

## **Re-opening of Eustachian tube atresia after radiotherapy in nasopharyngeal carcinoma: Two case reports.**

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### **Abstract**

**Nasopharyngeal Carcinoma (NPC) is a highly happening disease. Eustachian tube atresia after radiotherapy is easy to occur in NPC patients. This study presented 2 cases of re-opening of Eustachian tube atresia after radiotherapy for NPC patients. Two female cases (62 and 64 y old; receiving post-radiotherapy 6 and 20 y ago, respectively) were diagnosed with Eustachian tube pharyngeal orifice atresia. The Eustachian tube atresia was re-opened by laser. A plastic cone-shaped top tube was inserted and pulled and pushed repeatedly for about 6 months. The patients were followed up over 12 months. After treatment, the opened roundness pharyngeal orifice was formed. The Valsalva's air-blowing was easy. All two cases had no reduced pharyngeal orifice in follow up, and they had no yet abnormal patency of Eustachian tube. The Eustachian tube atresia after radiotherapy can be cured by using laser and inserting plastic cone-shaped top tube with pulling and pushing repeatedly.**

**Keywords:** Eustachian tube, Atresia, Nasopharyngeal carcinoma, Radiotherapy.

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### **Introduction**

Nasopharyngeal Carcinoma (NPC) is a high happen diseases in south China. Radiotherapy is the first choice for NPC. In many NPC patients, the Eustachian tube atresia is easy to occur after radiotherapy. The morbidity of this lesion is high as 35-75% [1]. Eustachian tube atresia is the primary cause for hearing loss in NPC patients after radiotherapy. It has a relationship inextricably interwoven with loss function of Eustachian tube, and is a result of radiotherapy harm [2]. The common Eustachian tube atresia can be remitted by puncture drum or a tube insert drum. However, it is more severe after radiotherapy, and the Eustachian tube is often closed by adhesion or scar at pharyngeal orifice or luminal cartilage segment [3]. In addition, the middle ear has secondary changes such as tympanic cavity adhesiveor, cholesteatoma, etc.. Furthermore, the atresia of Eustachian tube is very difficult to relieve. Until now there is no report on the cases with successful re-opening of Eustachian tube atresia. In this study, we firstly presented 2 cases of re-opening of Eustachian tube atresia after radiotherapy in NPC. The objective was to provide a reference for the treatment of Eustachian tube atresia after radiotherapy in NPC.

### **Case Report**

#### **Case 1**

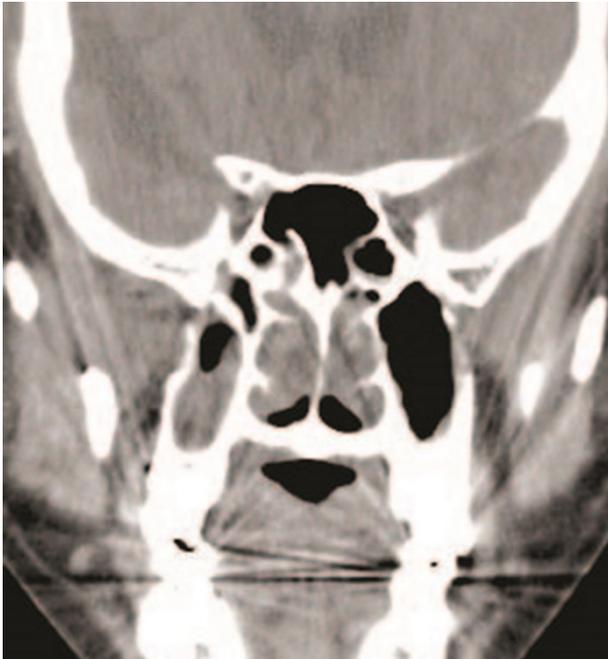
A female NPC patient with 65 y old received radiotherapy 6 y ago. She suffered from an atresia in nasal cavity and

nasopharyngeal. The CT finding was shown in Figure 1. The Eustachian tube pharyngeal orifice also had an atresia. The endoscopic photo finding was in shown in Figure 2, and the CT finding was in Figure 3. When inserting an included stainless steel wire plastics tube with 1 mm diameter from ostium tympanicum, it was impeded about 10 mm separate orifice of pharynx. The CT finding was in shown in Figure 4. The atresia orifice pharynx was re-opened by diode laser. A 1 mm diameter plastics tube was inserted to keep open about 6 months. A 2 mm-diameter plastics tube including a cone-shaped head end was inserted to replace the 1 mm tube and was activated back and forth repeatedly. The endoscopic photo finding was in shown in Figure 5. The tube was pulled out after about 6 months, and finally a roundness shape orifice pharynx was formed. The endoscopic photo finding was in shown in Figure 6. The Valsalva's air-blowing was very easy. The tympani member perforation was closed up after 1 month by itself. The hearing was improved compared with before treatment. The patient was followed up over one year, and the outcome was maintained good.

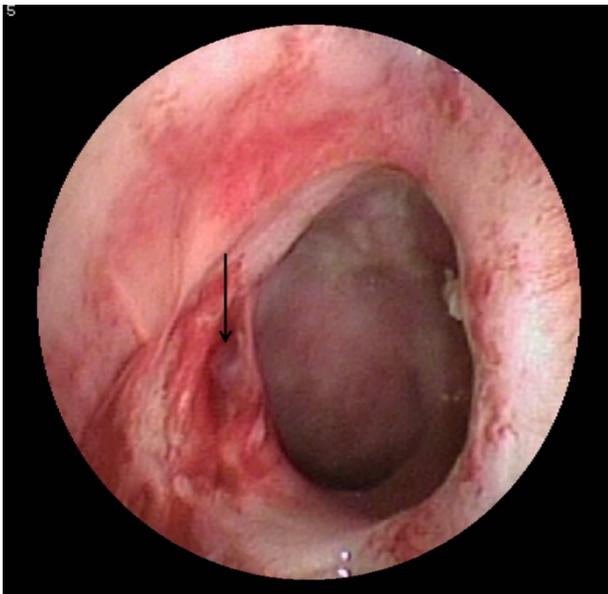
#### **Case 2**

A female patient with 64 y old received the radiotherapy over 20 y for nasopharyngeal cancer. She had left orifice pharynx atresia and soft palate paralysis. The endoscopic photo finding was in shown in Figure 7. The pharyngeal orifice was closed when a 1 mm include stainless wire plastic tube was inserted from ostium tympanicum to impede 10 mm separate orifice of pharynx. The CT finding was shown in shown in Figure 8. The

Eustachian tube pharyngeal orifice atresia was re-opened by diode laser and inserting a 2 mm diameter included a cone-shape head end plastic tube and activating back and forth. The endoscopic photo finding was showed in Figure 9. The tube was pulled out after about 6 months, and a roundness shape orifice pharynx was formed. The endoscopic photo finding was showed in Figure 10. The CT finding was shown in Figure 11. The Valsava's air-blowing was very easy too.



**Figure 1.** Case 1: Post-radiotherapy presented a narrow in nasal cavity and nasopharynx.



**Figure 2.** Case 1: Endoscopic photo indicated a right-side pharyngeal orifice atresia (black arrow).



**Figure 3.** Case 1: CT revealed that the pharyngeal orifice was closed (whiter arrow).



**Figure 4.** Case 1: CT indicated that an included stainless steel wire 1 mm diameter tube was impeding in Eustachian tube (black arrow).

### Discussion

The orifice pharynx atresia after radiotherapy for nasopharyngeal cancer is a common condition. However, it has not treatment experience for past very long time because of lacking valid methods.

This study may be first report for re-opening of pharyngeal orifice atresia after radiotherapy in whole world as we are aware.



**Figure 5.** Case 1: Endoscopic photo revealed that the orifice pharyngeal had a 2 mm-diameter cum cone-shape top plastic tube.



**Figure 6.** Case 1: A roundness shape orifice pharynx was formed.

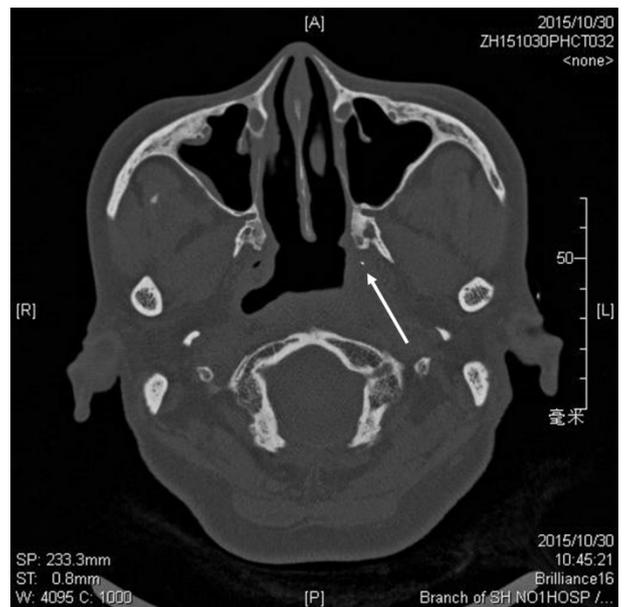
We had reported a case of pharyngeal orifice seal off since 8 y before [4]. In that case, the orifice pharynx atrisia was after operation of nasal endoscopy.

The closed orifice was re-opened by a diode laser, and 1 mm plastic tube and a titanic stent were inserted. The orifice presented a small hole after 6 months.

The secret could discharge from tympani to pharynx when air-ball compress in ear canal, but Valsava's air-blowing could not. Apparently, this result was not satisfactory.



**Figure 7.** Case 2: Endoscopic photo revealed closed pharyngeal orifice (black arrow).



**Figure 8.** Case 2: CT showed that, when a 1 mm includes stainless wire plastic tube inserted from ostium tympanicum was impeded 10 mm separate orifice of pharynx (red arrow).

Now we used a cum cone-shape top plastic tube pulling and pushing repeatedly for dilating the pharyngeal orifice. It made the mucous member and submucous together, and overturn into tube. The orifice was formed with a roundness hole and had not narrowed again. The two cases could perform the Valsava's air-blowing, which was a gold index for Eustachian tube unblocked. Recently, Kivekas et al. [5] report the histopathology of balloon-dilation Eustachian tube, which can make mucus member inflammatory reaction and swelling altered. Therefore, the dysfunction Eustachian tube was improved. Our cases are based on the same mechanism for gaining re-opened pharyngeal orifice.



**Figure 9.** Case 2: Eustachian tube closed orifice of pharynx was re-opened by diode laser and inserting a 2 mm diameter included cone-shape head end plastic tube with activating back and forth.



**Figure 10.** Case 2: Endoscopic photo revealed a roundness-shape pharyngeal orifice.

In this study, both two cases had no “patulous” or abnormal patency Eustachian tube. Recently, Aper et al. [6] report quantitative description of Eustachian tube movement during swallowing as visualized by transnasal videoendoscopy. This perhaps had some revelation. When Eustachian tube is opened, the torus happen medial rotation and soft palate elevation close the pharynx airway. Similarly, in respiration, the Eustachian tube is closed. As long as ruling Eustachian tube and several muscles coordinate, the tube open or respiration cannot happen at the same time. This physiologic mechanism can ensure no occurrence of “patulous”. Dennis et al. [7] have reported balloon dilation of the cartilaginous Eustachian tube. No “patulous” happens in their cases. Of course, the “patulous” perhaps has more complicated cause, so more studies are needed.



**Figure 11.** Case 2: CT revealed that the pharyngeal orifice was formed (red arrow).

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