Ameloblastic Carcinoma: A Multicenter Nigerian Study

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Purpose: To obtain a national profile on the prevalence and management of ameloblastic carcinoma in Nigerians.

Materials and Methods: Data were collected from the case files of patients with a histologic diagnosis of ameloblastic carcinoma from 4 tertiary referral centers in Nigeria from January 1980 to December 2008.

Results: Twenty patients were seen within the study period. There were 11 male and 9 female patients, with a male-to-female ratio of 1.2:1. Their ages ranged from 16 to 85 years (mean ± SD, 41.63 ± 19.8 years). The duration of the lesion before presentation was 6 months to 4 years. Twelve cases occurred in the posterior mandible alone, 1 case occurred in the anterior mandible alone, and 4 cases involved the anterior and posterior mandible. The posterior part of the maxilla was involved in 3 cases. A majority of the cases (17) occurred de novo, and 3 patients presented with carcinoma ex-ameloblastoma. Treatment included surgical resection with or without neck dissection. Eight patients declined treatment after diagnosis. Surgery was planned for 12 patients, but 2 patients died of intractable bleeding episodes before surgery. Mandibulectomies and maxillectomies were performed for 10 patients. Follow-up was carried out for 5 patients. Recurrence ranged from 6 to 96 months after the first surgery. Overall deaths recorded involved 6 patients. Three patients died within 3 years after the initial surgery and 1 patient died about 8 years after the initial surgery. One patient is still alive and well 1 year after surgery.

Conclusion: Ameloblastic carcinoma is an uncommon malignancy. Most cases occur in the mandible and arise de novo. Early diagnosis and radical local excision remain the mainstay of treatment.

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Ameloblastic carcinoma belongs to the family of malignant epithelial odontogenic tumors.[1] In the updated World Health Organization classification of odontogenic tumors,[2] it is referred to as an exceptionally rare malignant lesion of the jaws and refers to any ameloblastoma with histologic features of malignancy in the primary or recurrent tumor regardless of whether it has metastasized (Table 1). The tumor shows features of bizarre mitosis, varying degrees of cellular and nuclear atypia (Fig 1), and may arise de novo (primary type) or by malignant transformation of an existing ameloblastoma (secondary type).

The etiology is largely unknown for primary and secondary tumors. However, the hypermethylation of cytosine-guanine islands of the p16 gene of the tumor

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Table 1. WORLD HEALTH ORGANIZATION CLASSIFICATION OF ODONTOGENIC CARCINOMAS

Metastasizing (malignant) ameloblastoma
Ameloblastic carcinoma
Primary type
Secondary type (dedifferentiated) intraosseous
Secondary type (dedifferentiated) peripheral
Primary intraosseous squamous cell carcinoma
Solid type
Derived from keratocystic odontogenic tumor
Derived from odontogenic cysts
Clear cell odontogenic carcinoma
Ghost cell odontogenic carcinoma

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cells has been suggested as a possible cause of malignant change.[3]

Clinically, the primary type has been described as an aggressive tumor with bleeding, ulceration, and local destruction of tissues.[4,5] It can occur at any age, with no gender predilection. Radiographic features are consistent with that of ameloblastoma except for the occasional presence of some focal radiopacities.[6]

Although ameloblastic carcinoma is said to be rare, ameloblastoma remains the commonest odontogenic tumor in Nigeria and indeed the West African subregion, where it accounts for about 6% of oral tumors.[1] Apart from the report by Oginni et al[7] in 2003 from Nigeria, there has not been any other report of this condition from West Africa to the best of our knowledge. Therefore, this study was undertaken to obtain a national profile of the prevalence and management of ameloblastic carcinoma in Nigeria.

Materials and Methods

This retrospective study recruited all patients who presented with ameloblastic carcinoma in 5 Nigerian teaching hospitals from January 1980 to December 2008. These hospitals are the Obafemi Awolowo University Teaching Hospital, Ile-Ife; University College Hospital, Ibadan; Lagos University Teaching Hospital Idi-Araba, Lagos; Ahmadu Bello University Teaching Hospital, Kaduna; and the University of Maiduguri Teaching Hospital, Maiduguri. These centers are located in the southwest, north central, and northeast in Nigeria.

Patients' demographics and the duration of lesion, site of involvement, nature of presentation (de novo or ex-ameloblastoma), and the treatment given were retrieved from hospital records. Data were analyzed using descriptive statistics.

Results

Twenty patients were seen within the study period. There were 11 male and 9 female patients, with a male-to-female ratio of 1.2:1. Their ages ranged from 16 to 85 years (mean ± SD, 41.63 ± 19.8 years; median, 34 years). Sixty percent of patients were within the second to fourth decades of life.

Twelve cases occurred in the posterior mandible alone, 1 case occurred in the anterior mandible alone, and 4 cases involved the anterior and posterior mandible. The posterior part of the maxilla was involved in 3 cases. A majority of cases (17) occurred de novo, whereas 3 patients presented with carcinoma ex-ameloblastoma. The duration of the lesion before presentation in the hospital was 6 months to 4 years.

Treatment was by surgery with or without neck dissection. Mandibulectomies or maxillectomies were performed in 10 patients. Eight patients did not continue with treatment after diagnosis. Two patients died of intractable bleeding episodes before surgery. Of the 10 patients who had surgery, follow-up records were available for only 5 patients. Time to recurrence ranged from 6 to 48 months after the first surgery. Three patients died within 3 years after the initial surgery, 1 patient died about 8 years after the initial surgery, and 1 patient's follow-up is in progress (Table 2).

Discussion

Ameloblastic carcinoma is a rare malignancy. This is confirmed by the present study. Despite the relatively high prevalence of ameloblastoma in Nigeria,[5,7] only 20 cases of ameloblastic carcinoma were reported

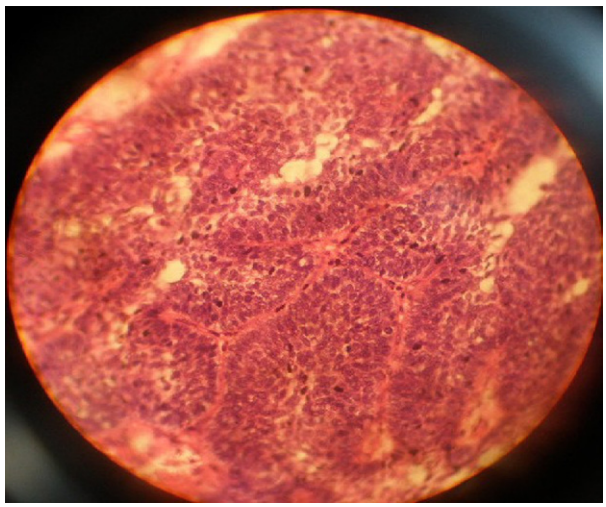

FIGURE 1. Photomicrograph of ameloblastic carcinoma (hematoxylin and eosin, magnification ×60).

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Table 2. SUMMARY OF THE PATIENTS' CLINICAL PROFILE

Patient No.	Age (yr)	Gender	Location	Treatment	TOR/mo	TOD/mo	Current Status
1	16	M	Anterior mandible	Partial mandibulectomy	—	—	—
2	16	F	Posterior mandible	Partial mandibulectomy	—	—	—
3	23	M	Posterior mandible	Partial mandibulectomy	No recurrence after 6 mo	—	—
4	24	M	Posterior mandible	Declined	—	—	—
5	25	F	Posterior mandible	Declined	—	—	—
6	27	M	Posterior mandible	Declined	—	—	—
7	31	F	Posterior mandible	Partial mandibulectomy	—	—	—
8	32	M	Anterior/posterior mandible	Hemimandibulectomy/neck dissection	No recurrence after 12 mo		Alive
9	33	F	Posterior mandible	Declined	—	—	—
10	34	M	Anterior/posterior mandible	Partial mandibulectomy	10	18 mo	Dead
11	34	F	Posterior mandible	Declined	—	—	—
12	36	F	Anterior/posterior mandible	Preoperative blood transfusion			Dead
13	39	M	Posterior mandible	Declined	—	—	—
14	49	M	Posterior mandible	Partial mandibulectomy	—	—	—
15	60	F	Posterior maxilla	Preoperative blood transfusion			Dead
16	61	F	Posterior maxilla	Partial maxillectomy	15	33 mo	Dead
17	65	M	Anterior/posterior mandible	Total Mandibulectomy	48	96	Dead
18	65	M	Posterior mandible	Declined	—	—	—
19	70	M	Posterior maxilla	Partial maxillectomy	12	28	Dead
20	85	F	Posterior mandible	Declined	—	—	—

Abbreviations: —, unavailable record; F, female; M, male; TOD, time to death from disease; TOR, time to recurrence.

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within the study period. About 85% of cases recorded in this study occurred de novo. This is consistent with reports from other parts of the world.[4,8] Ameloblastic carcinoma has been reported to affect a wide range of age groups. In the present study the median age of patients was 34 years and over half of these patients were younger than 40 years. This age group corresponds roughly to the peak age incidence of ameloblastoma in Nigeria,[9,10] but contrasts with the median age of 44 years reported by Benlyazid et al[4] in their review of 6 published cases of ameloblastic carcinoma. Although this condition generally affects male and female patients alike, the present study recorded a slight male predilection, which agrees with other reviews.[4,11]

Ameloblastic carcinoma occurs more frequently in the mandible than in the maxilla.[4,6] In the present study, over three fourths of cases occurred in the mandible. Although most studies agree that the clinical behavior of ameloblastic carcinoma[4,6,7] is not fully understood, the clinical behavior of this disease based on the findings of this series is that it is an aggressive local lesion. Although recurrences in the present study were essentially restricted to local tissues, some studies have recorded widespread metastasis to the lungs and bone through the lymphatics[11,12] and bloodstream. Metastatic lesions arising from ameloblastic carcinoma show malignant histologic features similar to those of the primary site. These lesions should be distinguished from metastatic ameloblastoma, which is defined as a histologically benign-appearing ameloblastoma with metastasis.[13] The lungs have been reported to be the most common site (75% to 88% of cases) for metastatic ameloblastoma, probably from aspiration. Other sites include the lymph nodes (15% to 27% of cases), liver, brain, bones, kidneys, and intestine.[14]

There is no consensus of opinion on the best treatment modality for ameloblastic carcinoma. Although all the reports agree on radical local excision,[4,6,7,15] some authorities have included neck dissection and radiotherapy[5] as adjuncts to local surgery. Surgery was the treatment of choice for the patients in the present study. Neck dissection was performed in 1 patient and, despite the late presentation (4 years), the submandibular lymph nodes were free of tumor (Fig 2).

Local recurrences were attributed to the difficulty in completely eliminating the malignant cells as they invaded soft tissues due to late presentation. Patient follow-up was a major problem in the present study because 75% of patients were lost to follow-up. This is likely due to ignorance and poverty in a developing country.

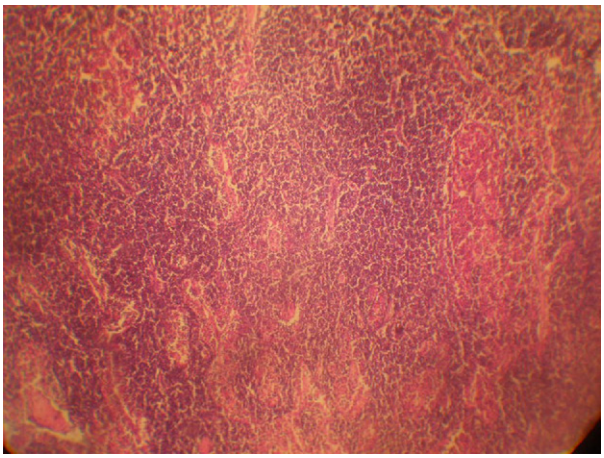

FIGURE 2. Right submandibular lymph node of a patient with ameloblastic carcinoma of 4-year duration showing no evidence of metastasis (hematoxylin and eosin, magnification ×60).

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In conclusion, ameloblastic carcinoma is a rare malignancy. The long-term follow-up findings from the present study suggest that recurrence of this lesion is common. Reports of a 5-year survival term from most studies and even from the present study are inconclusive because of poor follow-up. Therefore, early diagnosis and radical local excision remain the best choice of treatment. However, it appears that a great majority of patients with ameloblastic carcinoma would die from local recurrence or distant metastasis.

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