and has been treated for Pulmonary Tuberculosis 22 years ago. He used to work as a driver and a welder, used to smoke one pack per day, and is an occasional alcoholic beverage drinker. He presented with a gradually enlarging right submandibular mass noted initially when some teeth were extracted for application of dentures. At this point, it was estimated to be approximately 1 x 1 cm in size. A few weeks after, the mass was noted to be enlarging with concomitant pain. His dentist gave him NSAIDS, relieving him of pain, but the mass continued to grow. The patient did not experience any dysphagia or dyspnea. He only reported of undocumented weight loss.

For the next eight months, several doctors were consulted for subsequent opinions. He was advised surgery, but declined due to financial constraints. He was subsequently referred to our institution for further management and was initially received by the Otorhinolaryngology – Head and Neck Surgery Service. *Figures 1 and 2 depict the status of the patient when he was initially received.*

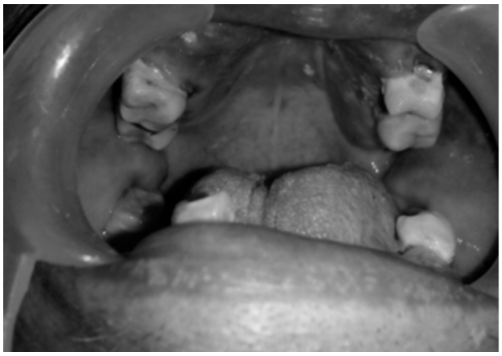

Figure 1. Oral cavity examination of the patient *(Photo courtesy of UP-PGH Department of ORL-HNS)*

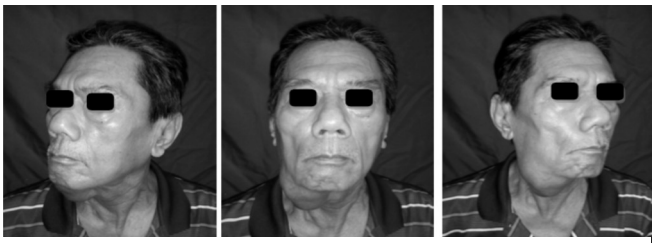

Figure 2. Patient when originally seen by the ORL-HNS Service (*Photo courtesy of UPPGH Department of ORL-HNS)*

CT-scan imaging was done revealing a fairly defined, heterogeneously enhancing soft tissue mass with calcifications and areas of necrosis in the submandibular area extending to the right masticator space measuring 6.5 x 4.3 x 5.6 cm (CC x W x AP), with no involvement of the other neck spaces, vascular structures, and lymph nodes (See *Figure 3).*

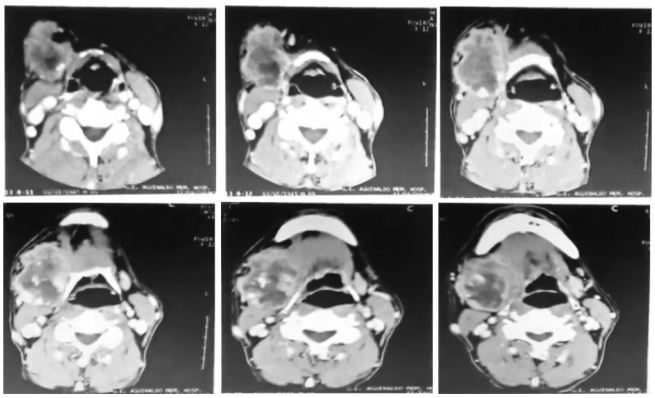

Figure 3. Representative CT Scan images of the patient from inferior to superior

Other metastatic work-up turned out to be negative. At this point, primary differentials were pleomorphic adenoma, adenoid cystic carcinoma, mucoepidermoid carcinoma, and squamous cell carcinoma. Several biopsies were done which revealed inconclusive findings. The ORLHNS service then decided to do wide excision of the mass (*Figure 4), and histopathologic study of the specimen revealed extraskeletal osteosarcoma (Figure 5) with close margins (1.5 mm away from the nearest excision margin), with no perineural nor lymphovacular space invasion seen*.

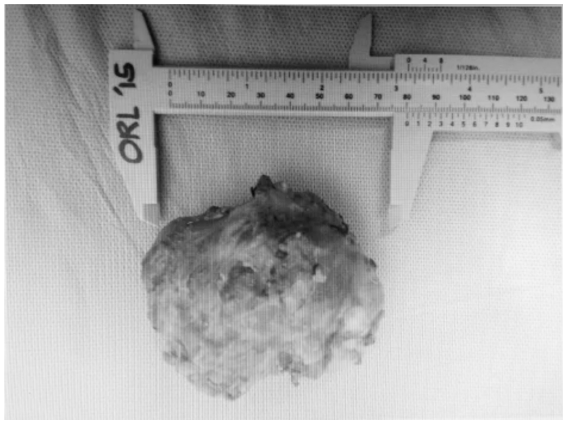

Figure 4. Gross specimen (tumor) removed during wide excision *(Photo courtesy of UPPGH Department of ORL-HNS)*

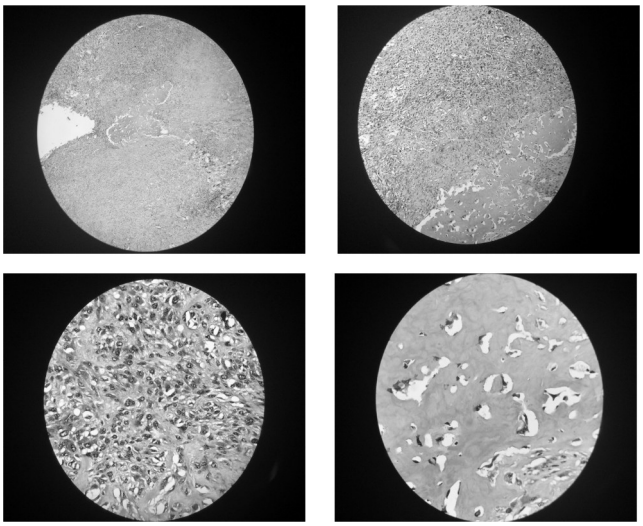

Figure 5. Histopathologic images of the specimen *(Photo courtesy of the UP-PGH Department of Laboratories)*

The patient was then referred to the Radiation Oncology service for adjuvant radiotherapy. We irradiated the fascio-cervical field using a Cobalt-60 machine with opposing lateral beams to a total of 66Gy, keeping the spinal cord dose to a maximum of 44 Gy, and low-risk areas to a maximum of 50 Gy. Radiation was delivered using conventional fractionation (2 Gy per fraction). *Figure 6 shows the x-ray treatment plan for the patient*.

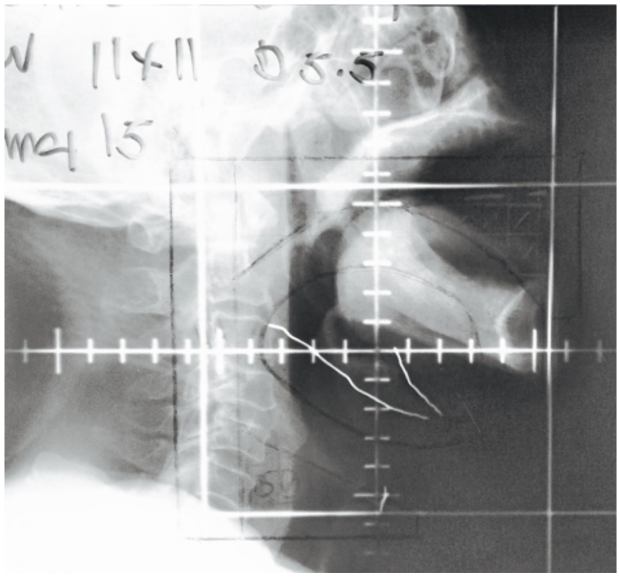

Figure 6. *X-Ray simulation and planning film*

The patient was followed-up once a week, and no significant morbidity was seen. Usual radiation toxicities such as dermatitis, xerostomia, mucositis, and dysphagia were observed, and managed accordingly, based on existing treatment guidelines. The patient was sent home, and was instructed to follow-up after three months. *Figure 7 shows the patient, after Radiation Therapy*.

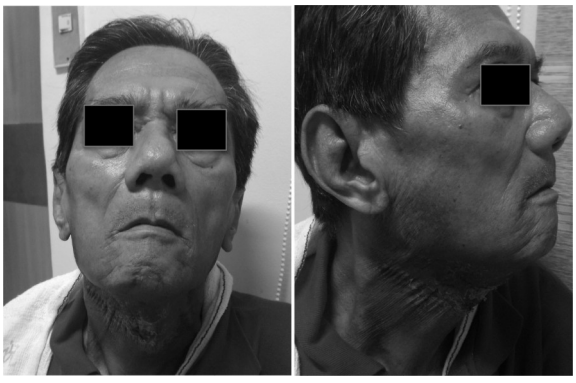

Figure 7. Patient on his last day of Radiation Therapy.

DISCUSSION

Treatment

Researchers from the Memorial Sloan-Kettering Cancer Center have recommended that treatment of ESOS should adhere to currently established guidelines in the treatment of soft tissue sarcomas.[b] The use of adjuvant therapy (chemotherapy or radiation therapy) should be individualized, based on independent risk factors, such as incomplete resections, large tumors (>5cm), or high-grade lesions. Chemotherapy and RT did not appear to affect or influence survival, but this may be attributed to the low number of patients in their study (fifteen pathologically-confirmed ESOS in a 17-year period from 1982-1999).

Ahmad and his colleagues from MD Anderson Cancer Center have supported this claim on the value of adjuvant therapy.[n] In their institutional experience, an overall response rate of 19% (two complete and three partial responses) was seen for Doxorubicin-based systemic therapy, which they deemed as a low response rate. They then insisted that ESOS should be viewed as clinically and therapeutically distinct from osseous osteosarcoma.

Though no clear survival or local control benefit when giving adjuvant radiotherapy have been established for ESOS as of the moment, the patient was irradiated on the basis of its very close margins on histopathology (1.5mm), and its size (>5 cm) preoperatively. Upon consultation with the Medical Oncology service, adjuvant chemotherapy is not warranted since there are no adverse features seen, but close follow-up was advised.

Prognosis

ESOS has an exceptionally poor prognosis which can partially be attributed to the limited clinical information about its natural course.[c,d,e,o] Researchers have set the estimated mortality to be between 70 to 80%, and overall disease-specific survival at 5 years at 50% (with a median follow-up of 35 months).[b]

The MD Anderson experience cited earliern revealed their statistics to be 82% (95% CI, 70-98), 64% (95% CI, 43-93%), 47% (95% CI, 30-70%), and 46% (95% CI, 26-80%) for the 5-year actuarial local recurrence-free survival, distant recurrence-free survival, event-free survival, and disease-specific survival, respectively.

Of the 88 patients in the landmark study by Chung[h], 65 had follow-up data. Twentyfive (38.5%) were alive, eight of whom were well, while 17 had recurrence or metastasis. The remaining 40 (61.5%) died, 4 of whom attributable to other causes not connected to the malignancy. Median follow-up for this study was 2.4 years, ranging from one to 22 years.

We plan to follow the patient up every three to six months for two to three years, then every six months for the next two years, then annually thereafter. Though limited data has shown poor prognosis for this kind of malignancy, compliance to follow-up and other medications was advised and reiterated, as he has a really good performance status at baseline.

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