

Case of cholesteatoma after radiation therapy for nasopharyngeal carcinoma

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Abstract. Introduction: This is the first report about a radiation therapy-induced cholesteatoma of the middle ear in case of nasopharyngeal carcinoma after nine years from oncological treatment. Method: A patient with an undifferentiated nasopharynx carcinoma T2N2cM0 treated nine years ago underwent a canal wall down mastoidectomy with type IV tympanoplasty for an attic-antral cholesteatoma with bone erosion. Results: There was no sign of recurrence after 18 months postoperative. Conclusion: The pathologically patent-patulous-Eustachian tube could lead to chronic suppurative otitis media with cholesteatoma many years after external beam RT for nasopharyngeal carcinoma.

Key Words: nasopharynx carcinoma, radiation therapy, cholesteatoma.

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Introduction

In the course of radiation therapy (RT) for nasopharyngeal carcinoma, the external, middle, and inner ear receive high doses of RT with functional and anatomical consequences (Carls et al 2002) Eustachian dysfunction (more often inability of the tube to open rather than being patulous) following RT for head and neck carcinomas have been reported (Liang et al 2011). Widening of the Eustachian tube lumen with the atrophy of Ostmann's fat pad may lead to pathologically patent-patulous-Eustachian tubes 5 to 10 years after RT for nasopharyngeal carcinoma (Takasaki et al 2000).

Case report

In 2003, a 54 years old man was diagnosed with a right undifferentiated nasopharynx carcinoma (NPC) T2N2cM0. Following initial evaluation, the patient was treated with three cycles of induction chemotherapy with CEP (epirubicin 75 mg/m² followed by paclitaxel 175 mg/m² on day 1, and cisplatin 75 mg/m² on day 2) followed by concomitantly chemotherapy with radiotherapy (CCRT). During CCRT, cisplatin 40 mg/m² was administered weekly, 1–2 h before RT. The patient received external beam RT by conventional fractionation: the primary tumor received 70 Gy in 7 weeks associated with 66 Gy to N+ nodes, 70 Gy to nodes >3 cm and 50 Gy to uninvolved cervical and supraclavicular areas. Treatment was carried out using photon beams of a cobalt-60 unit with a complete response. No signs of any loco-regional recurrence or distant metastasis were found for nine years.

Nine years later, the patient presented to Otorhinolaryngology Clinic of Emergency County Hospital, Cluj-Napoca for a several weeks of right recurrent otorrhea and unilateral hypoacusia. The videofibroscope exam showed a normal right Rosenmüller

fosette and a wide pharyngeal Eustachian tube. The otoscopy revealed an opaque/mat tympanic membrane with a pars flaccida retraction pocket (Figure 1). Audiometric examination included evaluating the air and bone conduction thresholds showed a middle conductive hearing loss. The CT scan with contrast of the nasopharynx and neck showed the absence of local or regional recurrence; the middle ear sections showed an attic-antral mass that produced the incus erosion. The patient underwent a canal wall down mastoidectomy and the intraoperative discoveries demonstrated the aggressiveness of the cholesteatoma expressed as the erosion of the incus and the stapes suprastructure and the erosion of the second part of facial bony canal. We performed an ossicular replacement of absent stapes and incus with T.O.R.P. (total ossicular replacement prosthesis), posterior wall reconstruction with tragal cartilage, and myringoplasty with tragal perichondrium. Postoperative treatment consisted in antibiotic therapy and intranasal corticoid for one month.

The hematoxylin-eosine staining led to a diagnosis of attic-antral cholesteatoma with bone erosion: a histologically normal keratinized squamous epithelium of the middle ear with keratin blades partially detached; the incus erosion was done following direct actions, light “invasive” of the epithelium without osteoradionecrosis or atrophy (Figure 2). There was no sign of recurrence after 18 months postoperative.

Discussion

According to our knowledge, this is the first report of a RT-induced cholesteatoma of the middle ear in case of nasopharyngeal carcinoma after nine years from NPC treatment. WHY did this patient form a cholesteatoma when so many others merely develop chronic effusions?

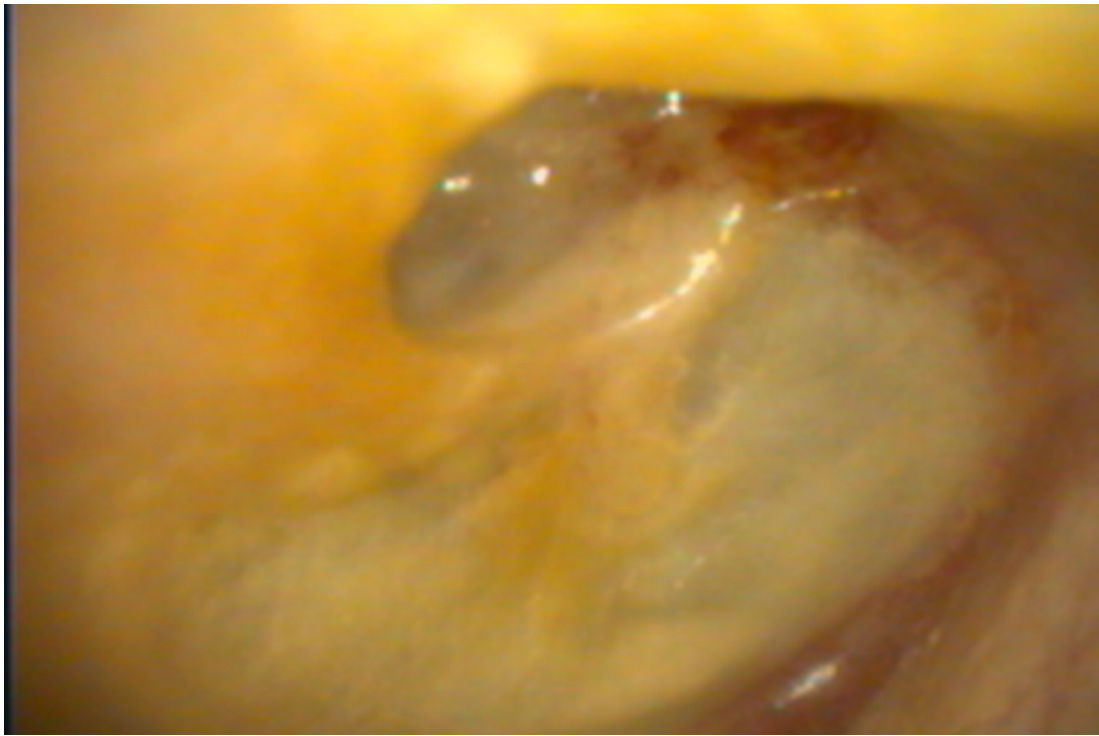


Fig. 1. Opaque tympanic membrane with a pars flaccida retraction pocket

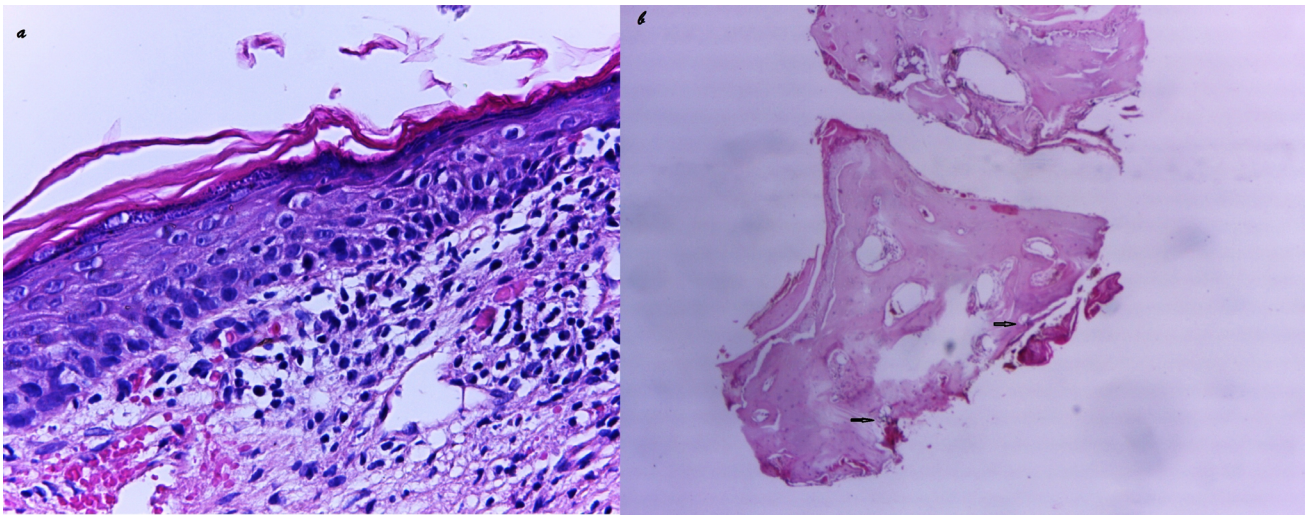


Fig. 2. a) histologically normal keratinized squamous epithelium with keratin blades partially detached, hyperemia in chorion, and microhemorrhage with plasma cell and lymphocyte infiltration. Hematoxylin-eosin staining. 40 \times ; b) Cortical and sponge bone representing a residue of the right incus with squamous epithelium partially detached on one-side slopes. At this site, we can see a slightly irregular shape, following direct actions, lightly “invasive” of the epithelium (marked by arrows). Hematoxylin-eosin staining. 4 \times

Radiation therapy-induced changes in the mesotympanic middle ear mucosa result from marked changes in the epithelium, connective tissue, and endothelial cells of blood capillaries. The consequences of RT on middle ear may be fibrosis and/or ossicular atrophy, tympanic membrane perforation, and persistent otorrhea (Liang et al 2011). Some studies have reported that a thickened drum may be observed several months after RT; permanent changes in the tympanic membrane (TM) are rarely observed (Bhandare et al 2007). Contrary to those studies, Carls et al (2002) reported the observations of TM perforation 8 years after high-dose RT. The main topics of other reports are the OME (otitis media with effusion) or CSOM (chronic suppurative otitis media) without cholesteatoma of irradiated ears

of NPC patients. Radiation therapy induced otitis media with effusion (OME) has been reported as the most common middle ear complication in patients treated for nasopharyngeal malignancies (Jereczek-Fossa et al 2003). It has also been suggested that the primary cause of RT-induced otitis media (OM) might be injury to the Eustachian tube’s ciliated epithelium, tubal swelling, and fibrosis that blocks the lumen (Bhandare et al 2007). In our case we presume that radiation therapy of the nasopharynx produced the Eustachian tube’s impairment with loss of the intrinsic elasticity of the tube. In addition, the abnormal patency could be caused by tissue pressure reduction and decreasing the fat deposits in the Eustachian tube, and maintained negative pressure in the middle ear.

- Patient treated nine years ago for nasopharyngeal carcinoma presented for a cholesteatoma of the right middle ear;
- He underwent a canal wall down mastoidectomy with ossicular and tympanic membrane reconstruction;
- No sign of recurrence of cholesteatoma after 18 months;
- Pathophysiology: the Eustachian tube's impairment with loss of the intrinsic elasticity of the tube with abnormal patency and negative pressure.

Acknowledgements

This paper was published under the frame of European Social Found, Human Resources Development Operational Programme 2007-2013, project no. POSDRU/159/1.5/S/138776. Ethics committee of Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Romania approved this paper. The patient signed the informed consent for therapy and to publish these data.

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Citation	Chirilă M, Bolboacă SD. Case of cholesteatoma after radiation therapy for nasopharyngeal carcinoma. <i>HVM Bioflux</i> 2015;7(4):324-326.
Editor	Ștefan C. Vesa
Received	5 October 2015
Accepted	6 October 2015
Published Online	6 October 2015
Funding	European Social Fund, Human Resources Development Operational Programme 2007-2013, project no. POSDRU/159/1.5/S/138776.
Conflicts/ Competing Interests	None reported