

## Post-therapy Taste Bud disorder in Nasopharyngeal Carcinoma

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### Abstract

*Nasopharyngeal Carcinoma (NPC) or Nasopharyngeal Carcinoma (NPC). Many are found in Indonesia. Radiotherapy as the gold standard for nasopharyngeal carcinoma (NPC). This study aims to determine the relationship between radiation therapy in NCP and taste disorders. article review. Conventionally for early stage NPC radiation (T1, T2) given at a dose of 200 - 220 cGy per fraction, given 5 times a week without rest. up to a total dose of 6000 - 7000 cGy in 6 weeks. As for NPC with a larger tumor size (T3 and T4), a higher total radiation dose was given to the primary tumor in the nasopharynx, namely 7000-7500 cGy. There is a relationship between nasopharyngeal carcinoma therapy with the ability to feel.*

**Keyword : Post-therapy; Bud disorder; Nasopharyngeal Carcinoma;**

## Introduction

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Cancer according to the World Health Organization (WHO) is the uncontrolled growth and spread of cells and can metastasize to surrounding tissues (Kemenkes, 2017). Nasopharyngeal Carcinoma (NPC) or Nasopharyngeal Carcinoma (NPC) is one of the most common malignancies in the field of Ear, Nose, Throat, Head and Neck (ENT-KL) disease which is commonly found in Indonesia (Adham *et al.*, 2012). Nasopharyngeal cancer is a malignant tumor originating from epithelial cells in the nasopharynx which is located behind the nasal cavity, above the soft palate and on its posterior wall there is the pharyngeal tonsil (Guo *et al.*, 2019). The nasopharynx functions as ventilation from the ear through the eustachian tube and as a resonance chamber in the formation of sound (Diniati, Fidiawati and Harianto, 2016).

In Indonesia, there are 6.2/100,000 with 13,000 new cases. Research conducted at Dr. Cipto Mangunkusumo Hospital in 1996 and 2005, there were 1,121 patients diagnosed with nasopharyngeal cancer. In 2010 nasopharyngeal cancer was ranked 5th of the 10 most common cancers. Based on Riskesdas data in 2013, the prevalence of cancer in Indonesia is estimated at 1.4% or around 347,792 people with the highest prevalence in Yogyakarta Province (4.1%), while Riau Province (0.7%) or around 4,301 people (Kemenkes, 2017 ). Based on previous research conducted at Arifin Achmad Hospital Pekanbaru in 2006-2008, nasopharyngeal cancer ranks 2nd in men (Diniati, Fidiawati and Harianto, 2016).

Like other therapies, radiation therapy has side effects, especially in children. This depends on age, irradiation location, irradiation field area, vital organs around the tumor, radiation methods and equipment used, and the number of doses given (Guo *et al.*, 2019). Side effects that appear can occur immediately or slowly, can occur locally or generally, and can occur from mild to severe (Santoso *et al.*, 2009).

Radiation therapy in nasopharyngeal cancer can cause several side effects such as mucositis, salivary gland dysfunction, taste dysfunction and malnutrition, dental disorders, bone changes, cutaneous changes, nerve damage, intellectual decline, hearing loss, the occurrence of malignant cancer due to radiation and bleeding Brain (Chang *et al.*, 2020). Based on this, the authors are interested in discussing taste disorders in post-therapy for nasopharyngeal carcinoma (Kemenkes, 2017).

## **Method**

A literature review is more than a summary of the sources, it has an organizational pattern that combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling, of that information. It might give a new interpretation of old material or combine new with old interpretations. Or it might trace the intellectual progression of the field, including major debates. And depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant.

## Result and Discussion

### Content

#### Characteristics of Nasopharyngeal Carcinoma

NPC is mostly found in the Mongoloid race (Lam and Chan, 2018). The incidence of NPC has something to do with the habit of consuming certain foods (salted fish) (Ho, 2017). Occupational risk factors, exposure to smoke, dust, alcohol consumption, and smoking have been shown to be associated with the incidence of NPC (Yong *et al.*, 2017). Primary tumors are more difficult to see directly and are often minimal or asymptomatic. NPC is more radiosensitive and chemosensitive. The incidence of regional and systemic metastases in NPC is higher. Approximately 50% -70% of patients with NPC when they first come for treatment found enlarged lymph nodes in the neck, a third of which are bilateral. Most (60%-95%) patients with NPC came for treatment at the clinic, which were already locally advanced (locoregionally advanced) or stage III-IV. Of patients with N3, 40% had asymptomatic distant metastases. Most (78%) of distant metastases were established after 18 months of first symptom appearance. This fact shows that NPC is actually a systemic disease. Therefore, NPC therapy should be aimed at killing loco-regional tumors and micrometastases (Kentjono, 2013).

#### Radiotherapy for Nasopharyngeal Carcinoma

Radiotherapy as the gold standard for nasopharyngeal carcinoma (NPC) has been started since around the 1930s, but the results of radiotherapy for NPC vary widely, the early stage gives a complete response above 80% while the advanced stage radiotherapy response drops sharply (Chua, Sun and Supiot, 2019). The radiation given is expected to improve the quality of life and prolong the survival of patients with NPC (McDowell *et al.*, 2020), including cancers that can be cured by radiation (radiocurable), especially if they are still early (stages I, II) (Santoso *et al.*, no date). Factors that can affect the response of NPC to radiation are divided into 2, namely intrinsic and extrinsic factors. Intrinsic factors include: biological properties, tumor type and apoptosis (Zhang *et al.*, 2017). Extrinsic factors that can affect the response of NPC to radiation include general condition, hemoglobin level, stage, dose and method. Providing radiation, radiation continuity, accuracy of radiation target location, radiotherapy tools and techniques and adjuvant therapy (Santoso *et al.*, no date).

Consideration of the choice of radiation as the treatment of choice for NPC is mainly based on the fact that histopathologically most (75%-95%) NPC of undifferentiated carcinoma (WHO type 3) and non-keratinizing carcinoma (WHO type 2) are highly radiosensitive (Peng *et al.*, 2019). Another reason is that the anatomical factor of the nasopharynx which is located at the base of the skull with many vital organs makes extensive surgery to obtain a tumor-free area (free margin) very difficult (Chen *et al.*, 2021) (Chen *et al.*, 2021). External radiation (teletherapy) at the loco-regional stage of NPC should be given at a sufficiently high dose (about 7000 cGy), aimed at the primary tumor in the nasopharynx and the area of expansion and metastasis in the cervical lymph

nodes. Radiotherapy is said to be successful if the eradication of all viable cancer cells is achieved (Kentjono, 2003).

#### **Radiation The radiation**

Dose required for tumor eradication depends on the number of cancer cells (tumor size). Tumors with a diameter of 3 cm (1010 cells) require a higher radiation dose than tumors with a diameter of 1 cm (109 cells). On the basis of this consideration, for advanced loco-regional stage NPC, radiation is given at a higher dose than for early-stage NPC. Conventionally for early stage NPC (T1, T2) radiation is given at a dose of 200 - 220 cGy per fraction, given 5 times a week without rest until it reaches a total dose of 6000 - 7000 cGy in 6 weeks. Meanwhile, for NPC with a larger tumor size (T3 and T4), a higher total dose of radiation to the primary tumor in the nasopharynx is given, namely 7000-7500 cGy (Kentjono, 2003).

If no metastases are found in the cervical lymph nodes, prophylactic radiation is given at a dose of around 4000-5000 cGy in four or four and a half weeks, while if there is an enlarged lymph node in the neck, radiation is given at the same dose as the primary tumor (6000-7500 cGy). After undergoing a total dose of external radiation, an evaluation with a CT scan was performed. If there is still residual tumor in the nasopharynx, the patient is rested for about 1-2 weeks and then given additional radiation with a reduced area of 1000-1500 cGy only to reach a total dose of 7500-8000 cGy or brachytherapy with a fraction of 3 x (2 x 300) cGy given in the morning and evening with a distance of  $\pm$  6 hours (Kentjono, 2003)

The protocol for treating NPC proposed by Brennan (2003) is as follows:

- Stage I : High-dose radiotherapy to the primary tumor in the nasopharynx and prophylactic radiation to the neck.
- Stage II : 1. Chemo-radiotherapy, or  
2. High-dose radiotherapy to the primary tumor in the nasopharynx. and prophylactic radiation to the neck
- Stage III : 1. Chemo-radiotherapy, or  
2. High-dose radiotherapy/hyperfractionated technique aimed at primary tumors in the nasopharynx and bilateral neck glands (if any)  
3. Neck dissection may be feasible eg in persistent neck tumors or recurrence provided that the primary tumor in the nasopharynx is controlled.
- Stage IV : 1. Chemo-radiotherapy, or  
2. High-dose radiotherapy / hyperfractionation technique aimed at primary tumors in the nasopharynx and glands (Kentjono, 2003).

One of the side effects of radiotherapy is that it can interfere with the ability to feel even though taste receptor cells are radioresistant. The pathogenesis of loss of sensation occurs in patients with poor nutrition, changes in saliva composition and volume are one of the mechanisms of radiotherapy complications that cause neural loss, occurring as a

result of radiotherapy (Huba et al., 2020). The feeling function can return slowly, several months after radiotherapy is completed, but can also persist. (Hasibuan, 2002).

### **Conclusion**

There is an association with radiation therapy in nasopharyngeal carcinoma with loss of taste ability where the sense of taste can return slowly several months after radiotherapy is completed but can also persist.

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