

Metastatic carcinoma of the Jaws: A review of literature

Akinbami B O

Department of Oral and Maxillofacial Surgery, University of Port-Harcourt Teaching Hospital, Port-Harcourt

Abstract

Introduction: Although metastatic jaw lesions are rare, clinicians must be aware of occurrence and should include them in their catalogue of differential diagnoses with a view to requesting for useful investigations that will aid timely consult and available palliative interventions. The aim of this study is to review and analyze the epidemiological behaviour of jaw metastases that have been reported in literature.

Method: The review was conducted at the Oral and Maxillofacial Department of the University of Port Harcourt Teaching Hospital. Information was obtained from articles written by various authors in Nigeria and other parts of the world and from the internet services provided by the Information and computer training centre of the University of Port Harcourt. A total of 31 articles were reviewed. The distribution, clinical manifestation at the secondary sites, investigations and treatment of the metastatic jaw diseases from the various primary sites were reviewed and documented.

Result: A total of 890 cases were reviewed, males were 402 and females were 488. The age range was 13 to 75 years with a mean age 43 years. The mandible was involved more than the maxilla. In 30% of cases, there were no symptoms at the secondary sites, lesion were detected by radiographs and scintiscanning. Other patients presented with jaw/ facial swelling and pain. The breast was the commonest primary site in females and the lung in males. Histopathology was used to confirm the metastatic lesions and 61% of them were found to be adenocarcinoma. Less than half of the cases were operable, and surgery of primary and secondary sites was combined with radiotherapy and chemotherapy in these cases. Prognosis was poor with varying survival rates.

Conclusion: Despite the fact that metastases to the jaws are rare than other bones of the body, these may be the first indication of a malignancy elsewhere in the body and this necessitates that suspected jaw swelling should be thoroughly evaluated to expedite treatment.

Keywords: Metastatic, jaws, carcinomas.

Date Accepted for publication: 11th March 2009

Nig J Med 2009; 139-142

Copyright ©2009 Nigerian Journal of Medicine

Introduction

Malignant diseases affecting any part of the body generally poses a lot of distress both physically and psychologically to the afflicted as well as a great deal of challenge to the clinician in terms of management and rehabilitation¹⁻³. These problems are however aggravated when there are regional and distant metastases supervening the primary diseases⁴. Metastatic carcinomas constitute only 1% of oral cancers.¹⁻⁷ Although, metastases to the bones of the body especially the vertebral column, ribs and long bones are common, distant spread to the jaw bones are rare or possibly, the incidence is poorly documented because the jaws are usually excluded from the radiologic skeletal survey.⁸⁻¹⁰ Other tissues/structures of the orofacial region which include the gingiva, buccal mucosa, palate and tongue can also be involved in the metastatic spread¹¹⁻¹³ but the purpose of this study is to review and analyze the epidemiological behaviour of jaw metastases that have been reported in literature.

Distribution of the Jaw Metastatic Lesions

A total of thirty-one (31) articles written over a period of forty-three (43) years were reviewed. There were a total of eight hundred and ninety (890) cases out of which 402 were males and 488 were females. The age range was 13-75years, mean of 43years and peak age of third to fifth decade. The mandible was affected in 75% of the cases, maxilla (20%) and in 5% of cases both mandible and maxilla was involved. The molar region of both jaws was mostly involved in the spread constituting 82% of the cases. A single case of metastasis to the condyle from a bronchogenic carcinoma was documented. The commonest primary sites in females were the breast, adrenal gland, colon/rectum, uterus/female genital structures and thyroid gland; while in males, commonest primary sites were the lungs, prostate, kidney, colon/rectum and bronchi. Thirty percent (30%) of the cases were asymptomatic, while swelling was reported in 70%, pain in 54%, ulceration in 52%, and bleeding in 25%. Other features documented included; mobility of teeth 48%, paraesthesia 35%, trismus 5%, cervical lymphadenopathy 14%, epistaxis 3% and pathological fracture 0.4%. Adenocarcinoma either of the follicular, papillary, or poorly differentiated type

constituted 61% while others which include squamous cell carcinoma, small or oat cell carcinoma, hepatocellular carcinoma, nephrocarcinoma, rhabdomyosarcoma, fibrosarcoma, myxoid sarcoma and osteosarcoma constituted 39%. Both primary and secondary sites were operable in 42% with varying periods of follow up. This was combined with chemotherapy and radiotherapy in responsive cases. Fifty-five (55%) cases were inoperable and they received chemotherapy combined with radiotherapy in responsive cases as well as responsive cases. Others discharged themselves against medical advice. Overall mortality rate was 76% with varying figures for 5 year and 10 year survival periods.

Table I: Showing the Distribution of Primary Sites of Malignancies in Relation to Sex in the 890 Cases

Site	Male	Female	Total
Breast	-	198	198
Lung	108	3	111
Kidney	75	35	110
Prostate	101	-	101
Colon/rectum	32	57	89
Adrenal gland	12	68	80
Thyroid	8	45	53
Uterus and FGS	-	50	50
Bronchi	21	4	25
Liver	16	7	23
Testis	17	-	17
Stomach	5	8	13
Oesophagus	3	9	12
Soft tissue	2	0	2
Femur	1	1	2
Tibia	1	1	2
Nasopharynx	0	1	1
Parotid gland	0	1	1
TOTAL	402	488	890

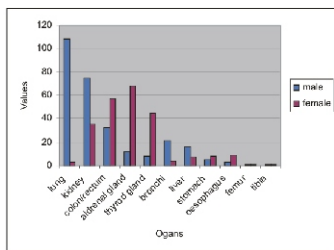


Figure1: Chart Representing the Distribution of the Primary Sites Common to Both Sexes

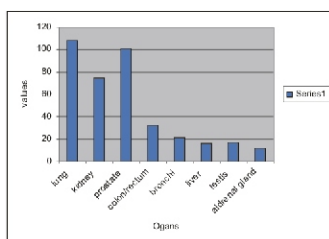


Figure 2: Chart Representing the Distribution of the Prevalent Primary Sites in Males

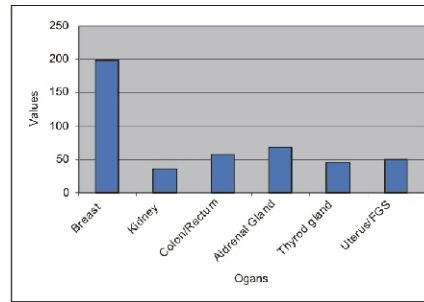


Figure3: Chart Representing the Distribution of the Prevalent Primary Sites in Females

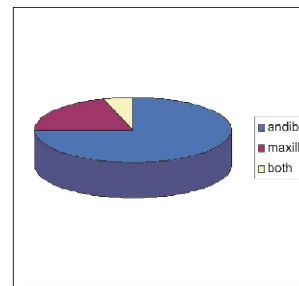


Figure 4: Chart Representing the Distribution of the Metastases in the Jaws

Aetiopathogenesis and Path of Spread

Metastatic cancers of the jaws constitute only about 1% of the malignant diseases of the jaws.¹⁻⁷ Secondary malignant tumors are commoner in the lower jaw (mandible) than the maxilla because more red marrow is present in the mandible. Available information about the prevalent sites of involvement by the secondary spread showed that posterior part of the mandible and maxilla are the most involved site because of the rich vascular hematopoietic tissue of these regions.⁶⁻¹² Overall analysis of the incidence of these malignancies in the articles reviewed shows a higher figure for females than males. Primary sites of these tumours include the breasts, kidney liver, kidneys, prostate, thyroid gland, colon/rectum, adrenal glands and so on. Thyroid, stomach, esophageal cancers are commoner in females and these account for higher metastatic rates.¹³⁻¹⁵ Chronic gastritis, peptic ulcer diseases, iron deficiency/ Plummer-Vinson's and connective tissue diseases are common predisposing factors in females.¹⁶⁻¹⁹ Similarly, the higher figures for lung, bronchi and liver metastases in men reflects the more prevalent rates of these cancers in the male gender with higher smoking tendencies.²⁰⁻²² Cancers of the prostate and testis; as well as those of the breast and female genital structures are peculiar to the specific gender respectively and metastases from these organs have a high predilection for the jaws.²³⁻²⁴

As widely known, the aetiology of these cancers is not well understood but genetic mutations and alterations in the balance of the activities of both the oncogenes and tumour suppressor genes have been fully documented.^{3,4}

25

There are 2 paths of haematogenous spreads of the metastatic lesions. The first is via the inferior vena and its tributaries from the organs in the abdomen and pelvis as well as via the superior vena from the organs in the head and neck. Metastatic spread through these great veins reach the lungs before getting to the jaws, however there are cases where the jaws are the first depots of metastases, and that shows that there is a probability of metastatic tissue in the blood stream not implanting in the lung tissues which may perhaps be due to the high pressure flow within the large caliber vessels.^{26,27} However, this direct spread to the jaws may also be explained by the presence of the second path which is the connection between the azygous/ hemiazygous veins and the non-valvular vertebral venous plexus (Batson's plexus).²⁶⁻²⁸

Evaluation of Metastatic Jaw Swellings

Metastatic lesions of the jaws can manifest like odontogenic infections and other diseases in the orofacial region and clinicians must have a high index of suspicion.^{5-9, 29} These lesions present with swelling of either the jaws or the mucosa, moderate to severe pain, altered sensation, progressive mobility and tenderness of tooth/teeth, non-healing ulcerations and bleeding from the lesion or the gums, epistaxis or pathological fractures.^{7-13,30} However these features are preceded by clinical manifestations of the cancers in the primary sites, although jaw involvement may be the first clinical manifestation of these diseases.^{8-11, 31} In 30-40% of cases as seen in the review, the jaw metastases are asymptomatic. Apart from the clinical presentations, the cases were diagnosed by identifying the tissues of the primary origin when biopsies of the secondary sites were done especially in well-differentiated lesion. In most cases of poorly differentiated lesions, it was difficult to specify/recognize tissue from the primary site. Additional investigations that were done include serum biochemistry for electrolytes and tumour markers, skeletal survey, ultrasound and scintiscanning.²⁰⁻²⁷

Treatment Modalities and Prognosis of Metastatic Jaw Lesions

Various forms of treatment were reported by many authors.¹⁻³¹ These include surgical excision at the primary and secondary sites, radiotherapy, chemotherapy and

hormone therapy. In some cases of excessive bleeding following excisions, external carotid ligation and selective embolization were done.¹³⁻¹⁸ In the management of these metastatic lesions to the jaws, hemorrhage has been reported as one of the problems that complicate surgical excision of jaws especially in tumours from the lungs and liver, such tumours were found to respond better to radiotherapy rather than surgery¹⁸. Problems of reconstructions, recurrence and low survival rate are also contending issues in the management of these cases based on the fact that many of these patients either present very late or appropriate diagnosis could not be made promptly. However for younger patients and those that present early, aggressive treatment which include radical conventional or laser excision of both the primary and secondary sites, combined with radiotherapy, chemotherapy, hormone therapy and gene therapy. Interferons are possible interventions to improve the prognosis of the diseases. Metastases to the jaw bones have a poor prognosis and a survival rate of less than 1 year.

Role of Biphosphonates

Biphosphonates were used to control severe pain in some cases, biphosphonates are potent inhibitors of osteoclastic function and survival, preventing bones resorption and pain transiently.¹² However some of these drugs were reported to cause osteonecrosis of the jaws.

Conclusion

Despite the fact that metastases to the jaws are rare than other bones of the body, the fact that these may also be the first indication of a malignancy elsewhere in the body necessitates that suspected jaw swellings should be thoroughly evaluated to expedite treatment. Generally, there is dearth of information on the incidence of metastatic jaw cancers in Nigeria and black Africa probably due to the fact that majority of the metastases do not manifest at the early stages with jaw swellings, coupled with the fact that routine skeletal surveys are not done. Even in cases where this is requested, appropriate maxillofacial views that will aid consult and interpretation does not form part of the request, another reason is the problem of thorough and detailed clerking, as well as lack of proper documentation and record-keeping in our hospitals. Therefore, clinicians must be highly suspicious of the possibility of jaw bone metastases and appropriate diagnostic protocol/ multidisciplinary approach to management of these lesions must be adopted.

References

1. Tamiolakis D, Tsamis I, Thomaidis V, Lambropoulou M, Alexiadis G, Venizelos I, et al. Jaw bone metastases: four cases. *Acta Dermatoven APA* 2007; 16: 21-25.
2. Harrison D, Lund VJ. *Tumours of the upper jaw*. New York: Churchill Livingstone, Longman 1993; 673-677.
3. Van der Waal RIF, Buter J, Van der Waal I. Oral metastases: report of 24 cases. *Br J Oral Maxillofac Surg* 2003; 41: 3-6.
4. Zachariades N, Kumoura F, Vairaktaris E, Mezitis M. Metastatic tumours to the jaws; a report of seven cases. *J Oral Maxillofac Surg* 1989; 47: 991-996.
5. Yun- Hoajung, Bong-Hae, Kyuung- Soo N. *Korean J Oral Maxillofac Radiol* 2004; 34:195-197.
6. Herseberg A, Leibovich P, Buchnor A. Metastatic tumours to the jaw bones: analysis of 390cases. *J Oral Pathol Med* 1994; 23: 337-341.
7. Antonto AA, Antonto PA. Gnathic bone metastases: a retrospective study of 10 cases. *Rev Bras Otorhinolaryngol* 2008; 74:561-565.
8. Heslop I.H. Secondary neoplasia of the Jaws. *Br.J Oral Surg* 1964;2: 47-48.
9. Md Shumim A, Rakish B, Nazoora k, Zuber A, Nishat A. Metastatic Mandibular Adenocarcinoma. *JACM* 2007; 8:196-198.
10. Jones D. Adenocarcinoma of the esophagus presenting as mandibular metastasis. *J Oral Maxillofac Surg* 1989; 47 504-507.
11. Ajike S.O, Adebayo E.T. Report of six cases of metastatic jaw tumours in Nigeria. *Nigerian Journal of Surgical Research*.2004; 2: 30-33.
12. Clausen, Paulsen H. Metastatic carcinoma to the jaws. *Acta. Pathol, Microbial. Immunol scand* 1983; 57: 361-364.
13. Meyer HL Shklar G. Malignant tumours metastatic to the mouth and jaw. *Oral Surg* 1965; 20:350-352.
14. Batsakis JG. *Tumours of Head and Neck*. Baltimore: Williams and Wilkins, 1979.
15. Yaser F, Lanmaz D, Akgunlu F. Mandibular Metastasis in a patient with lung adenocarcinoma. *Dentomaxillofac Radiol* 2006; 35: 383-385.
16. Anil S, Lal PM, Gill DS, Beena VT. Metastasis of thyroid carcinoma to the mandible. *Australian Dental Journal* 1999; 44: 56-57
17. Kaveri H, Punnya VA, Amsavardani ST. Metastatic thyroid carcinoma to the mandible. *J Oral Maxillofac Pathol* 2007; 11: 32-34.
18. Lim SY, Kim SA, Ahn SG, Kim SG, Kim HK, Hwang B, et al: A retrospective analysis of 41 Korean patients. *Int J Oral Maxillofac Surg* 2006; 35: 412-415.
19. Gregorio SA, Penin AG, Pages R, Moreno. Tumours metastatic to the mandible. Analysis of 9 cases and review of the literature. *J Oral Maxillofac surg* 1990; 48: 296-251.
20. Carrol KO, Krols SO, Mosca NG, Jackson E: Metastatic carcinoma to the mandible: Report of 2 cases. *Oral Surg Oral Med Oral Path* 1993; 76: 368-374.
21. Peacock TR, Fleet JD. Condylar metastasis from bronchogenic carcinoma. *Br J Oral Maxillofac Surg* 1982; 20:39-41.
22. Shankar S. Dental pulp metastasis and pan-osseous mandibular involvement with mammary adenocarcinoma. *Br J Oral Maxillofac Surg* 1984; 22: 455-457.
23. Bodner L, Vardy NS, Geffen DB, Nash M. Metastatic tumours to the jaws: a report of 8 new cases. *Med Oral Pathol Cir Bucal* 2006; 1:132-135.
24. Da Silva NJ, Summerlin DJ, Cordell KG, Abdelsayed RA, Tomich CE, Hanks CT, et al. Metastatic tumours in the jaws, a retrospective study of 114 cases. *J Am Dent Assoc* 2006; 137: 1667- 1672.
25. Gratz KW, Sailer HF, Makek M. Osseous metastases in upper and lower jaws. *Dtsch Z Mund Kiefer Gesichtsch* 1990; 14:122-131.
26. Wu YT. Metastatic carcinoma to the oral tissues and jaws- study of 25 cases. *Zhonghua kou Qiang Yi Xue Za Zhi* 1990; 25: 258-261.
27. Rodrigues G. Metastatic Osteosarcoma to the maxilla. *Kuwait Medical Journal* 2003; 35: 219-221.
28. Singh HB, Singh H, Chakraborty M. Metastatic osteosarcoma of the maxilla. *J Laryngol Otol* 1978; 92: 619-622.
29. Zaninato S, Porta C, Moroni M, Natasi G. Jaw bone metastases from hepatocellular carcinoma. *Hal J Gastroenterol Hepatol* 1997; 29: 478-479.
30. Li R, Walvekar RR, Nalesnik MA, Gamblin TC. Unresectable hepatocellular carcinoma with a solitary metastasis to the mandible. *The American Surgeon* 2008; 74: 346-349.
31. Ohba T, Katayama H, Nakagama E, Takeda N. Mandibular metastasis of osteogenic sarcoma- report of a case. *Oral Surg Oral Med Oral Path* 1975; 39: 821-825.