Characteristics of Hearing Impairment in Patients with Nasopharyngeal Carcinoma in AR Bunda Hospital Prabumulih June 2018 - September 2019

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ABSTRACT
Nasopharyngeal carcinoma (NPC) is a malignant tumor that grows in the nasopharynx with predilection in the Fossa of Rossenmuller and roof of the nasopharynx. Clinical manifestations of nasopharyngeal carcinoma can be divided in Four categories: nasopharyngeal symptoms, symptoms of tubal dysfunction, cranial base involvement symptoms, and symptoms of neck mass. Hearing Loss is a common symptom in patients with nasopharyngeal carcinoma due to dysfunction of the Eustachian tube. The objective is to determine the characteristics of hearing loss in nasopharyngeal carcinoma patients at AR Bunda hospital Prabumulih. Descriptive cross-sectional study. The sample was all patients diagnosed with NPC and performed an audiometric examination at AR Bunda hospital Prabumulih from June 2018 until September 2019. 14 patients diagnosed with NPC found 9 male patients (64.28%) and 5 female patients (35.72%). The age most often is age group 41-60 years. The most common hearing loss is conductive hearing loss (50%) in the right ear with a moderate degree (57.14%) and conductive hearing loss (57.2%) in the left ear with a moderate degree (50%). Based on the location of the nasopharyngeal mass, it was found to be bilateral (50%). The highest incidence of NPC at the group age of 41-60 years. The most common hearing loss is moderate-conductive hearing loss.

Keywords: *Nasopharyngeal Carcinoma, Hearing Loss, Audiometric*

1. INTRODUCTION

Nasopharyngeal carcinoma is a malignancy in the head and neck area that has unique epidemiological characteristics, with incidents varying according to race and geographical differences. In addition, there is also a unique spectrum of histopathological features, clinical characteristics, and biological properties. The highest incidence of nasopharyngeal carcinoma in the world is found in population of the southern Chinese especially the Cantonese in Guangdong province and Guangxi region with amount reaching more than 50 per 100,000 population per year. While the incidence of nasopharyngeal carcinoma in the world is relatively rare, namely 2% of all head and neck squamous cell carcinomas, with an incidence of 0.5 to 2 per 100,000 in the United States. Nasopharyngeal carcinoma is a malignant tumor that ranks first most commonly among malignant neck head tumors in Indonesia, which is around 60%. The incidence of nasopharyngeal carcinoma in Indonesia is quite high, which is around 4.7 new cases per year per 100,000 population or estimated at around 7000-8000 cases per year in Indonesia. Nasopharyngeal carcinoma is mainly found in men of productive age (the ratio of male and female patients is 2.18: 1) and 60% of patients aged between 25 and 60 years [1,2].

Clinical manifestations of nasopharyngeal carcinoma can be divided into 4 categories: nasopharyngeal symptoms, symptoms of tubal dysfunction, cranial base involvement symptoms, and symptoms of neck mass. Symptoms related to Eustachian tube dysfunction include hearing loss, tinnitus. Hearing Loss is a common symptom in patients with nasopharyngeal carcinoma due to dysfunction of the Eustachian tube. The hearing loss in the form of a sound sensation without external stimulation (tinnitus) can be heard in

the form of a ringing, roaring, hissing sound. According to Ayan et al. [4], as many as 40-50% of NPC patients complain of hearing loss, ears feel full and ringing. The middle ear is a part that is affected by NPC. This is because there is a connection between the middle ear and the nasopharynx by the eustachian tube. Middle ear effusion is the most common symptom in the ear. Hearing disorders caused by middle ear effusion are usually unilateral conductive hearing disorders. Middle ear effusion is caused by dysfunction of the eustachian tube. The middle ear effusion can be caused by tumor extension which eroded the petrosus bone and cartilage in the eustachian tube. The involvement of the veli palatini muscle damaged by the tumor causes middle ear effusion. Neurologically, an electromyographic examination of the muscles tensor veli palatini and the levator veli palatini muscle, which resulted in paralysis of the muscles causing impaired tubal function. Nasopharyngeal carcinoma also causes ear complaints feel full due to the occurrence of negative pressure in the ear. Sensorineural hearing loss can occur if there is a tumor in the cochlea or cerebellopontine angle, usually this disorder is very rare and occurs in patients with advanced or recurrent stages. Unilateral ringing ears can appear in patients with NPC, which is caused by disturbances in the eustachian tube, middle ear or hearing nerve [3,4,5,6,7].

2. METHOD

This is a descriptive cross-sectional study, with secondary data collected from the medical record in the AR Bunda Hospital Prabumulih from June 2018 until September 2019. Inclusion criteria is patient with Nasopharygeal Carcionoma and performed audiometric examination at AR Bunda Hospital Prabumulih from June 2018 until September 2019. The primary outcomes were examination for NPC like physical examination, CT scan, biopsy result and audiometric result.

3. RESULT

The number of all patients that has NPC that was collected from the medical record of the ENT Clinic of AR Bunda Hospital Prabumulih from June 2018 until September 2019 was 14 patients.

Table 1. Demography

Characteristic	Category	Number of patients	Percentage (%)
Age (year)	0- 40 41-60 61-80	1 12 1	7.14 85.7 7.14
Gender	Male Female	9 5	64.28 35.72
Nasopharyngeal mass	Right Left Bilateral	4 3 7	28.57 21.43 50
Total		14	100

The highest NPC patients were in age group of 41 to 60 years old is 12 patients (85.7%), followed by the age group from 0-40 years old is 1 patient (7.14%), and from 61-80 years old: 1 patient (7.14%). From these numbers, 64.28% 9 patients) were man and 35.72% (5 patients) were women. Based on the location of nasopharyngeal mass. The highest number is found to be bilateral 7 (50%), Right side 4 (28.57 %) followed by left side 4 (21.43 %) (Table 1).

Table 2. Audiometric Result in NPC Patients

Hearing Loss	Right		Left	
	n	%	n	%
Normal	3	21.42	4	28,6
Conductive	7	50	8	57.2
Sensorineural	2	14.29	1	7.14
Mixed	2	14.29	1	7.14
Total	14	100	14	100

In this study, the highest hearing loss was conductive hearing loss in the right ear as many as 7 patients (50%), left ear as many as 8 patients (57.2%). Followed by normal hearing in the right ear as many as 3 patients (21.42%) and left ear as many as 4 patients (28.6%). A total of 2 patients (14.29%) had mixed hearing loss in the right ear and in the left ear mixed hearing loss was 1 patient (7.14%). The least number was sensorineural hearing loss in the right ear as many as 2 patients (14.29%) and the left ear as many as 1 patient (7.14%) (Table 2).

Table 3. Degree of Hearing Loss in NPC Patients

Degree of hearing loss	Right		Left	
	n	%	N	%
Normal	3	21.42	4	28.58
Mild	3	21.42	3	21.42

Degree of hearing loss	Right		Left	
	n	%	N	%
Moderate	8	57.14	7	50
Severe	-	-	-	-
Very Severe	-	-	-	-
Total	14	100	14	100

In this study, the highest degree of hearing loss was moderate hearing loss in the right ear as many as 8 patients (57.14%) and the left ear as many as 7 patients (50%) followed by mild hearing loss in the right ear by 3 patients (21.42%) and left ear 3 patients (21.42%) and normal hearing in the right ear as many as 3 patients (22.42%) and left ear as many as 4 patients (28.58%). (Table 3).

Table 4. Tympanic Membrane of NPC Patients

Tympanic Membrane	Right		Left	
	N	%	n	%
Normal	3	21,42	4	28,58
Convex	7	50	8	57,14
Gloomy	4	28,58	2	14,28
Total	17	100	17	100

In this study the tympanic membrane in patients with nasopharyngeal carcinoma was convex in the right ear as many as 7 patients (50%) and the left ear as many as 8 patients (57.14%) followed by a gloomy tympanic membrane in the right ear of 4 patients (28.58%) and in the left ear as many as 2 patients (14.28%). The normal tympanic membrane appearance in the right ear is 3 patients (21.42%) and the left ear is 4 patients (28.58%) (Table 4).

4. DISCUSSION

In this study, it was found that nasopharyngeal carcinoma was more common in men than women. According to a study conducted by Adham et al [8] it was mentioned that the incidence of nasopharyngeal carcinoma was more prevalent among men than women with a ratio of 2-3:1. This explains that nasopharyngeal carcinoma is influenced by gender. In this study it was found that the majority of nasopharyngeal carcinoma patients in the 41–60-year age group with 15 patients. Previous studies mentioned that nasopharyngeal carcinoma is more prevalent between the ages of 40-50 years the main cause of nasopharyngeal carcinoma is the consumption of preservative foods containing nitrosamines such as salted fish, and fish that are preserved by fumigation [8,9].

On the nasopharyngoscopy examination obtained as many as 47% there is a bilateral mass in the nasopharynx, the right side is 29.4% and the left side is 23.5%. In accordance with the literature stating that there is a mass in the nasopharynx, tubal dysfunction can occur which subsequently occurs middle ear effusion due to infiltration of tumors in the nasopharynx which can damage the cartilage, muscles, and muscular nerve tensor and levator veli palatini. So that ear disorders such as the ears are full, hearing loss, and tinnitus are the most common complaints [10,11,12].

In this study, the most hearing loss was conductive hearing loss in the right ear by 47%, left ear as much as 52.9%. Followed with normal hearing in the right ear as much as 23.5% and the left ear as much as 29.4%. As many as 17.7% had mixed hearing loss in the right ear and in the left ear mixed hearing loss was 11.8%. The smallest number was sensorineural hearing loss in the right ear as much as 11.8% and the left ear was 5.89%. The highest degree of hearing loss is moderate hearing loss in the right ear as much as 52.9% and the left ear as much as 47% followed by mild hearing loss in the right ear as much as 23.5% and the left ear as much as 23.5% and normal hearing in the right ear is 23.5% and the left ear is 29.4%.

Tympanic membrane features in patients with nasopharyngeal carcinoma are convex to the right ear by 47% and the left ear as much as 52.9% is followed by a gloomy tympanic membrane in the right ear as much as 29.4% and in the left ear as much as 17.7%. The normal tympanic membrane appearance in the right ear is 23.5% and the left ear is 29.4%. In accordance with the literature, the majority of NPC patients experience conductive type hearing problems with varying degrees according to the infiltration of tumor mass in the nasopharynx, according to audiometry and tympanometry results. There are patients with sensorineural and mixed hearing disorders, this can occur if the tumor mass is inside the cochlea or the cerebellopontine angle, or is in the room before Cochlea. A CT scan is needed to confirm the presence of the mass. Conductive hearing disorders are mostly experienced by NPC patients. This is due to the occurrence of tubal dysfunction due to infiltration of the tumor in the nasopharynx. Impaired functioning of the tube causes middle ear effusion. So that the picture of a convex and cloudy tympanic membrane appears and conductive hearing loss. If the process of the disorder continues then, it can turn into a sensorineural disorder

because the process of middle ear effusion involves interference with the cochlea. The degree of hearing loss in patients with mostly mild and moderate degrees, this is because the process of the middle ear has not been so heavy that the conduction process can still proceed. This can also occur because patients may experience new tubal dysfunction [3,13,14,15].

5. CONCLUSION

The highest incidence of NPC in this study was 41-60 years of age with man more than women with the ratio 2:1. Nasopharyngoscopy examination shows bilateral nasopharyngeal mass. On audiometry examination, it was found that the most common hearing loss was moderate conductive hearing loss.

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