Chondrosarcoma of the Mandible in a Filipino Female*

Lerico T. Reyes, MD and Danilo D. Deveza Jr., MD, FPSOHNS

ABSTRACT

Chondrosarcomas are malignant neoplasms that are generally slow-growing tumors, characterized by formation of hyaline cartilaginous neoplastic tissue. It accounts for 20% of malignant bone tumors and rarely affects the spine and craniofacial bones. A 45-year-old female presented with a 1-year history of pain and swelling on the left mandible who underwent excision of mass and was diagnosed as odontogenic myxoma. Recurrence of the mass occurred and a plain head and neck CT scan revealed a large multilobulated, expansile, heterogeneously, hypodense to isodense mass with scattered micro and macro-calcifications occupying the left maxillary and mandibular regions. The patient underwent tracheostomy tube insertion followed by wide excision of submandibular mass, hemimandibulectomy with reconstruction plate with pectoralis major myocutaeneous flap under general anesthesia. Final histopathology revealed a low grade chondrosarcoma with positive S-100 staining. Patient was discharged against medical advice and was lost to follow up. There was recurrence of the tumor which resulted to severe tumor bleed which led to the patient's demise. This case report highlights the challenges in diagnosing malignant bone tumors as well as the surgical management and approach to such cases. A collaboration with the clinician, radiologist and pathologist is recommended to quickly recognize and diagnose such cases which have an aggressive type of tumor.

Key words: Jaw, chondrosarcoma, mandible, odontogenic, myxoma

According to Warren Chow in 2018[1], chondrosarcomas are malignant neoplasms that are generally slow-growing tumors, characterized by formation of hyaline cartilaginous neoplastic tissue. It is a malignant tumour with pure hyaline cartilage differentiation which rarely affects the spine and craniofacial bones. Primary chondrosarcoma accounts for 20% of malignant bone tumors, 90% of those are of the primary or conventional type.[2] It is a tumor of adulthood and old age, but craniofacial chondrosarcomas are found to be more common in younger patients, with a third of them under 40's.[3]

According to Purgina, et al. in 2017, the head and neck region is responsible for 1-12% of chondrosarcomas and half of those occur in the jaw and craniofacial bones. The most common sites affected are the ilium, followed by the proximal femur, proximal humerus, distal femur, and ribs.[3] An electronic search and analysis without time restrictions was undertaken in October 2017, of chondrosarcoma of jaw bones was done by De Souza, et al. in 2018, where in the study was able to identify and review only 224 cases.[4]

Benign and malignant primary tumors of the head and neck are very rare. In addition to this, the complex anatomy of the head and neck makes it challenging for clinicians, pathologists, and radiologists to diagnose. There is limited literature with regards to chondrosarcoma of the mandible in the Philippines making this an interesting case. Upon using the search engine PubMed with keywords Chondrosarcoma and Philippines, only one result was found and upon searching Philippine Journal of Otolaryngology – Head and Neck Surgery (PJO-HNS) archives, only one result was found. This paper aimed to present a

*Department of Otorhinolaryngology-Head and Neck Surgery

rare case of a female patient with chondrosarcoma of the mandible who was previously diagnosed as a case of odontogenic myxoma and to discuss the approach and management when encountering such rare cases.

THE CASE

A 45-year-old, hypertensive and diabetic female was admitted with a chief complaint of a left mandibular mass. One year prior to admission, she experienced pain and tenderness in her 3rd left mandibular molar which prompted her to see dental consult. Tooth extraction was done and which afforded relief of symptoms. Ten months prior to admission, she noticed a firm, tender, pinkish non-movable mass on the 3rd left mandibular molar area which progressively increased in size. She consulted a private clinic and was advised to undergo excision of the mass. Eight months prior to admission, patient underwent excision of mass and biopsy revealed chondroid and chondromyxoid differentiation with atypia. Immunohistochemical staining was recommended but patient was lost to follow up. Six months prior to admission, there was a recurrence of the mass in the same area which progressively increased in size, extending to the left mandibular area. The patient consulted a private ENT doctor and incision biopsy was done which revealed a low-grade spindle lesion with myxoid feature compatible with odontogenic myxoma and was advised surgical operation. Two weeks prior to consult, still with a rapidly progressing left mandibular mass associated with difficulty eating and paresthesia on the lower lip prompting consult at another private ENT doctor who also recommended surgical intervention and was subsequently admitted in FEU-NRMF.

Patient was admitted with a working diagnosis of left mandibular mass, odontogenic myxoma. A 14cm x 5cm x 11.5cm large solid mass on the left mandibular area extending to the left maxillary that was noted to be fixed, with smooth borders (Figure 1). The center of the mass and the submental area were noted to be tender. Examination of the oral cavity showed trismus and a fixed, non-tender exophytic mass measuring approximately 6cm x 3cm x 2.5cm with whitish material was seen in the left gingivobuccal area which displaced the tongue to the right (Figure 2). The first mandibular premolar tooth was also observed to be displaced.

A plain head and neck CT scan was requested which revealed a large multilobulated, expansile, heterogeneously, hypodense to isodense mass with scattered micro and macro-calcifications occupying the left maxillary and mandibular regions approximately measuring 12.3cm x 10.6cm x 12.8 cm (CC x W x AP). There is associated involvement of the left mandibular ramus extending to the ipsilateral mental region exhibiting sunburst appearance with destruction of the mandibular body as well as lysis. There is compression of the surrounding structures with deviation of the mandible and oropharyngeal structures to the right (Figure 3).

The patient underwent tracheostomy tube insertion followed by wide excision of submandibular mass, hemimandibulectomy with reconstruction plate with pectoralis major myocutaeneous flap under general anesthesia. Intraoperatively, the mass was noted to have extended at the left condyle and retromolar trigone on the left, up to the first premolar to the right

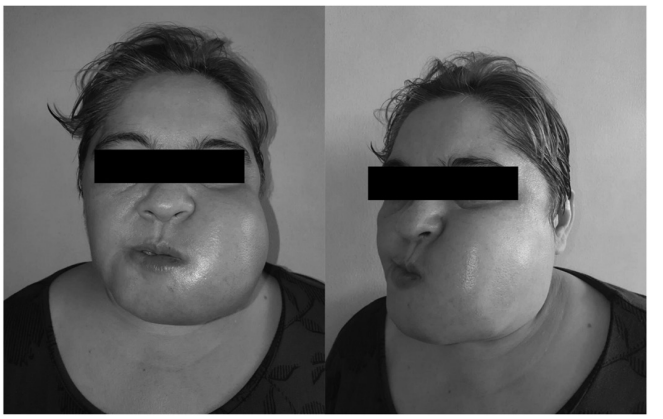

Figure 1. A 14cm x 5cm x 11.5cm large solid mass on the left mandibular area extending to the left maxillary that was noted to be fixed, with smooth borders.

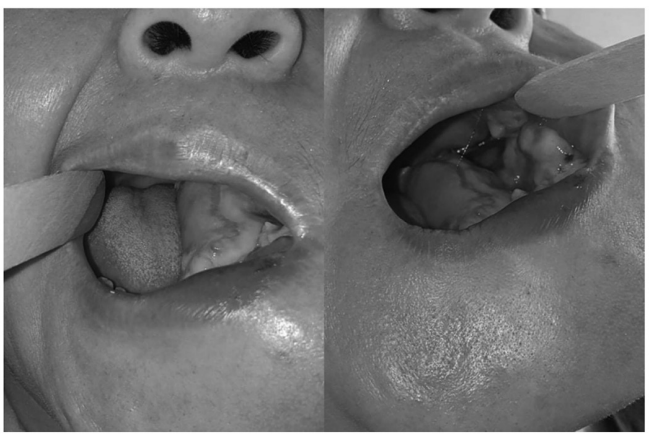

Figure 2. A fixed, non-tender exophytic mass measuring approximately 6cm x 3cm x2.5cm with whitish material was seen in the left gingivobuccal area which displaced the tongue to the right

(Figure 4). The excised mass measured approximately 16.5cm x 12.7cm x 11.4 cm. Reconstruction was done using a straight ream plate with 20 holes and vertical ream plate with 2 holes (Figure 5). A posterior pectoral flap was developed up to the subcutaneous layer and was attached to the harvested pectoralis major, creating a myocutaenous flap to cover the mucosal defect (Figure 6). Forty-eight hours post-operatively, the edge of the skin flap on the was noted to be slightly necrotic hence, debridement and re-suturing was done. Five days post-operatively, minimal yellow discharge was noted along the suture line inferior to the lower lip hence Deprotinized Calf Blood Extract + Polidocanol (Solcoseryl Dental Adhesive Paste) was applied. There was also discoloration noted in the flap with no dehiscence.

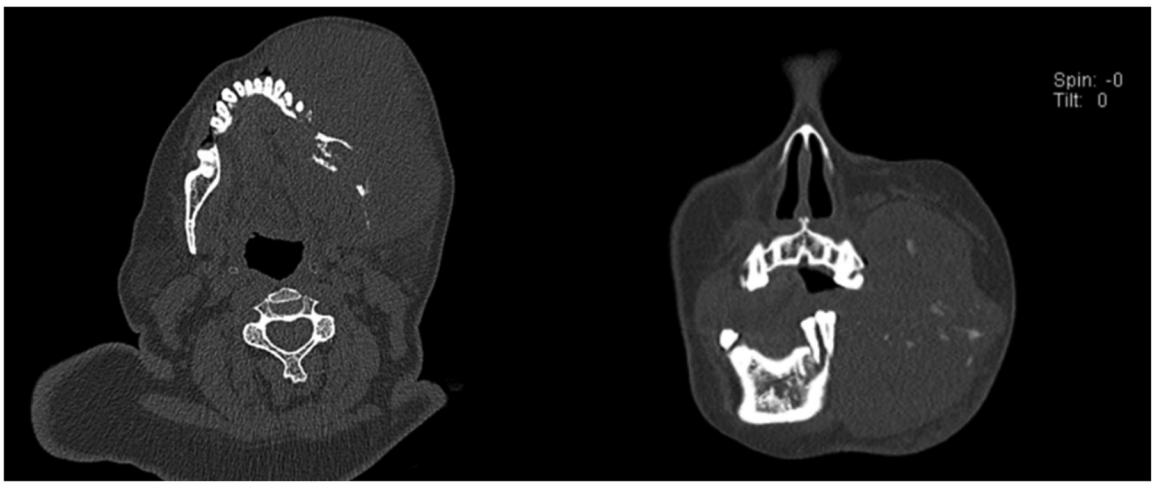

Figure 3. Large multilobulated, expansile, heterogeneously, hypodense to isodense mass with scattered micro and macro-calcifications occupying the left maxillary and mandibular regions approximately measuring 12.3cm x 10.6cm x 12.8 cm (CC x W x AP)

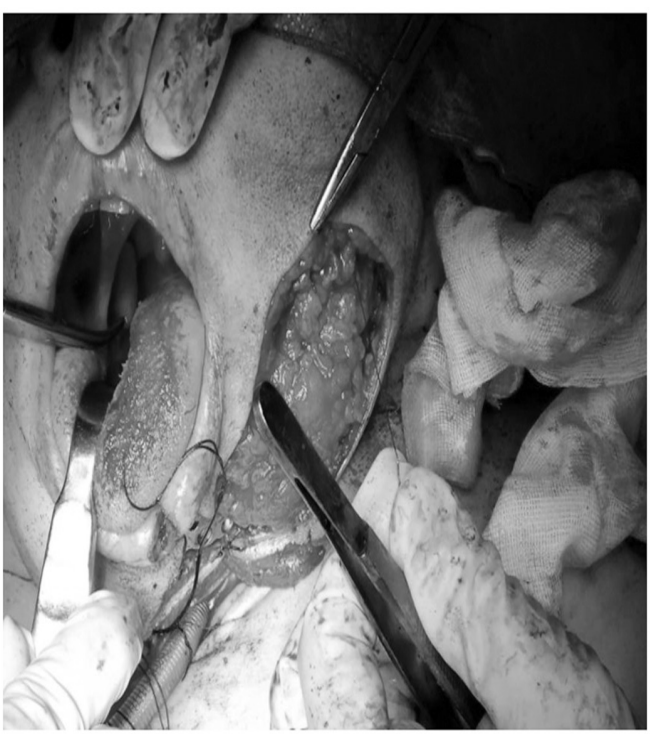

Figure 4. Mass was noted to have extended at the left condyle and retromolar trigone on the left, up to the first premolar to the right. The was measured approximately 16.5cm x 12.7cm x 11.43 cm

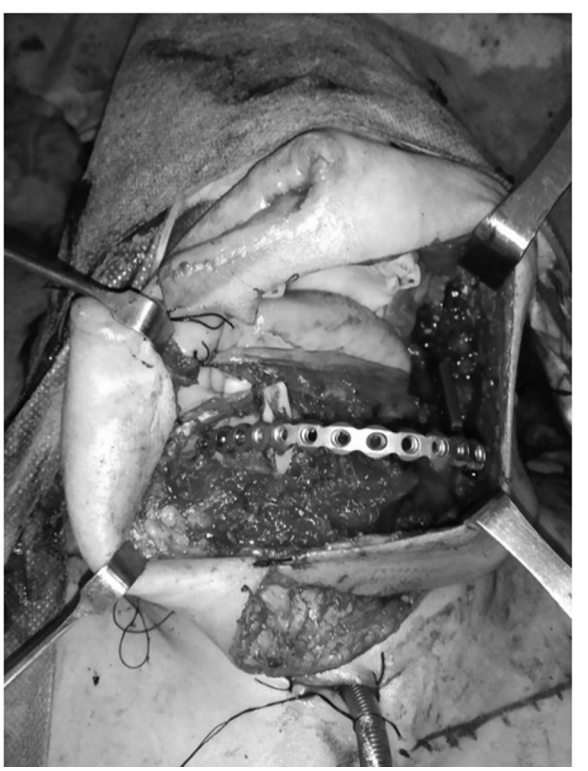

Figure 5. Reconstruction was done using a straight ream plate with 20 holes and vertical ream plate with 2 holes.

Histopathology revealed malignant biphasic tumor arranged in sheets. One component is composed of sheets of clear cells that exhibit marked pleomorphism, hyperchromatic nuclei and coarse chromatic pattern and prominent nucleoli. Areas of cartilaginous components are seen with no definite bone formation. These findings are consistent with low grade chondrosarcoma. (Figures 7 & 8).

Ten days post-operatively, there was dehiscence noted on the mentum exposing the reconstruction plate. Seventeen days post-operatively, there was yellow purulent discharge noted in the left mentum hence wound debridement was done. Twenty-three days post-operatively, there was dehiscence noted in the anterior flap hence the implant was removed followed by wound debridement.

Thirty-six days post operatively, patient decided to go home against medical advice due to financial constraints. Patient followed 1 month after the procedure and presented with facial paralysis, House Brackmann Scale IV. Patient was referred for radiation therapy but was lost to follow up until relatives reported patient to have expired 4 months after the procedure due to tumor recurrence and massive tumor bleeding.

DISCUSSION

Chondrosarcoma (CS) most commonly affects the long bones such as ilium, femur and humerus and is extremely rare in the spine and craniofacial bones.[2] Chondrosarcoma only represents 0.1 % of all head and

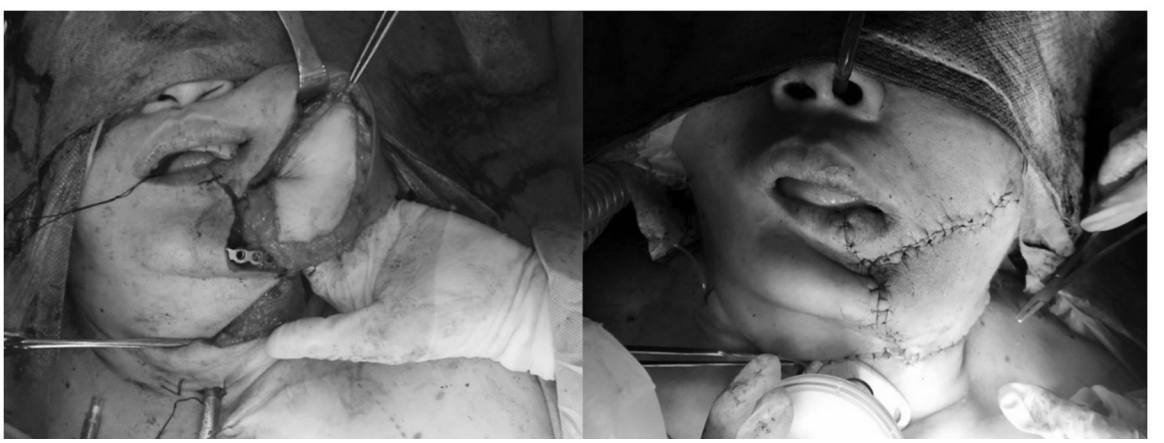

Figure 6. A posterior pectoral flap was developed up to the subcutaneous layer and was attached to the harvested pectoralis major, creating a myocutaenous flap to cover the mucosal defect.

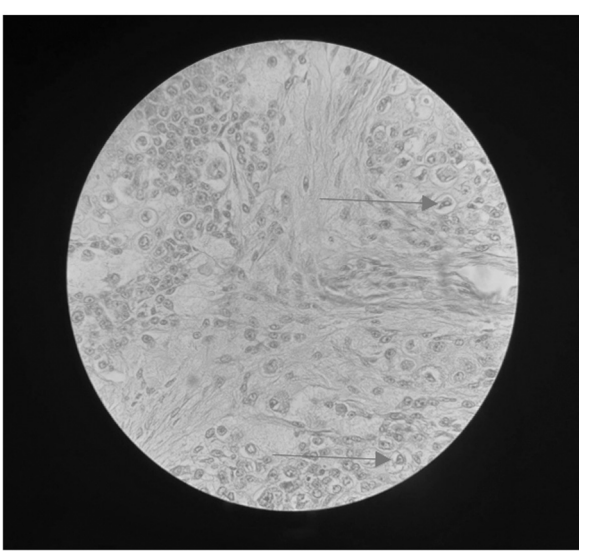

Figure 7. Slide shows malignant biphasic tumor arranged in sheets. Red line arrows point to clear cells.

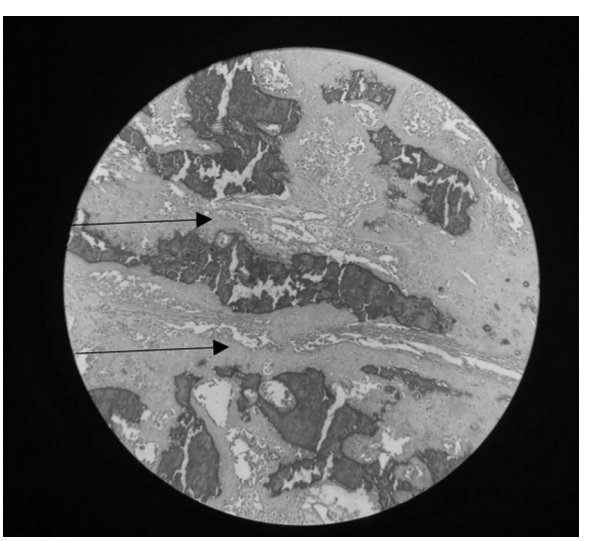

Figure 8. Slide shows cartilaginous components pointed by black line arrow.

neck neoplasms.[5] If present in the head and neck, most chondrosarcomas occur in the maxilla are rarely in the mandible.[6] It is the second most common malignant bone tumor, and has different histological subtypes, conventional chondrosarcoma being the most common (about 80-90%).[7] There are two types of conventional chondrosarcoma based on the location: central if it originates within the medullary cavity, and peripheral if within the cartilage cap. However, the origin of the neoplasm remains to be controversial. According to Kundu, et al. (2011), chondrosarcoma may come from pre-existing conditions such as Paget's disease and fibrous dysplasia. Such diseases were not present in the present case.[8]

Grading is important in predicting prognosis and histologic behavior. According to WHO, chondrosarcomas are graded on a scale of 1-3 and is based on nuclear size, nuclear staining, and cellularity (Table 1). About 10% of tumor recurrence have an increased degree of malignancy.[2] In our present case, our patient demonstrated a low-grade chondrosarcoma with S100 stain – focal positive, which is also found in other low grade chondrosarcoma subtypes.[9]

Common clinical manifestations include pain and swelling, alone or in combination as well as premature eruption of or exfoliation of teeth. On early stages, swelling can be painless.[2,6] These manifestations are consistent with our case, wherein pain and tenderness started on the 3rd mandibular molar until it progressed into a mass extending to the left mandible. Diagnosis usually requires a combination of clinical, histopathologic, and radiographic examination. Unfortunately, there is no pathognomonic radiographic finding for CS. According to WHO, radiographic findings may show fusiform expansion with cortical thickening of the bone with punctate or ring like opacities.[2] Alternatively, CS may demonstrate ill-defined cloud-like matrix with calcified "whorls and arcs" and can even present with ground glass and sunburst appearance, which is also present in other bone neoplasms. In the present case, the mass involved the left mandibular ramus as well as the ipsilateral mental region and exhibited a sunburst appearance with micro and macrocalcifications.[6]

Histopathology is still the mainstay of diagnosis, although the use of CT scans and MRI's is essential in locating the tumors location and extent, as well as characterize its growth. Myxomas appear bland with stellate-shaped cells with a mucoid rich matrix in a pale eosinophilic cytoplasm. Commonly, odontogenic myxomas are mistaken histopathologically with a developing dental papilla. However, other neoplasms of the bone like chondromyxoid fibroma and myxoid chondrosarcoma may show a myxoid component which may pose a diagnostic dilemma for clinicopathologists. Both of these lesions must show focal evidence of chondroid differentiation and pleomorphism to be diagnosed as such. Unfortunately, the microscopic descriptions of the first two biopsies of the patient were not available. This could have provided information on how odontogenic myxoma was diagnosed and show if there are similarities with the final histopathologic result.[10] Odontogenic myxomas are rare benign tumors of mesenchymal origin which are locally aggressive and are known to have a high recurrence rate of more than 25% but are not known to transform to any other bony lesion. It is still unclear if this is a case of a misdiagnosis, or an entirely new tumor growth, but the incision biopsy which revealed the odontogenic myxoma makes the latter unlikely.[11]

Patient underwent tracheostomy tube insertion followed by wide excision of submandibular mass, hemimandibulectomy with reconstruction plate with pectoralis major myocutaeneous flap under general anesthesia. A 16.51cm x12.7cm x 11.43 cm mass was excised. Surgical treatment with adequate safety margin of about 2-3cm is the most effective treatment modality for chondrosarcoma. Residual disease may cause recurrence, which is more common than metastasis, hence, neck dissection is not routinely performed. Radiotherapy may be used as adjunct in residual cases or as palliative treatment for unresectable cases while chemotherapy can be applied as an adjunct in high grade or aggressive chondrosarcomas.[5,6] Based on the AJCC TNM staging on bone cancer, patient is assigned as stage IB. Hence, either intralesional excision or wide excision can be done if resectable. Surveillance will include MRI or CT with contrast every 6-12 months for 2 years then yearly as well as chest imaging.[12] Despite 2 procedures of wound debridement and wound suturing, wound dehiscence continues to be a problem for this case, probably due to the patient being a diabetic, resulting in poor wound healing.

There are several limitations to this case. First is the unavailability of the first two biopsy results which could have helped determine if it was indeed a malignant transformation or a misdiagnosis. Second is that the patient was lost to follow up due to the pandemic and was not able to undergo the recommended chemoradiation.

Table 1. WHO Grading on conventional chondrosarcomas

Grade	Histological Features	5 Year Survival Rate
1	Tumours are moderately cellular and contain hyperchromatic plump nuclei of uniform size. Occasionally binucleated cells are present. The cytology is very similar to enchondroma.	89%
2	Tumours are more cellular and contain a greater degree of nuclear atypia, hyperchromasia and nuclear size.	53%
3	Lesions are more cellular and pleomorphic and atypical than grade 2. Mitoses are easily detected.	53%

CONCLUSION

There is limited number of reports of chondrosarcoma of the head and neck in the Philippines, most especially the mandible. Clinical presentation of odontogenic myxomas and chondrosarcomas of the mandible are similar. Such cases require histopathology by an experienced pathologist to also rule out histopathologically similar neoplasms. The rarity of disease makes it difficult to recognize or diagnose without proper collaboration of clinicians, pathologists, and radiologists. There are guidelines available for the management of chondrosarcomas but no established protocol specifically for head and neck chondrosarcoma. This makes it more difficult to treat considering the size of the structures in the head and neck compared to the most common affected bones in chondrosarcoma, like the ilium, femur, and humerus. Nevertheless, the most effective treatment approach is still resection with wide margins. The pandemic has impacted this case greatly, resulting to multiple lost to follow ups. With earlier treatment, the case could have a more favorable outcome.

SUMMARY

Presented is a case of a 45-year old female diagnosed with Chondrosarcoma of the mandible. Definitive diagnosis requires a combination of clinical, histopathologic, and radiographic examination as it may mimic other neoplasms. Histopathology is still the mainstay of diagnosis while surgical resection with adequate margins remains to be the most effective treatment for resectable cases. For unresectable cases, radiotherapy is recommended.

REFERENCES

1. Chow WA. Chondrosarcoma: biology, genetics and epigenetics. F1000Res. 2018 Nov 20;7:F1000 Faculty Rev-1826. doi: 10.12688/f1000research.15953.1.
2. Fletcher CDM, Unni KK, Mertens F. (Eds.): World Health Organization Classification of Tumours. Pathology and Genetics of Tumours of Soft Tissue and Bone. IARC Press: Lyon 2002.
3. Purgina B, Lai CK. Distinctive head and neck bone and soft tissue neoplasms. Surg Pathol Clin 2017 Mar;10(1): 223-79. doi: 10.1016/j.path.2016.11.003.
4. De Souza LL, Pontes FSC, Fonseca FP, da Mata Rezende DS, Vasconcelos VCS & Pontes HAR. Chondrosarcoma of the jaw bones: a review of 224 cases reported to date and an analysis of prognostic factors. Int J Oral Maxillofacial Surg 2018. doi:10.1016/j.ijom.2018.11.006
5. Lee SY, Lim YC, Song MH, Seok JY, Lee WS & Choi EC. Chondrosarcoma of the Head and Neck. Yonsei Med J 2005; 46(2), 228. doi:10.3349/ymj.2005.46.2.228
6. Sarin V, Singh K, Kakkar V, Singh G. Chondrosarcoma of mandible: A rare case report. Iran J Otorhinolaryngol. 2021 Nov;33(119):389-94. doi: 10.22038/IJORL.2021.47251.2553.
7. Rozeman LB, Cleton-Jansen AM & Hogendoorn PCW. Pathology of primary malignant bone and cartilage tumours. Int Orthop 2006; 30(6): 437–44. doi:10.1007/s00264-006-0212-x
8. Kundu S, Pal M, Paul RR. Clinicopathologic correlation of chondrosarcoma of mandible with a case report. Contemp Clin Dent. 2011 Oct;2(4):390-3. doi: 10.4103/0976-237X.91811.
9. McLoughlin GS, Sciubba DM, Wolinsky JP. Chondroma/chondrosarcoma of the spine. Neurosurg Clin N Am 2008 Jan;19(1):57-63. doi: 10.1016/j.nec.2007.09.007.
10. Godishala Swamy SR, Naag S, Bahl S, Priyadarshini E. Odontogenic myxoma: A causality dilemma - Report of a nonpareil case and review of literature. J Oral Maxillofac Pathol 2018 Jan;22(Suppl 1):S2-S6. doi: 10.4103/jomfp.JOMFP_120_16.
11. Shivashankara C, Nidoni M, Patil S & Shashikala KT. Odontogenic myxoma: A review with report of an uncommon case with recurrence in the mandible of a teenage male. Saudi Dental J 2017; 29(3): 93–101. doi:10.1016/j.sdentj.2017.02.003
12. National Comprehensive Cancer Network. (2020). Bone cancer (version 1.2020)