

PREVALENCE OF JAW METASTASES OF MALIGNANT NEOPLASIA: A MULTICENTRE STUDY IN SOUTHERN NIGERIA

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ABSTRACT

BACKGROUND: Orofacial metastases are rare and often omitted in the differential diagnoses of jaw lesions until after the histopathologic diagnosis. This is a study of the prevalence and the clinicopathologic features of metastatic orofacial tumours.

METHODS: A retrospective 29-year study in three tertiary dental centres in Southern Nigerian was carried out. All patients with orofacial malignancies were identified from the medical records. Those with histological diagnoses of metastatic tumours were retrieved. The demographic data and clinicopathologic features of each case were obtained. The proportions and descriptive variables of the data were analyzed with SPSS, version 20.

RESULTS: Orofacial malignancy was diagnosed in 695 patients, of which 6 were of metastatic origin giving a prevalence of 0.9 %. All the metastases involved the jaw bones and were post-surgical. The posterior mandible was the preferred site, (n=5, 83.3 %) and none was observed in the oral soft tissues. The thyroid and the prostate were the most frequent organ of origin in women and men respectively. The mean age at presentation was 52.6 ± 13.9 (SD) years. The male: female ratio was 1:2. Swelling (n=6, 100.0%) and pain (n=3, 50.0%) were the commonest presentation. Mixed radiopacity/lucency (n=4, 66.7%) was the commonest radiologic appearance.

CONCLUSION: A low prevalence of orofacial metastases was observed in this study. Destructive jaw swellings in elderly patients after therapy for malignant neoplasms should be suspected and evaluated to exclude metastases.

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INTRODUCTION

The diagnosis of a metastatic jaw tumour is often challenging for both the clinician and the pathologist, and requires their mutual cooperation. Orofacial metastases are responsible for 0.1% of all malignancies^{1,2} and 1.0 - 2.0% of all orofacial malignancies.³⁻⁵ A northern Nigeria study of six jaw metastases seen over a 20-year period reported a prevalence of 1.5%.⁶

A low prevalence of orofacial metastasis of 1.0% – 1.5% is reported by some authors.^{3,4} While some studies observed equal gender distribution,⁷ and a male dominance of 1.2:1 in jaw bone metastasis.⁸ The origin of the primary lesion is influenced by gender.^{3,9} The study from Northern Nigeria observed a female predominance of 60.0% for patients with orofacial metastasis.⁶ They also reported the thyroid gland as the predominant (50.0%) primary site of origin, and thyroid adenocarcinoma as the prevalent secondary lesion. In an Asian study of 29 metastases to the oral cavity and oropharynx, the most common primary sites were the liver (n=10, 34%) and lung (n=10, 34%).⁵ The largest and most recent review of jaw bone metastases, reported greater frequency from breast in women and lungs in men.⁸ The mean age of patients with orofacial metastasis was reported as 53.4 years.⁸

Metastatic lesions to the head and neck are found more in the mandibular bone than maxilla and orofacial soft tissue.^{8,10} They are more frequent in the posterior mandible,^{4,11} but only 15.7% in the maxilla.⁸ Irani⁸ in his review found 125 (27.6 %) jaw metastases as first indication of occult malignancy, and the commonest clinical features were swelling and pain. The radiographic features of orofacial jaw metastases are not specific or characteristic, but variable, often described as irregular or ill-defined radiolucencies.⁶

Adenocarcinoma of any type is the most frequently diagnosed metastases to the jaw bone,^{6,8} but metastatic sarcomas were very rarely reported.⁵ The prognosis of orofacial metastases is poor,¹² and a Korean study reported 86 % of patients died within 12 months of diagnosis of orofacial metastasis.⁵ Reports of soft tissue

metastases showed the gingiva as the most frequent site, followed by the tongue.¹³ Gingival metastases usually mimicked hyperplastic or reactive gingival lesions and were well vascularized.^{14, 15}

Patients often fail to volunteer past clinical history of therapy that could help include metastasis as a differential. This is probably due to ignorance of the relationship between their current orofacial swelling and a past surgical therapy for a primary malignant tumour. The authors are not aware of any literature on the prevalence of jaw metastases in Southern Nigeria to compare with. This study examines the prevalence and the clinicopathologic features of metastatic orofacial tumours in three tertiary Centres located in Southern Nigeria. The importance of histopathology investigations in the diagnosis of a metastasis is highlighted.

MATERIALS AND METHODS

This was a 29-year retrospective study covering the period of 1990-2018. Three tertiary dental centres: University of Nigeria Teaching Hospital Enugu, University College Hospital Ibadan and Obafemi Awolowo University Teaching Hospital Ile-Ife, all in Southern Nigerian were involved. They offered 8 years to 28 years of oral pathology services. All patients with malignant jaw tumours were identified from the medical records. Those with histological diagnoses of a metastatic tumour to the orofacial tissues were retrieved. The demographic data and clinicopathologic features of metastatic cases were obtained.

The proportions and descriptive variables of the data were analyzed with SPSS, version 20 (Chicago: SPSS Inc.) Proportions, frequencies and percentages, were calculated for the descriptive variables of swelling, pain, ulceration, teeth mobility. The means and standard deviations of continuous variables: age, tumour free interval and mean duration were determined.

RESULTS

Orofacial malignancy was diagnosed in 695 patients, out of which 6 (0.9 %) cases were of metastatic origin. The mean age was 52.6 ±

13.9. The male: female ratio was 1:2 and the mean tumour-free interval was 42.5 ± 44.1 (range 7 - 120) months. The mean duration of orofacial metastases at presentation was 7.3 ± 8.6 (range: 1.5 – 9) months.

The most frequent presenting complaints were swelling (n=6, 100%) and pain (n=3, 50.0%) [Table 1]. All the cases of orofacial metastases involved the jaw bones, and were post-surgery, following therapy for the primary malignancies.

Table 1. Presenting Orofacial Complaints

Symptoms & Signs	Frequency of Complaints
Swelling	6 (100.0 %)
Pain	3 (50.0 %)
Ulceration	2 (33.3 %)
Teeth mobility	1 (16.7 %)

One of the patients was a 72 year old female with a 2-year bucco-lingual swelling on the body and ramus of the left mandible. Although she had a past surgical history of thyroidectomy over a decade ago, this was not captured in the history even in the midst of mild discrete recurrent thyroid swelling. Similarly the history of knee swellings was initially thought to suggest arthritic swellings commonly observed in the elderly. Following a biopsy, a histologic diagnosis of a metastatic follicular carcinoma was made, with the primary lesion being a thyroid follicular adenocarcinoma. She was therefore reviewed and further investigations confirmed metastases to the distal femurs, lungs, and the skull.

The posterior mandible was the preferred site of orofacial metastases (n=5, 83.3 %). The maxilla (premaxilla) had only 1 (16.7 %) case involved in metastatic deposit, while none was observed in the oral soft tissues [Table 2]. Most of the orofacial metastasis originated from the thyroid (n=2, 33.3%), and the prostate (n=2, 33.3%), with primary diagnoses of follicular thyroid carcinoma (Figure 1) and prostatic

adenocarcinoma (Figure 2) respectively. The primary therapies received by the patients were thyroidectomy, prostatectomy, resection of colon with wide margin, and mastectomy.

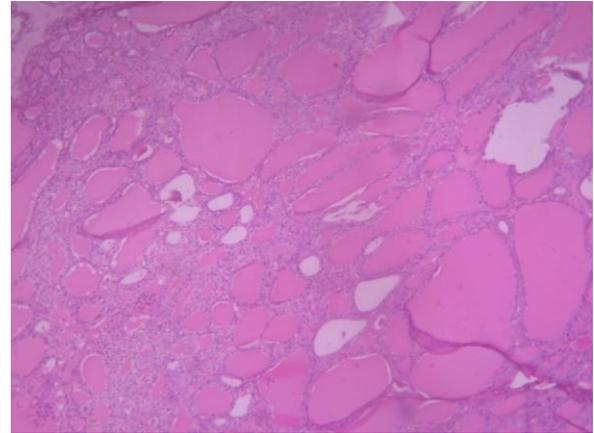


Figure 1: Photomicrograph showing extensive colloid follicular formation as classically seen in follicular thyroid carcinoma (H&E, x40)

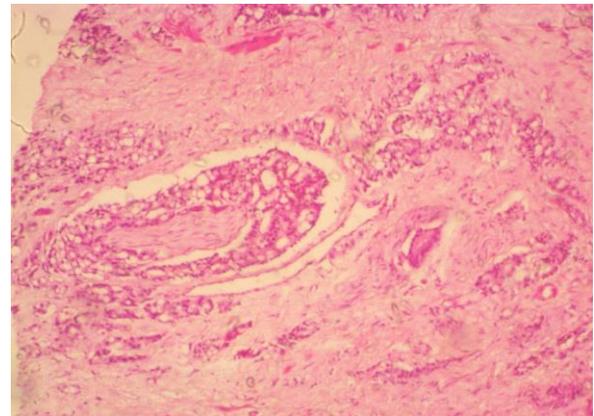


Figure 2: Photomicrograph of adenocarcinoma of the prostate showing malignant glandular cells in a cribriform pattern, in cords and nests in an extensive connective tissue stroma. There is perineural invasion (H&E, x40)

DISCUSSION

The lack of adherence to the principles of clinical history taking and physical examination could be responsible for the omission of metastatic neoplasms in differential diagnoses of maxillofacial swellings. This results in retrospective correlation of histopathology diagnosis of metastatic deposits with relevant clinical findings. A case in this series had thyroidectomy done a decade earlier and

presented with disseminated metastatic lesions to the lungs, skull and distal femurs. The patient only returned to the clinic because of dental pain. It appears that patients and their relatives seek medical attention mostly when swelling is present and pain is unbearable.

The low prevalence (0.9%) of orofacial metastasis observed in this Southern Nigerian study is comparable with the 1.0 % – 1.5% prevalence reported in other studies.^{3,4,6} In contrast to studies that observed equal gender distribution,⁷ and male dominance in orofacial metastasis,⁸ this study found a dominance of females (male to female ratio of 1:2), which is similar to the Northern Nigeria study.⁶ The mean age was 52.6 years at presentation in this study, which is comparable to the 53.4 years reported by Irani.⁸

It appears that factors such as race and prevalence of primary tumours in various populations may be responsible for the reported differences in secondary sites. The type of predominant primary lesion and the site of orofacial metastases are influenced by gender.^{3,9} Similar to the Northern Nigeria study⁶ which reported the thyroid gland as the predominant (50.0%) primary site of origin, and thyroid adenocarcinoma as the prevalent secondary lesion, this study observed that thyroid and prostate glands were the primary sites for most metastatic jaw tumours in women and men respectively. This is in contrast to the findings in an Asian study where the most common primary sites were the liver and lung.⁵ Another recent study reported a greater frequency of origin from the breast in women and the lung in men.⁸

Table 2: Organs with primary and secondary malignancies, and clinicopathological details

1 ⁰ Organ	Sex	Age (years)	1 ⁰ Diagnosis	2 ⁰ Organ	2 ⁰ Diagnosis	Interval between 1 ⁰ & 2 ⁰ (yrs)	Radiographic features on the Jaws
Thyroid	F	72	Follicular Thyroid Carcinoma	Mandible (Lt body)	Follicular Carcinoma	10	Mixed radiolucent/opacity
Thyroid	F	51	Follicular Thyroid Carcinoma	Mandible (left body/ angle)	Follicular Carcinoma	5	NA
Prostate	M	40	Prostatic Adenocarcinoma (high grade)	Mandible (Rt body)	Adenocarcinoma	0.8	Moth-eaten & Mixed radiolucent/opacity
Prostate	M	70	Prostatic Adenocarcinoma (intermediate)	Mandible (Left body/ Angle)	Adenocarcinoma (intermediate)	4	Mixed radiolucent/opacity
Breast (Lt)	F	42	Invasive ductal Carcinoma	Premaxilla	Invasive ductal carcinoma	0.6	N/A
Colon	F	62	Adenocarcinoma	Mandible (right Angle/ Ramus)	Adenocarcinoma	0.9	Multilocular radiolucency

All the cases in the Nigerian series were deposited in the jaw bones with majority in the posterior mandible, conforming with previous reports of more frequent metastasis in posterior mandible.^{4,11} Metastatic deposits to the maxilla was observed in one (16.7 %) case in this series and compared well with the 15.7% in a large review.⁸ There was no finding of orofacial metastasis that revealed an occult malignancy in our series, perhaps due to the small sample size.

The findings in this study supports the report of adenocarcinoma as the most frequently diagnosed metastases to the jaw bone.⁸ Soft tissue metastases were not detected in this series probably due to the few cases seen.

All the 6 cases in this study occurred post-surgery for a primary malignancy. The commonest clinical features observed in this series were swelling and pain, which were the same reported in literature.⁸ The mixed radiopaque-radiolucent lesions observed in this study are in agreement with previous report of irregular or ill-defined radiolucencies of orofacial jaw metastases.⁶

The prognosis of orofacial metastases is poor,¹² as shown by the short interval of appearance of metastatic lesions after surgical treatment of the primary malignancy. In this series the mean interval was 42.5 ± 44.1 (Range 7 - 120) months. A Korean study reported a range of <1month to 104 months interval, and 86% of patients died within 12 months of diagnosis of orofacial metastasis.⁵

In conclusion, it is probable that metastatic tumours to orofacial tissues are under reported among Nigerians. This may account for the few cases diagnosed in the Centres studied. Similar to the findings in the Northern Nigeria study,⁶ there is a low prevalence of orofacial metastasis in Southern Nigeria and women were predominantly affected. The thyroid gland was the most common primary source of metastasis in women, and the prostate gland in men. Destructive jaw swellings in elderly patients after therapy for malignant neoplasms should be suspected and evaluated to exclude metastases.

Competing Interests: The authors declare absence of any competing interests.

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REFERENCES

1. Zachariades N. Neoplasms metastatic to the mouth, jaws and surrounding tissues, *J Cranio Max Fac Surg* 1989;17:283-90.
2. Lim SY, Kim SA, Ahn SG, Kim HK, Kim SG, Hwang B, *et al* : Metastatic tumours to the jaws and oral soft tissues: A retrospective analysis of 41 Korean patients. *Int J Oral Maxillofac Surg* 2006;35:412-5.
3. Hirshberg A, Leibovich P, Buchner A: Metastatic tumors to the jawbones: analysis of 390 cases. *J Oral Pathol Med* 1994;23(8):337-41.
4. van der Waal RIF, Buter J, van der Waal I. Oral metastases: report of 24 cases. *Brit J Oral Maxillofacial Surg* 2003;41:3-6.
5. Shin SJ, Roh JL, Choi SH, Nam SY, Kim SY, Kim SB, *et al*. Metastatic carcinomas to the oral cavity and oropharynx. *Korean J Pathol* 2012;46:266-71.
6. Adebayo ET, Ajike SO. Report of six cases of metastatic jaw tumors in Nigerians. *Niger J Surg Res* 2004;6:30-3.
7. Hirshberg A, Shnaiderman-Shapiro A, Kaplan I, Berger R. Metastatic tumours to the oral cavity - pathogenesis and analysis of 673 cases. *Oral Oncol* 2008;44:743-52.
8. Irani S. Metastasis to the Jawbones: A review of 453 cases. *J Int Soc Prevent Communit Dent* 2017;7:71-81.
9. Rajappa S, Loya A, Rao RD. Metastasis to oral cavity: A report of two cases and review of literature. *Indian J Med Pediatr Oncol* 2005;26:43-6.
10. Irani S. Metastasis to the oral soft tissues: A review of 412 cases. *J Int Soc Prev Community Dent* 2016;6:393-401.
11. Hirshberg A, Leibovich P, Buchner A. Metastases to the oral mucosa: Analysis of 157 cases. *J Oral Pathol Med* 1993;22:385-90.
12. Kumar GS, Manjunatha BS. Metastatic tumors to the jaws and oral cavity. *J Oral Maxillofac Pathol* 2013;17:71-5.

13. Hirshberg A, Buchner A. Metastatic tumours to the oral region: An overview. *Eur J Cancer B Oral Oncol* 1995;31B:355–60.
14. Seoane J, Van der Waal I, Van der Waal RI, Cameselle-Teijeiro J, Anton I, Tardio A. Metastatic tumours to the oral cavity: A survival study with a special focus on gingival metastases. *J Clin Periodontol* 2009;36:488–92.
15. Curien R, Moizan H, Gerard E. Gingival metastasis of a bronchogenic adenocarcinoma: Report of a case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007;104:e25–8.