

A rare case of maxillary ameloblastoma with lung metastasis: a case report

Karpal Singh Sohal (✉ karpal@live.com)

Muhimbili University of Health and Allied Sciences <https://orcid.org/0000-0001-5214-6843>

Salvatory M Mlaga

Hubert Kairuki Memorial University

Edda A Vuhahula

Muhimbili University of Health and Allied Sciences

Case Report

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Abstract

Background Ameloblastomas are low-grade neoplasms of odontogenic epithelium that account for about 1% of all oral tumours and about 10% of odontogenic tumours. Rarely, these tumours have a potential of distance metastasis, and once they do metastasize, they are termed as metastatic ameloblastoma. **Case presentation** A 24-year-old African man presented with a massive swelling on the right side of the face for 2 years in 2018. He was previously operated for a swelling in the right side of the maxilla in 2012, which was histologically diagnosed as ameloblastoma. Clinical and radiological evaluation revealed a massive maxillary tumour that had a local extension to the brain. X-ray and CT scan of chest pointed out to metastatic mass in the lungs. Histology of the recurrent tumour mass revealed it to be follicular ameloblastoma and CT-guided fine-needle aspiration cytology of the lung mass showed microscopic features of ameloblastoma similar to primary jaw tumour. **Conclusion** A Close and long-term follow-up is mandatory in patients diagnosed with ameloblastoma even years after primary resection.

Background

Ameloblastomas are low-grade neoplasms of odontogenic epithelium that account for about 1% of all oral tumours and about 10% of odontogenic tumours [1]. They commonly occur in the mandible and involvement of the maxilla is reported to be about 20% [2, 3]. Although they are considered to be benign tumours with a slow growth rate, they are locally aggressive with a high tendency for local recurrence if not removed completely [1, 4]. Rarely, these tumours have the potential of distance metastasis [3], whereby this phenomenon is associated with a prolonged tumour duration and multiple recurrences following surgical interventions [2]. When histologically benign-appearing ameloblastoma does metastasize, it is referred to as metastatic ameloblastoma [5]. According to 2005 WHO classification, metastatic ameloblastoma was classified as a malignant odontogenic tumour, however, in 2017 WHO classification, it was moved to the benign ameloblastoma subtypes [6].

The management of metastatic ameloblastoma is challenging partially due to its rarity [7]. The treatment options include close observation, surgical resection, and chemotherapy/radiotherapy [8]. Generally, if the metastatic lesions are resectable, then surgery is the treatment of choice, but for inoperable cases, radiotherapy and/or chemotherapy may be used despite unpredictable and poor results [7, 9, 10].

Herein, we describe a very rare case of maxillary ameloblastoma that had metastasized to the lungs. We describe the challenges in the diagnosis and management of such cases in a developing country setting.

Case Presentation

A 24-year-old African man presented to our institute in December 2018 with a complaint of a swelling on the right side of the face for about 2 years. The patient reported that the swelling had started spontaneously as a painless nodule around the region of right cheek in 2016, and it gradually, but consistently increased in size resulting in obvious facial deformity. In about a year, the swelling was

involving the entire right side of the face and started to become painful. The pain was localized and dull in nature. By mid-2018, the swelling extended to involve the right eye causing it to be pushed up and outwards, but there was no loss of vision. This was followed by an outward extension of the swelling around the region of the right cheek, which later ulcerated and started to bleed. The patient also reported that in 2012, he was admitted to our hospital due to a swelling in the right side of the upper jaw which was surgically treated.

Clinical examination of the patient revealed a young man, who was sick looking, slightly wasted and pale. He was well oriented to his surroundings. On local examination, the patient presented with facial asymmetry due to a massive irregular exophytic mass on the right side of the face that measured approximately 23 by 14 centimetres. The overlying skin was hyperaemic and shiny with an area of ulceration. There were visible surgical marks of previous surgery as well. The right eye was displaced superiorly and outwards, however, the vision was not lost. The nose was displaced towards the left side, with occlusion of the right nostril. The overstretched overlying skin had a normal temperature and could not be folded. The swelling was mildly-tender, firm and fixed to the underlying structures. There was an ovalish outgrowth/extension of the swelling at its lower border which was ulcerated and was profusely bleeding.

Intraorally, the lesion was occupying the entire right side of the upper jaw extending just a few millimetres beyond the midline to the left side of the palate. The lesion was oval in shape, with an otherwise hyperaemic overlying mucosa. Based on these clinical findings a provisional diagnosis of low-grade sarcoma was made.

The workup done on the patient included haematological investigations, radiological investigations and histopathological analysis of the tissue. The complete blood count result was normal, except that he had low levels of haemoglobin (7.1 g/dl). The liver function test and renal function tests were within normal ranges. Initial radiological investigations included a computed tomography scan (CT scan) of the head and neck region and chest x-ray. The CT scan images revealed a massive heterogeneous lesion that caused destruction of the cortical plate with an extension to the anterior cranial fossa (Fig. 1a and b). The chest x-ray showed features of lung metastasis (Fig. 2a). A wedge biopsy from the lesion revealed it to be follicular ameloblastoma (Fig. 3a and b). The biopsy results of the previously operated lesion were traced and they were also indicative of follicular ameloblastoma. Due to its clinical aggressive nature, a panel of oral and maxillofacial surgeons requested another tissue biopsy to be taken which was reviewed by a panel of different pathologists and similar results were obtained. Immunohistochemistry for Ki 67 revealed an aggressive tumour with 60–80% reactivity in neoplastic cells (Fig. 4). A chest CT scan (Fig. 2b) was taken and a CT guided fine needle aspiration cytology of the lung mass was performed. The results of the aspirates were indicative of ameloblastoma as well (Fig. 5). The final diagnosis was thus metastatic ameloblastoma.

Due to unresectability of the primary lesion, the patient was presented in the tumour board and planned for palliative chemo-radiotherapy in February 2019. The patient was referred to us in April 2019, following

episodes of profuse bleeding per oral cavity after receiving 3 cycles of chemotherapy and radiotherapy. Haematological investigation revealed pancytopenia. He received 4 units of whole blood and was returned to the cancer institute for further management.

Discussion And Conclusion

Metastatic ameloblastoma refers to a lesion that metastasizes to a distant organ but the histology of both primary and metastatic tissues is benign [11]. It is an infrequent entity, accounting for approximately 2% of ameloblastoma cases [12]. The commonly reported site for metastasis includes the lungs, cervical lymphnodes, diaphragm, liver, brain and bone [5]. The lung is the most common site for metastasis, and in approximately 80% of the cases, the primary site is the mandible [4]. The case which has been presented here is considered rare not only because of being metastatic ameloblastoma but also due to the fact that maxilla was the primary site.

The mechanism by which a histologically benign-looking lesion spreads to a distant organ is unclear [13]. Proposed mechanisms of metastatic spread include hematogenous and lymphatic routes and aspiration of tumour cells from the primary oral lesion [4, 13, 14]. Another possible mode of metastasis is tumour implantation during surgical procedures [8]. In the current case reported, direct implantation of tumour cells in the lung and aspiration from the endotracheal tube during previous surgery (hemimaxillectomy) cannot be ruled out.

Metastatic ameloblastoma may occur at any age, ranging between 5 and 94 years [13, 15]. However, the 3rd decade of life seems to be the most affected age group [8, 10, 12, 16, 17]. The number of years between the diagnosis of the primary tumour and metastases varies between 0 and 15 years [15]. In the case presented here, the patient presented with a primary tumour at the age of 17 years, and at the age of 24 years, he developed metastasis. This falls within the same range of time as documented in the literature.

Our patient did not have any signs or symptoms that could raise suspicious of lung metastasis, unlike in case reported by Rabo et al. [8] in which the patient had intermittent, non-radiating, sharp and piercing upper back pains. It was the clinical behaviour of the tumour (i.e. painful, bleeding and highly invasive) that did not match with histological diagnosis of ameloblastoma that led to further workup including a chest x-ray and CT scan. These investigations led to the identification of a lesion on the chest raising suspicion of metastasis that was later confirmed by cytology. The diagnosis of metastatic ameloblastoma is almost always made retrospectively after metastasis has occurred and not otherwise [14]. It is difficult to predict which cases would metastasize and which would not, and this is among the challenges in managing these lesions.

Histopathologically, it is difficult to differentiate between metastatic ameloblastoma and non-metastatic ameloblastoma, however, there are specific markers that show strong positivity in metastatic ameloblastoma [4, 18, 19]. Immunohistochemical markers that are strongly positive in ameloblastoma but not in metastatic ameloblastoma include extracellular-signal-regulated kinase 5 (ERK-5) and KRSA,

whereas, N-terminus-truncated p73 isoform (Δ Np73) was reported to be found in 100% of metastatic ameloblastomas [19]. In the current reported cases, however, these investigations could not be carried out due to reasons such as unavailability of reagents for carrying such investigations and the cost of acquiring these reagents. Immunohistochemistry for Ki 67 was done, however, it does not specifically point out to metastatic ameloblastoma but rather indicates local invasiveness and recurrences of ameloblastoma, thereby its prognosis [20, 21].

There is no therapeutic gold standard for treating metastasizing ameloblastoma due to the small number of cases reported [18]. Radical surgery remains the mainstay of therapy, while the role of chemo- and radiotherapy still is yet to be defined [10, 18]. In some cases, surgery has been successfully combined with additive and adjuvant radiotherapy [10]. Radiotherapy has been recommended for inoperable metastatic deposits, but because the response is unpredictable, it is used only for palliative care [8]. In the case reported herein, surgery could not be done as the tumour had already extended to the cranium, thus palliative chemo-radiotherapy was chosen, which, however, showed no significant benefit. Since surgery was not done, the prognosis was expected to be poor, as it has been reported that with adequate resection and radiotherapy, the median survival is 6 years compared to 2 years when resection is not done [17].

There may be a role for routine annual chest x-rays when assessing patients with ameloblastomas [22], however, in our case, this could not be done as the patient did not turn up for follow-up clinics after the first surgery, and only came back with a huge tumour 6 years later. Delay in seeking health care and failure to attend the follow-up clinics is attributed mainly to financial difficulties that most of the patients in developing countries face [23].

Conclusion

This case reports a rare case of maxillary ameloblastoma that metastasized to the lungs. Metastatic ameloblastoma is a rare tumour characterized by an indolent clinical course. It is difficult to predict metastasis, even with adequate surgery of the primary lesion. Close and long-term follow-up is mandatory in patients diagnosed with ameloblastoma even years after primary resection since there is no clear protocol to prevent or detect metastatic ameloblastoma.

Abbreviations

CT scan: Computed tomography scan; ERK-5 = extracellular-signal-regulated kinase-5; WHO = World Health Organization.

Declarations

Consent for publication

Written informed consent was obtained from the patient for the publication of the case report and accompanying images.

Availability of data and materials

The complete data and materials described in the case report are freely available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests with regards to authorship and/or publication of this paper.

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Authors' contributions

KSS aided the process of patient's information collection, performed the clinical and radiographic examinations and drafted and edited the manuscript. SMM contributed in writing and editing of the manuscript. Performed the histological analysis of the tissue samples. EAV broadened the conceived idea, performed histological analysis of the samples and contributed in the editing of the manuscript. All authors contributed to final critical revision of the manuscript, and have read and approved the final manuscript.

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Figures

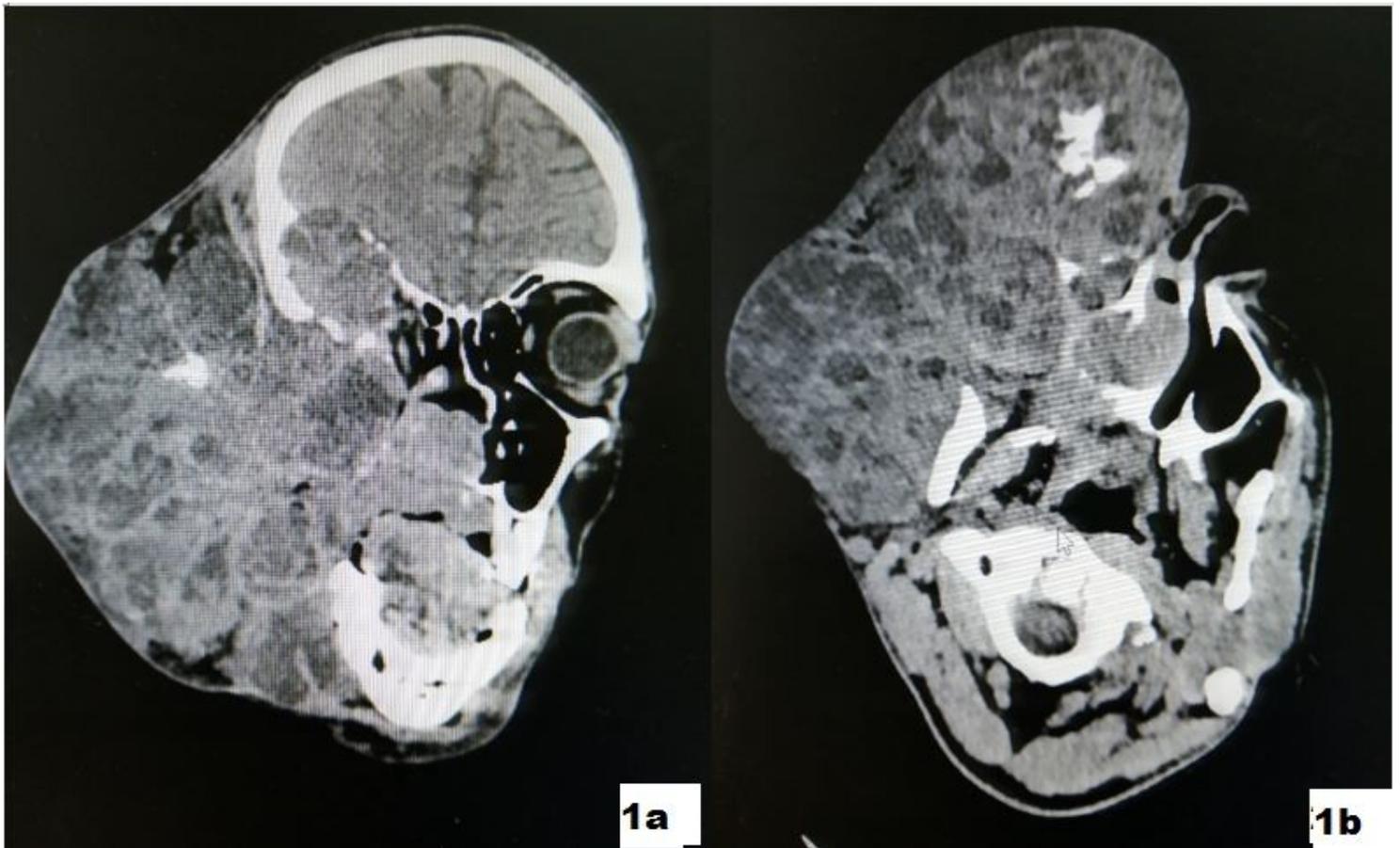


Figure 1

Computed tomography (CT) scan appearance of the maxillary lesion. (a) Coronal CT scan demonstrates a heterogeneous soft tissue mass, originating from the maxilla, involving the right maxillary sinus and the orbital roof, and extending into the cranial fossa. (b) axial CT scan showing a huge heterogeneous soft tissue mass causing destruction of the walls of the maxillary sinus and displacing the nasal septum to the left.

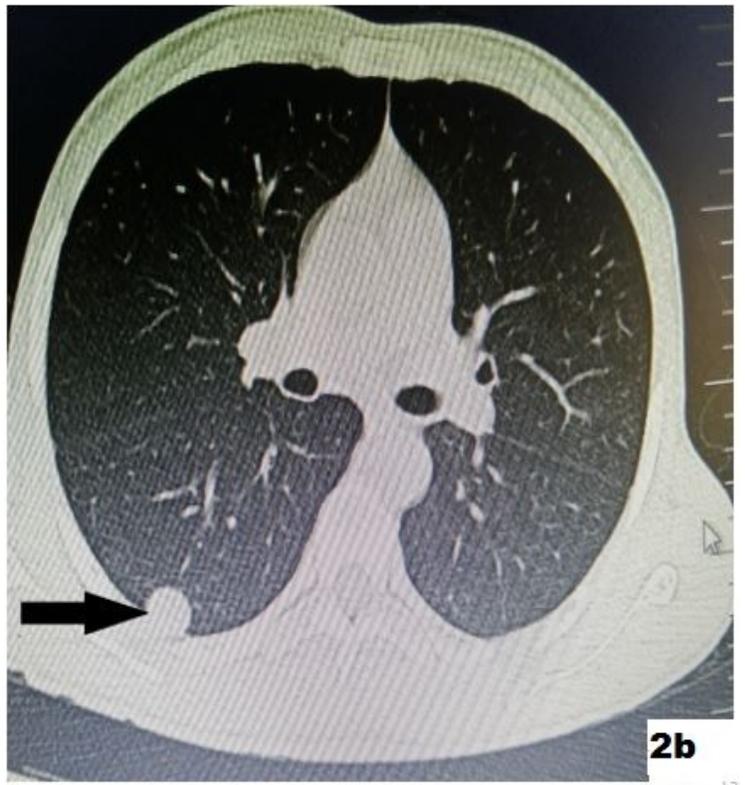
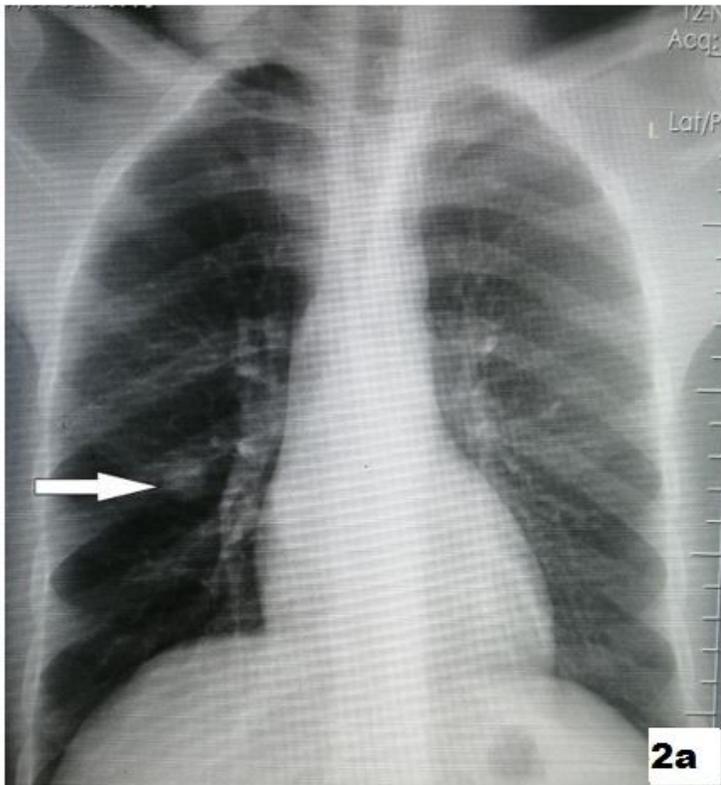


Figure 2

Chest X-ray and CT scan of the metastatic lesions. (a) X-ray showing a solitary nodular opacity in the middle zone of the right lung (white arrow). (b) CT showing soft tissue mass in the posterior aspect of the right lung presenting as a nodule (black arrow).

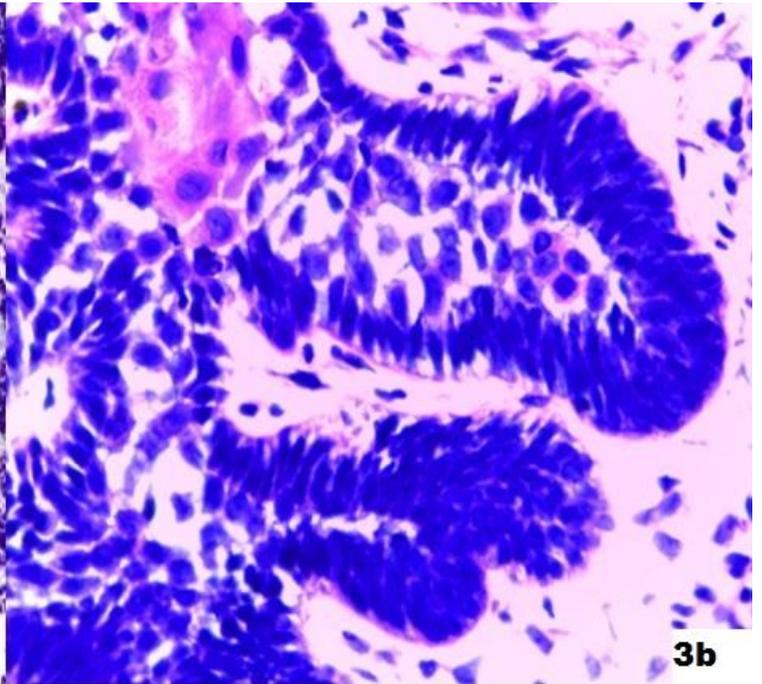
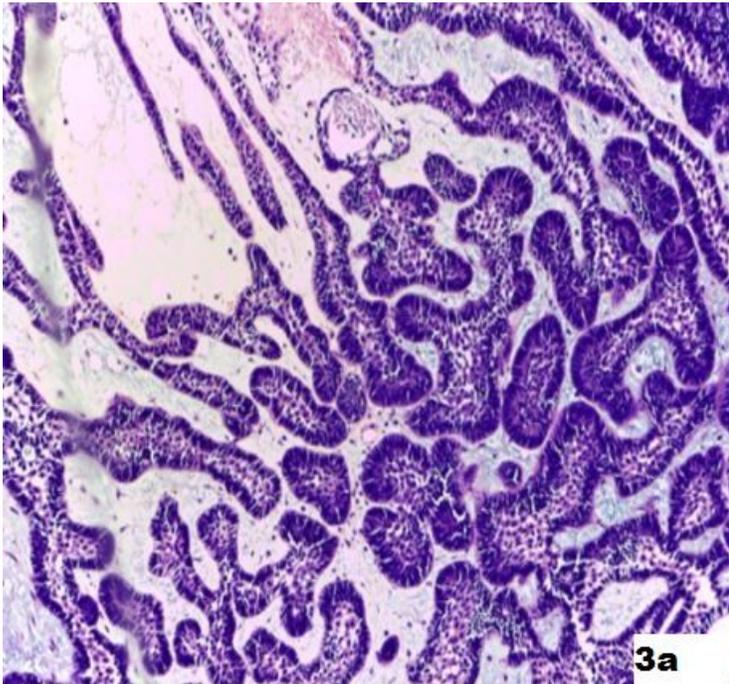


Figure 3

Histopathological images (H& E) of the maxillary lesion: (a) Islands of odontogenic epithelium with peripheral palisading and stellate reticulum at the centre (magnification x10). (b) foci of abnormal mitoses in both the peripheral palisading cells and the central stellate reticulum (magnification x40).

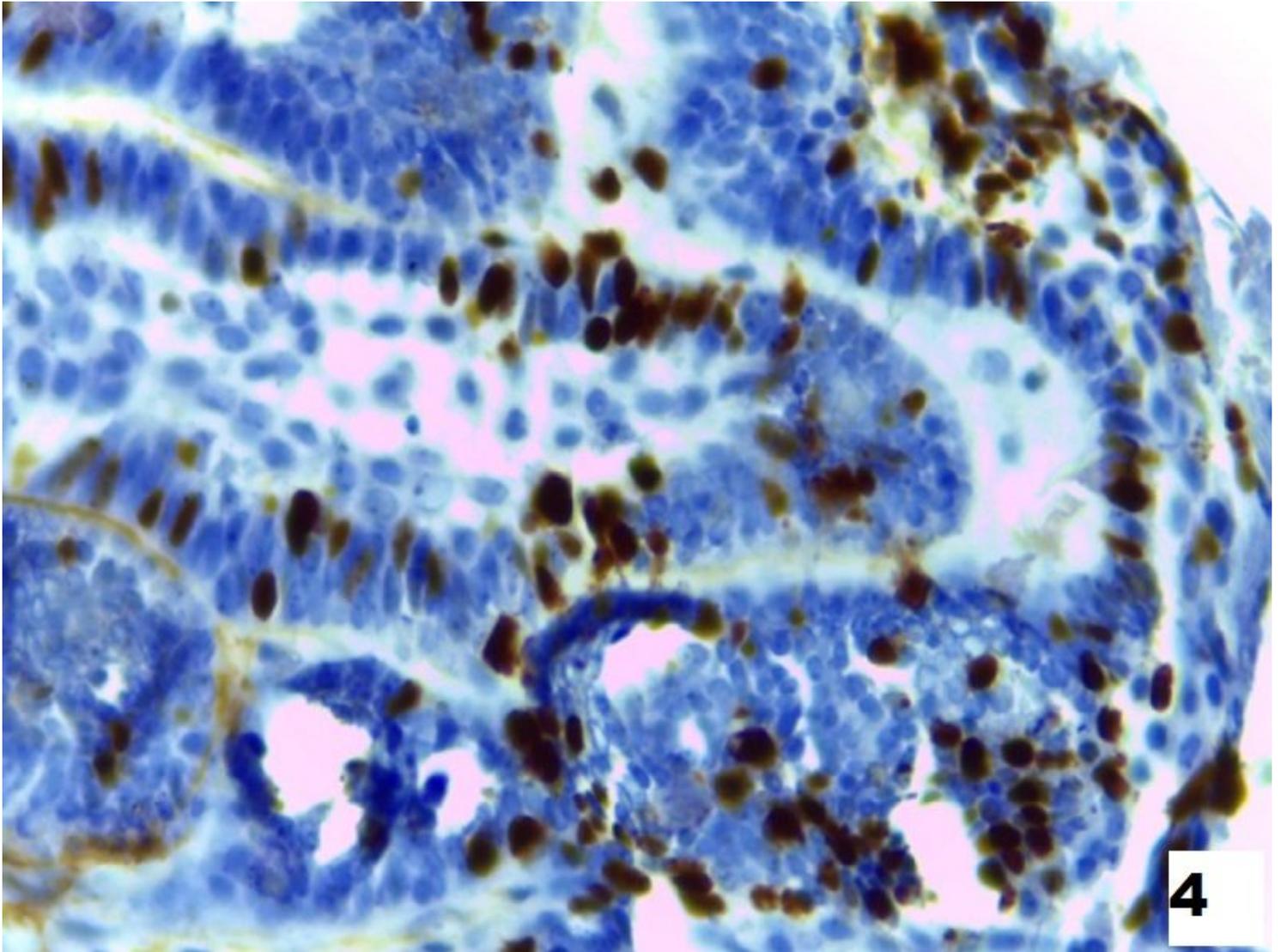


Figure 4

Immunohistochemistry staining of the maxillary lesion: Ki-67 positive staining with the labelling index reaching 60-80% reactivity in neoplastic cells.

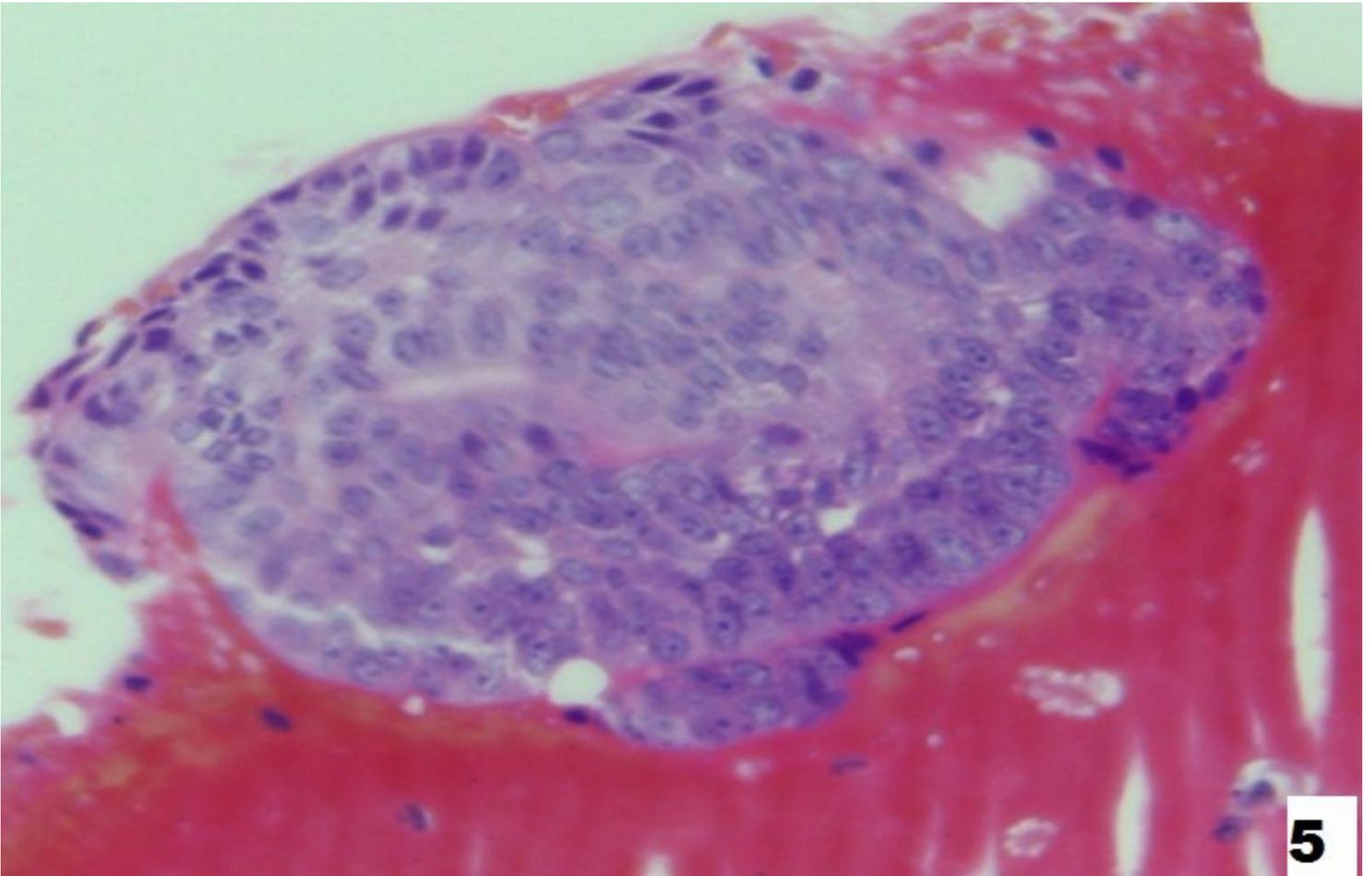


Figure 5

Histocytological images (H& E) of the lung mass showing cellular smear with clusters of odontogenic epithelia characterized by peripheral palisading and loose pale nuclei at the centre.

Supplementary Files

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