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Case report

Tension pneumocephalus secondary to osteoradionecrosis of the clivus



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ABSTRACT

We report the case of a 36 year-old man with relapsing undifferentiated nasopharyngeal carcinoma treated with a re-irradiation Cyberknife, who subsequently developed tension pneumocephalus due to a cerebrospinal fluid leakage located at the clivus. The fistula was caused by osteonecrosis of the skull base secondary to the tumor invasion and to the sequelae of the radiotherapy. An endoscopic endonasal technique was used in order to repair the defect, with a peduncolated nasoseptal flap harvested to perform the skull base reconstruction. In this paper, we discuss the importance of identifying this possible complication related to radiotherapy in the management of neoplasm along the skull base; moreover, the role of endoscopy in the diagnosis and treatment of skull base fistulas is also described and commented.

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1. Introduction

Nasopharyngeal carcinoma (NPC) is an uncommon malignant tumor, often locally advanced at diagnosis. In these cases, especially in the presence of skull-base metastasis, the standard treatment consists of high doses of conformal radiotherapy with chemotherapy.¹ Pneumocephalus is defined as the presence of gas within any of intracranial compartments, mainly based on a valve mechanism. Tension pneumocephalus (TP) is a rare and important neurosurgical

emergency which is known to occur after trauma, nitrous oxide anesthesia and craniotomy. It is rarely observed with tumor and can be correlated with skull base defects due to tumor invasion, tumor change after chemotherapy or osteoradionecrosis of the skull base.²

We report the case of a 36 year-old patient diagnosed with relapsing undifferentiated NPC, treated with Cyberknife, who subsequently developed TP due to a clival fistula. The fistula was caused by osteonecrosis of the skull base and was repaired with an endoscopic endonasal technique, using a peduncolated nasoseptal flap.

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Fig. 1 – Preoperative axial head CT scan showing the pneumocephalus.

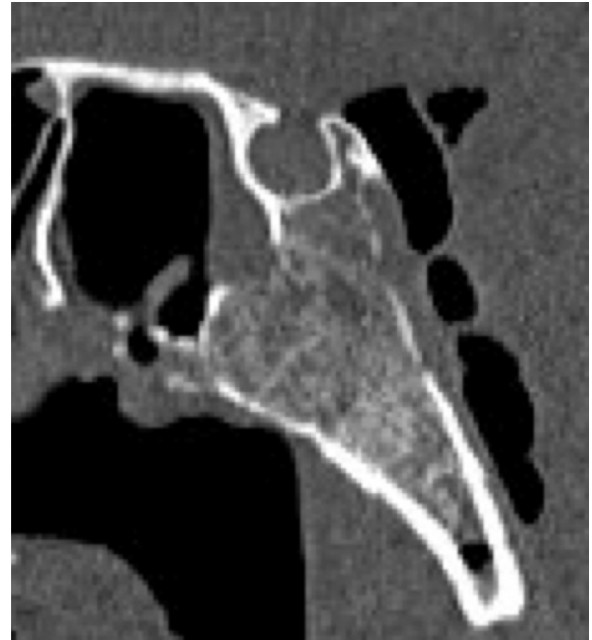


Fig. 2 – Preoperative sagittal head CT scan showing the necrotic bone of the clivus.

2. Case report

In December 2010, due to the development of a laterocervical adenopathy, a 36 years-old man was diagnosed with an undifferentiated NPC (cT3N2bM0). In January 2011, the patient underwent a left-side modified radical neck dissection (levels I–V) and elective chemo-radiotherapy consisting in Cisplatin + RT (66 Gy) followed by Cisplatin/5-FU. Due to the relapse of the disease on the clivus and sphenoidal bone, in June 2013 a second line stereotactic radiotherapy (Cyberknife) was performed at a dose of 27 Gy in 3 fractions (isodose 66%).

In July 2014, Patient was admitted to the E.D. of our hospital because of general disorientation, progressive tendency to drowsiness, cephalaea, fever and aqueous rhinorrhea. At the time of evaluation, physical and neurological examination revealed disorientation, tendency to drowsiness, no cranial nerve deficits and no other significant findings. Nasal endoscopy revealed the presence of necrotic bone over the clival area, in the paramedian portion of the nasopharynx, with an active cerebrospinal fluid rhinorrhea. A Computed Tomography (CT) scan revealed the presence of massive tension pneumocephalus with erosion of infero-posterior parts of sphenoidal sinus and possible radionecrosis of the clivus (Figs. 1 and 2). In emergency, after somministrating antibiotic therapy consisting of IV Linezolid (at a dose of 600 mg two times a day) and Meropenem (at a dose of 1 g three times a day), which was also maintained in the post-operative period, the patient underwent endoscopic endonasal repair of the clival fistula with a peduncolated nasoseptal (Hadad) flap.³ During the operation, several mucosal biopsies were made in the

sphenoidal sinus, clivus and nasopharynx; the pathological examination revealed radionecrosis with signs of infiltration by infiltrating undifferentiated non-keratinising squamocellular carcinoma (Fig. 3). Because of the persistence of aqueous rhinorrhea, four days after the first intervention, the patient underwent a new endoscopic endonasal repair of the fistula (Fig. 4) with a controlateral nasoseptal flap. The patient was then transferred to the intensive care unit (ICU) where he

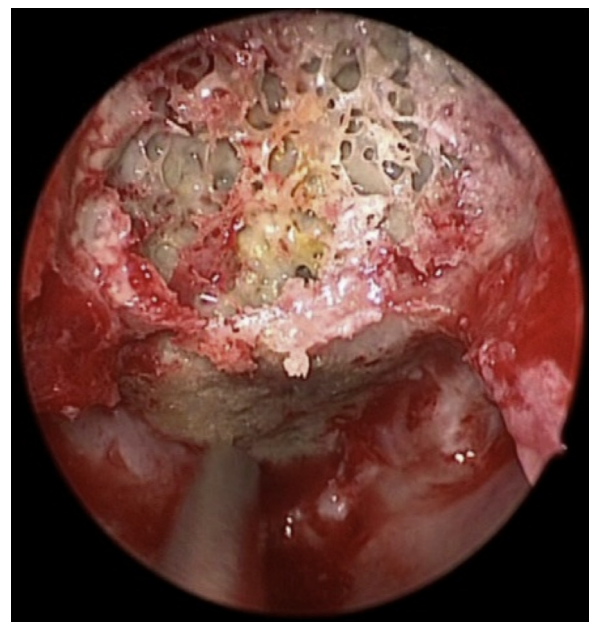


Fig. 3 – Intraoperative view of the necrotic bone of the clivus.

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