Actinomycosis of the right maxillary sinus mimicking the recurrence of adenoid cystic carcinoma – case presentation

Promienica prawej zatoki szczękowej imitująca wznowę raka gruczołowo-torbielowatego – opis przypadku

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ABSTRACT:
Introduction: Adenoid cystic carcinoma (ACC) is a rare malignancy originating from the salivary glands. It accounts for about 1–5% of all malignancies in the head and neck region. It was first described in 1853 and 1854. The main prognostic factors are tumor extension, degree of malignancy, lymph node metastases, infiltration of neural tissue and the margin of healthy tissues. Actinomycosis is a specific inflammation caused by gram-positive anaerobic bacteria Actinomyces israelii.

Case report: A case of a 75-year-old woman treated for ACC is presented. During the follow-up examination, the patient presented symptoms of a local recurrence of ACC, which was suspected until the second histopathological examination that pointed to actinomycosis of the right maxillary sinus.

Conclusion: Due to frequent recurrences of ACC after treatment, follow-up in these patients should be long-term, and any worrying symptoms should be diagnosed for potential recurrence.

KEYWORDS: actinomycosis, adenoid cystic carcinoma, paranasal sinuses

STRESZCZENIE:

Opis przypadku: W niniejszej pracy podjęliśmy próbę przedstawienia przypadku 75-letniej kobiety leczonej w naszej Klinice z powodu raka gruczołowo-torbielowatego. Podczas badania kontrolnego chora wykazywała objawy wznowy miejscowej ACC; dopiero przeprowadzone drugie badanie histopatologiczne wskazało promienicę prawej zatoki szczękowej.

Wnioski: Z powodu częstych wznow ACC po leczeniu, badania kontrolne powinny być wieloletnie, a każdy niepokojący objaw powinien być diagnozowany w kierunku potencjalnej wznowy miejscowej.

SŁOWA KLUCZOWE: promienica, rak gruczołowo-torbielowaty, zatoki przynosowe
ABBREVIATIONS

ACC – adenoid cystic carcinoma
CT – computed tomography
HIV – human immunodeficiency virus
MRI – magnetic resonance imaging
TNM – system for classifying a malignancy

INTRODUCTION

Adenoid cystic carcinoma (ACC) is a rare malignancy originating from the salivary glands. It accounts for about 1–5% of all malignancies in the head and neck region. It was first described in 1853 and 1854 by French scientists that paid attention to its characteristic cribriform weaving, infiltration of local tissues, and perineural spreading. ACC is built of basal cells that are arranged in a uniform, cribriform and trabecular form. It may lead to late local recurrences and distant metastases. The main prognostic factors are tumor size, degree of malignancy, lymph node metastases, infiltration of neural tissue, and the margin of healthy tissues. It should be differentiated from other malignant lesions, including basal cell carcinoma, neuroendocrine tumors, and adenomatous squamous cell carcinoma [1].

Actinomycosis is a specific inflammation caused by gram-positive anaerobic bacteria *Actinomyces israelii*. It was first described by Von Hacker in 1885 [2]. These bacteria co-create the bacterial flora of the oral cavity, throat, digestive tract, and genitourinary system. Infection with this pathogen triggers formation of abscesses and fistulas. The clinical locations of the actinomycosis infection include cervicofacial, thoracic, and abdominal ones. The characteristic feature of actinomycosis is formation of a specific granulation that consists of yellowish so-called actinal papules. In many cases, actinomycosis may resemble malignant lesions, tuberculous, or nocardiosis [3].

We would like to present a case of a 75-year-old woman who was treated in our Department due to ACC. During the follow-up examination, the patient presented symptoms of local recurrence of ACC. After the second histopathological examination, it was found to be actinomycosis of the right maxillary sinus.

CASE PRESENTATION

A 75-year-old woman was referred for a follow-up examination. The patient was primarily operated on due to adenoid cystic carcinoma 18 years earlier in our Department. The Caldwell-Luc operation was performed with adjuvant radiotherapy.

The patient developed hypertension and rheumatoid arthritis after radiotherapy due to ACC in 2003.

In the follow-up examination, the patient complained of pain in the right maxilla and pathological mass present for about 1 month. In the intraoral examination, a pathological mass in the alveolar process of the maxilla was found. Oro-antral fistula was present. Teeth showed increased mobility.

A biopsy was performed. There were no atypical cells found in the examined tissue. The patient was referred for computed tomography (CT) (Fig. 1.) revealing soft tissue infiltration in the lateral and frontal wall of the right maxillary sinus, right palatine bone, and right orbital floor. Mixed lytic and sclerotic transformation of the sphenoid bone was present. No lymphadenopathy was noticed.

The patient was referred for a maxillofacial surgeon consultation. Due to high susceptibility to local recurrence of ACC, another biopsy was performed before qualifying the patient for a total right maxillectomy. The second biopsy (Fig. 2.) was described as follows: “fragments of the mucosa covered with multilayered flat epithelium with acanthotic hyperplasia. No atypical cells are present. Active inflammatory infiltration and calcification are present. Necrotic masses including mostly granulocytes and colonies of *Actinomyces*”.

The patient was treated with a penicillin-group antibiotic for 3 weeks (amoxicillin with clavulic acid 1.0 orally every 12 hours). After 3 weeks an oro-antral fistula was closed using a buccal flap (Fig. 3.) during surgery under general anesthesia. The patient was followed up for 3 months without local recurrence.

DISCUSSION

ACC is found in both, minor and major salivary glands, but noticeably more commonly in minor salivary glands (according to Rahmani et al. about 50–70% of cases) [4]. ACC originates from the cells of the mucous glands. That is why it may originate from any organ that
Consists of these cells. There are described cases of ACC present in the nasal cavity, paranasal sinuses, tongue, or palate [1]. Adenoid cystic carcinoma’s growth is slow, local recurrences are common, but metastases to the regional lymph nodes are relatively rare. This malignancy spreads perineurally to the local tissues in its early stage, being the reason for problems with determining the surgical margins. Most commonly, distant metastases are present in bones, lungs, or liver. According to Spiro et al., in patients with tumors greater than 3 cm and with local metastases to the regional lymph nodes, the probability of distant metastases is higher [5]. ACC may occur in any age group, but most commonly it affects patients older than 50 years. It is more common in females but, according to Rahmani et al., ACC does not present sex predilection [4].

The most common symptoms that patients present with are tumor and pain [6]. Some patients also complain of facial nerve paresthesia, tongue immobility, or nose bleeding. The first symptoms depend on the location of the tumor. In case of the submandibular and parotid salivary gland being affected – this is mostly tumor; in case of the tongue – burning sensation, pain, and numbness; in case of the nasal cavity and paranasal sinuses – nasal obstruction [7].

A very important factor in the diagnostics and treatment of ACC is the molecular factor, with transcription factors being described the best. Piotrowska-Seweryn et al. noted that most of the cases presented a translocation t(6;9) that triggers fusion of transcription factors MYB and NFIB into one product. This results in higher activity of MYB in tumor cells [1]. Other groups of molecular factors are cells’ proliferation markers, ligands and growth factor receptor proteins, cell oncogenes, DNA repair proteins, adhesive proteins, estrogen receptors, and lymphangiogenesis markers [1].

The treatment of patients with ACC is mostly dependent on the location of the tumor. The treatment of choice is a wide resection with safe surgical margins and potential reconstruction. In case of patients with ACC in the parotid salivary gland with metastases to the lymph nodes, a radical neck dissection is recommended [1]. In patients with paranasal sinuses and nasal cavity ACC, a functional endoscopic surgery is proposed [1]. Adjuvant radiotherapy is also recommended [7]. According to Shishioda et al. ACC is sensitive to radiation and a total dose of 70–80 Gy should bring satisfactory effects [8]. Chemotherapy finds application only in very advanced stages of ACC, meaning T4b in TNM classification [9]. According to Bruzgielwicz et al. 18 out of 19 patients were qualified for adjuvant radiotherapy (1 patient died before the treatment), 5 of the patients presented local recurrence (2 months up to 8 years after adjuvant therapy), 3 patients presented distant metastases (lungs and liver), and 2 patients presented unilateral metastases to the lymphatic system of the neck [7].

Actinomycosis is most commonly associated with immunological disorders as it is mostly described in patients with HIV, leukemia, or malignant tumors [3]. It mostly affects young adults with a predominance of male gender. Morbidity is associated with intrinsic infection after trauma (bone fracture) or dental treatment, e.g. endodontic treatment. There perfect conditions for growth of anaerobic bacteria in both, soft and hard tissues [10]. Other risk factors include diabetes, trauma, or radiotherapy. In the case we described, the patient...
was after adjuvant radiotherapy due to ACC. Due to complications within the oral cavity, including decreased saliva flow and lower immunity, the patient was more prone to dental carries and periodontal diseases. That was the cause of opportunistic infection with *actinomyces* and development of actinomycosis in the maxillary sinus.

To the best of our knowledge, there are few reports in the literature on actinomycosis after radiotherapy. Martos-Plasencia et al. described a case of actinomycosis of the anus after brachytherapy against adenocarcinoma [11]. M.M. Curi et al. examined the correlation between actinomycosis and osteoradionecrosis. They proved that radiotherapy creates conditions for actinomycosis development because microorganisms develop very well in costal lesions. Radiation triggers the formation of hypoxic, oligocellular tissue that has poorly developed vessels. That leads to the disintegration and formation of non-healing wounds. Microorganisms e.g. *actinomyces spp.* colonize the lesions, worsening regeneration [10].

The clinical forms of actinomycosis include cervicofacial, thoracic and abdominal ones. Very often it mimics other lesions, like malignancies, and the problem with obtaining diagnostic material slows down the diagnostics and alters the proper treatment. Yoshihama et al. described a case of actinomycosis of the vocal fold that imitated a tumor of the larynx [12]. Actinomycosis is a rare disease entity and most commonly it appears after radiotherapy due to basocellular carcinoma. It may also be correlated with red lichen or immunosuppression after kidney transplantation. The patient described by Yoshihama et al. was not affected by any of the mentioned conditions [12]. Another case was described by Choudhury et al. where they found actinomycosis in a patient with basocellular carcinoma. In the piriform recess, there was a lesion found mimicking malignancy. The histopathological finding was basocellular carcinoma and actinomycosis [13]. Baig et al. described a case of actinomycosis mimicking an esophageal tumor. The patient complained of dysphagia which is a rare symptom of the disease [14].

The diagnostics of actinomycosis relies on the histopathological examination and culture of sputum or a biopsy. Microscopic image reveals yellowish sulfur granules. They are formed by microcolonies of *actinomyces* and cell debris. Sulfur granules are present in 50% of cases so their absence does not exclude the presence of actinomycosis [14].

The treatment of choice in actinomycosis is antibiotic therapy and pus drainage or surgical excision. The latter is recommended when the lesion is small as it improves the effect of antibiotic therapy [15]. The antibiotic of choice is penicillin. Alternatives are third-generation cephalosporins, macrolides and clindamycin. Resistance to antibiotics is not a problem in case of actinomycosis although there are variants resistant to ceftriaxone. The drugs that present little to no effect are aminoglycosides, fluoroquinolones and doxycycline [15]. However, the use of broad-spectrum antibiotics should be limited as it may lead to the formation of resistant bacterial flora. The length of the therapy remains controversial – it may last from one week up to a few months [15]. A patient described by D’Amour et al. presented remission of symptoms after a month from biopsy with pus drainage and one week of therapy with claritromycine [15].

Due to the high rate of local recurrences and distant metastases of ACC, a long-term follow-up is advised. Patients described by Bruzgielewicz et al. were followed up every month for the first 3 years and every two months in the following years. Control CT or magnetic resonance imaging (MRI) scans were performed twice a year or in suspicion of recurrence. Once a year, a control chest x-ray was performed [7]. According to Amit et al., a 5-year disease-free survival rate is estimated at 44–48% in patients with metastases to the lymph nodes, in contrast to those with N0 where the 5-year disease-free survival is estimated at 73–77% [16]. Many authors present different results on a 15-year disease-free survival, being consistent that it is rare. Rahmani et al. believe that there is no possibility for a total cure in patients with ACC [4].

**CONCLUSIONS**

Patients after radiotherapy for head and neck cancer are more prone to actinomycosis infections. Actinomycosis may mimic the local recurrence of malignant lesions.

**REFERENCES**


