Journal of the Medical Sciences
(Berkala Ilmu Kedokteran)

Volume 55, Number 1, 2023; 70-78
https://doi.org/10.19106/JMedSci005501202309

Facial nerve paralysis in nasopharyngeal carcinoma: a case report

Jarod Wahyu Kristiyanto[1]*, Muyassaroh[2], Dwi Antono[2]

[1]Department of Ear Nose Throat-Head Neck Surgery, Faculty of Medicine, Universitas Diponegoro, Semarang, [2]Dr. Kariadi General Hospital, Semarang, Central Java, Indonesia

Submitted: 2021-11-11
Accepted : 2022-07-27

ABSTRACT

Nasopharyngeal carcinoma (NPC) is cancer originating from the mucosal lining of nasopharynx, with the highest predilection in the fossa of Rosenmüller. One-fifth of NPC cases have cranial nerve complications. The location of Rosenmüller's fossa which is adjacent to foramen lacerum and middle base of the cranium allows the tumor to extend directly into the cranium and surrounding cranial nerves. This paper reported a case of facial nerve paralysis in NPC. A 55-year-old man came to the Ear-Nose-Throat (ENT) Clinic at Dr. Kariadi General Hospital, Semarang with complaints of facial pain on the right side, headache, a lump on the left neck, fullness in ears, and nosebleed. However, the patient did not complain of double vision. After a thorough history taking, physical examination, radiology, and histopathology tests, the patient was diagnosed with WHO 3 ECOG I T3N2M0 stage III NPC with House Brackmann III facial nerve paresis at the level of Mastoid segment. The patient was treated using chemotherapy treatment by an ENT specialist with a chemotherapy regimen of paclitaxel-cisplatin for 6 cycles. In conclusion, although rare, NPC can cause facial nerve paralysis.

ABSTRAK

Karsinoma nasofaring (KNF) adalah kanker yang berasal dari lapisan mukosa nasofaring dengan predileksi terbanyak di fossa Rosenmuller. Seperlima kasus KNF menimbulkan komplikasi pada saraf kranial. Lokasi fossa rossenmuller yang berdekatan dengan foramen laserum dan dasar tengah kranium memberikan jalan bagi tumor untuk meluas langsung ke dalam kranium dan saraf kranial yang berdekatan. Makalah ini melaporkan sebuah kasus paralisis nervus facialis pada KNF. Seorang laki-laki usia 55 tahun datang ke poli THT-KL RSUP DR. Kariadi Semarang dengan keluhan wajah perot sebelah kanan, nyeri kepala, benjolan pada leher sebelah kiri, telinga gembrebeg, dan mimisan. Namun pasien tidak mengeluhkan adanya penglihatan ganda. Berdasarkan anamnesis, pemeriksaan fisik, radiologi dan histopatologis yang menyeluruh, pasien didiagnosis dengan KNF WHO 3 ECOG I T3N2M0 stadium III dengan Parese Nervus Fasialis (VII) *House Brackmann* III setinggi segmen Mastoid. Pasien kemudian ditangani oleh spesialis THT dengan regimen kemoterapi paclitaksel-cisplatin sebanyak 6 siklus. Dapat disimpulkan, meskipun jarang, KNF dapat menyebabkan paralisis nervus facialis.

Keywords:
nasopharyngeal carcinoma;
facial nerve paresis;
chemotherapy;
paclitaxel;
cisplatin

*corresponding author: jarodwahyu@gmail.com

INTRODUCTION

Facial nerve palsies are a common and significant presentation specifically to ear, nose, and throat (ENT) surgeons and also in general medical practice. Facial nerve is a fundamental structure both for communication and emotion, and as such, functional impairment can lead to significant deterioration in the quality of life. In most cases, the etiology for facial nerve palsy remains idiopathic and has the name 'Bell palsy' (70% cases), followed by trauma (10 to 23% cases), usually caused by fractures involving the petrous part of temporal bone, and facial wounds transecting the branches of the facial nerve thus causing facial nerve palsies. A viral Herpes-Zoster infection (4.5 to 7.0% cases) may lead to facial paralysis due to geniculate ganglionitis (also known as Ramsay Hunt syndrome/ RHS). Neoplasia, although uncommon (2.2 to 5.0% cases), can also cause facial paralysis. A slowly progressing onset of facial palsy should raise the suspicion of malignancy and prompt a full and thorough head and neck examination.[4]

Nasopharyngeal carcinoma (NPC), previously known as lymphoepithelioma, is a malignancy arising from the epithelium of the nasopharynx. An interplay of environmental factors, genetic structure, and Epstein-Barr virus (EBV) infection is involved in the etiology of disease. One-fifth of NPC patients have cranial nerve involvement at the time of diagnosis. In contrast to the frequently involved the V and VI cranial nerves, the I, VII and VIII cranial nerves are rarely affected in nasopharyngeal cancer. Symptoms of the neurological disorders include diplopia, loss of sensation in the cheeks, decreased corneal reflexes, and headaches involving the II, III, IV, V, and VI cranial nerves. Disorders of the IX, X, XI, and XII cranial nerves can cause dysphagia, soft palate hemiparesis, and tongue paralysis. Disorders of the VII and VIII cranial nerves are rare, accounting for less than 1% of all cases.[5-7]

Facial palsy due to NPC does not happen very often, with incidence of less than 1% of all cases. The facial nerve exits the brainstem, enters the cerebellopontine angle, the temporal bone, and finally to the parotid; after exiting the parotid it branches to supply the facial muscles. Tumor involvement anywhere along the nerve can cause facial paralysis. The nearby location of Rosenmüller's fossa to the foramen lacerum and middle base of the cranium provide way for tumor to extent directly to the cranium and adjacent cranial nerve.[8] The purpose of this paper is to report a rare case of facial nerve paralysis in NPC.[9]

CASE

A 55-year-old man came to the ENT clinic complaining of asymmetry of right facial muscle since 3 mo ago, accompanied by fullness in ears and nosebleeds, headache, and a lump on the left side of neck. The patient did not complain of double vision. He had 20 yr history of smoking and frequent consumption of salted fish.

Based on physical examination, this man had a good general condition (compos mentis), and normal vital signs. Physical examination of the facial nerve showed asymmetry due to weakness on the right side when the patient was asked to smile with showing teeth, raised his eyebrows, puffed his cheeks, and pouting lips with showing teeth (FIGURE 1). Further examination of the facial nerve is described in TABLE 1. We also found an enlarged lymph nodes on the right and left side of the neck, at level II and III with a size of 2x2x1 cm, and the same skin color as around.

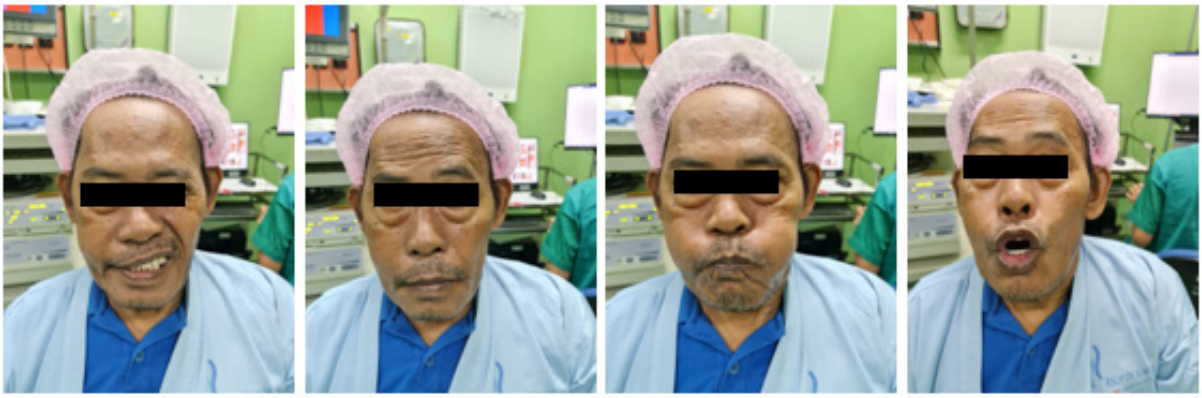

FIGURE 1. Facial nerve examination. The facial asymmetry is clearly visible when the patient smiled with showing teeth, raised his eyebrows, puffed his cheeks, and pouting lips with showing teeth.

TABLE 1. Facial nerve examination.

Examination	Right	Left
Raised eyebrows	Weak	+
Frown eyebrows	-	+
Lift and wrinkle nose up	Weak	+
Close your eyes tightly	Weak	+
Laughing out loud, showing teeth	Weak	+
Pouting mouth while showing teeth	Weak	+
Puffing cheeks	Weak	+
Whistling	Weak	+
Pull the corners of the lips down	Weak	+
Plunging the mouth forward	Weak	+
Gustatory test	-	+
Stapedius reflex	+	+
Scheimer test	10mm	5mm

The results of flexible nasopharyngoscopy examination showed a mass in front of the right torus tubarius extending to the right choana. The surface of the mass was lumpy, fragile and bleed easily (FIGURE 2). Biopsy was performed at three locations. Based on the morphological and immunohistochemical profile, it supports the diagnosis of non keratinizing squamous cell carcinoma, undifferentiated subtype.

The audiometric examination results showed a mixed degree of very severe hearing loss (PTA 81.25 dB) on the right ear while the left ear was still within normal (PTA 17.5 dB). The result of tympanometry are as follows: right ear B, left ear A, and right acoustic reflex positive (FIGURE 3). The facial nerve examination showed facial nerve paresis House Brackmann III at the level of Mastoid segment.

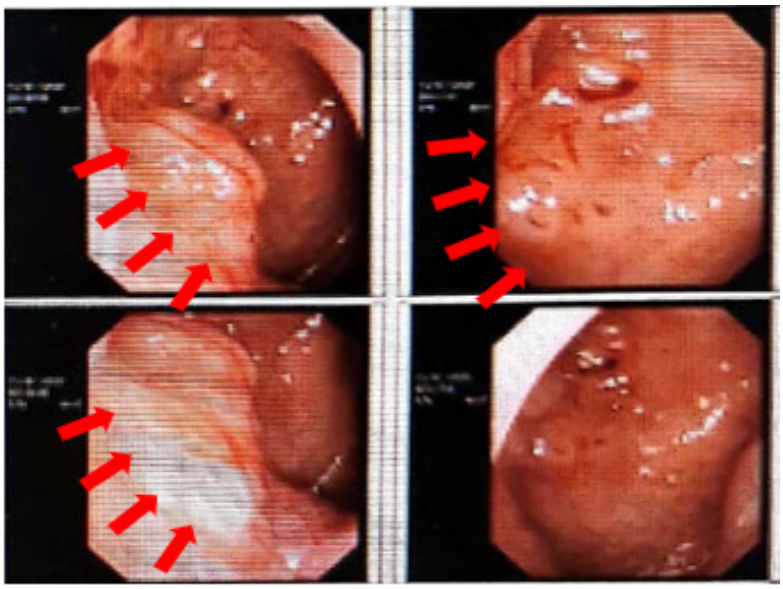

FIGURE 2. Nasopharyngoscopy examination. Red arrow: a mass in front of the right torus tubarius extending to the right choana.

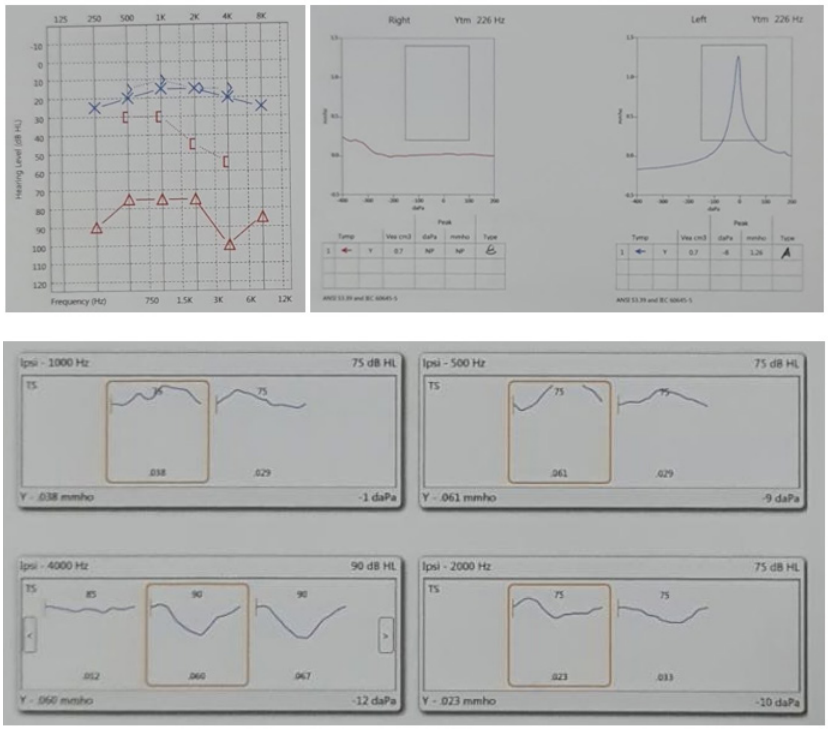

FIGURE 3. The audiometric and tympanometry results of both ears.

On a 1.5T MRI examination, a non-homogeneous solid mass appeared in the right nasopharyngeal mucosal space which seemed to extend to the right parapharyngeal space, right carotid space, right retropharyngeal space, right masticator space, right oropharyngeal mucosal space, right hard palate and seemed to expand, destroying posterior wall into the right maxillary sinus. Multiple lymphadenopathy were also observed in the right and left colli regions

of the level II, III with the largest size of ± 2.66 x 2.16 cm on the left level III, with a tendency to be a nasopharyngeal mass (T3N2Mx), no signs of increased intracranial pressure, and a right mastoiditis appearance was observed (FIGURE 4).

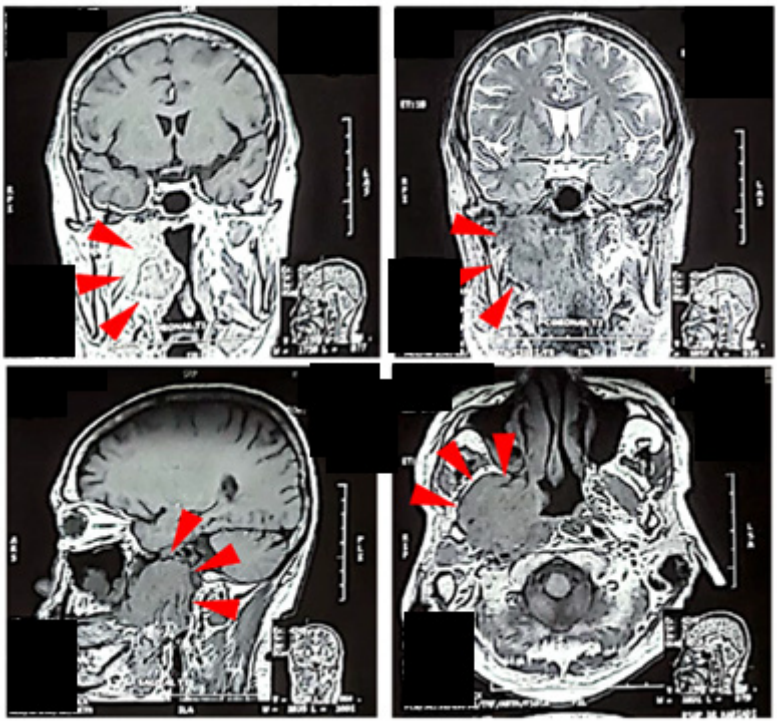

FIGURE 4. 1.5 T MRI results. The red arrow showed inhomogeneous solid mass appeared in the right nasopharyngeal mucosal space which extend to the right parapharyngeal space, right carotid space, right retropharyngeal space, right masticator space, right oropharyngeal mucosal space, right hard palate and destroy posterior wall to the right maxillary sinus.

Based on the history, physical examination, radiology, and histopathology exams, the patient was diagnosed with WHO 3 ECOG I T3N2M0 stage III NPC with House Brackmann III facial nerve paresis at the level of Mastoid segment. The was treated with paclitaxel-cisplatin chemotherapy regimen for 6 cycles.

DISCUSSION

Here we reported a case of NPC with a complication of facial nerve paresis. Among all facial nerve palsies, 5% of them are caused by tumor, one of which is NPC. Examinations that can be done to establish a facial nerve paresis includes facial nerve examination and in this case, it showed a House Brackmann III paresis of the VII nerve at the level of the Mastoid segment.

Nasopharyngeal carcinoma is a malignancy originating from the epithelial cells that cover the surface of the nasopharynx.[1,10,11] The local spread of NPC can be through the parapharyngeal space (FIGURE 5).[1,12,13]

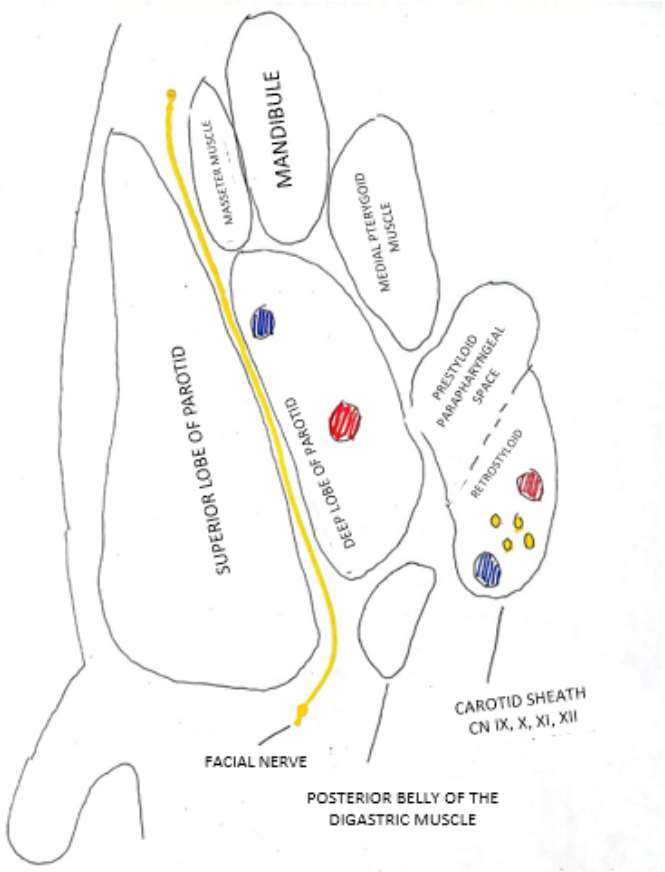

FIGURE 5. Axial anatomy of the parapharyngeal space.

Vertical upward spread

The tumor extends intracranially, spread along the medial fossa, this is called as petrosphenoid spread, usually through the foramen laserum, then into the cavernous sinus, middle cranial fossa and anterior cranial fossa involving the anterior cranial nerves (N. I and N. VI). Symptoms arising which caused by the damage of anterior cranial nerves due to tumor metastasis is called petrosphenoid syndrome. The most common symptoms are diplopia and trigeminal neuralgia (N. II - N.VI paresis).

Backward spread

The tumor extends extracranially through the pharyngobasilar fascia along the posterior fossa (including the foramen spinosum, foramen ovale and so on), wherein lies the IX and XII cranial nerves; this process is called retroparotidian spread. This spread affects the cranial nerves VII and XII along with the cervical sympathetic nerves. Symptoms caused by the damage of cranial nerves IX and XII is called retroparotidian syndrome/jugular jackson syndrome. Cranial nerves VII and VIII are rarely affected by tumors because they are located quite high in the anatomical system of the body.

Spread to lymph nodes

Spread to lymph nodes begins in the lymph nodes located lateral to the retropharynx, namely the nodes of Rouviere. Inside the gland, cancer cells grow and multiply making the gland to enlarge and appears as a lump on the lateral side of neck. This lump is often ignored by patients because it is painless. Afterwards, cancer cells will continue to grow, penetrating outside the glands and affecting the muscles below, making it difficult to move the muscle.

Distant metastases

Cancer cells can enter the blood or lymphatic flow, attacking organs that are located far from the nasopharynx (bones, liver, lungs). The facial nerve exits the skull base through the temporal bone and then passes through the parotid gland and supplies various extracranial structures in the head. This nerve is responsible for motor innervation to all muscles of facial expression, posterior to the digastric, stylohyoid and stapedius muscles. Facial nerve also supplies sensory parts to the anterior two-thirds of tongue and parasympathetic to facial glands including the submandibular, sublingual, nasal palatine, lacrimal and pharyngeal glands, but not the parotid glands (FIGURE 6).[7,14]

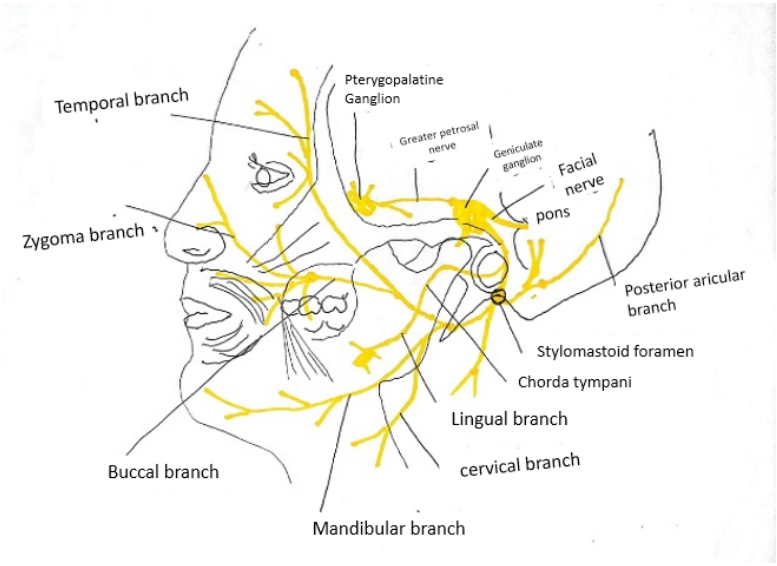

FIGURE 6. Facial nerve pathway

The facial nerve exits the brainstem to the cerebellopontine angle (CPA), the temporal bone (internal acoustic meatal, middle ear, and mastoid), the parotid gland and then branches to supply the facial muscles. The presence of inflammation, tumor infiltration along the path of the facial nerve can cause facial paralysis.[5-7] The most common intracranial tumors are CPA tumor, NPC (usually accompanied by other cranial nerve disorders) and parotid gland tumor.

Facial nerve involvement in CPA may be caused by the cancer metastasis (hematogenous, via cerebro-spinal fluid/CSF), or leptomeningeal spread), whereas involvement in the ear may result from direct invasion through the eustachian tube or parapharyngeal space. Indirect invasion may be due to tubal occlusion. The location of the eustachian tube which is adjacent to the fossa of Rosenmüller's can cause negative pressure in the tympanic cavity which results in otitis media and if not treated properly can cause mastoiditis and facial paresis. Involvement of the facial nerve due to parotid gland impairment should raise a suspicion of lymphatic spread of the tumor to the retropharyngeal lymph node group, which may drain into the parotid gland. From the parotid gland, the tumor has access to lymphatic plexus, parotid parenchyma, facial nerve, and even the parapharyngeal space.[5,12,15]

Facial paresis in this case occurred due to retroparotidian spread of the mass, toward the parapharyngeal, retropharyngeal, carotid, and masticator areas as seen on the MRI imaging. The prognostic for the facial palsy were good with chemotherapy due to mass reduction.

CONCLUSION

Although rare, facial nerve paralysis is one of the complications of NPC. In this case report we present a 55-year-old man who has been diagnosed with House Brackmann III facial nerve paresis at the level of the Mastoid segment due to retroparotidian spread of stage III NPC. The patient prognostic for facial nerve palsy are good due to the mass reduction in chemotherapy.

ACKNOWLEDGEMENT

All examination photos were original and under the patient consent. The identity of the patient was masked. We would like to thank all the staffs of Department of Otolaryngology-Head and Neck Surgery Dr. Kariadi General Hospital, Semarang for their full supports upon writing of this report.

REFERENCES

1. Wei W, Chua D. Nasopharyngeal cancer. In: Bailey BJ, Healey GB, Johnson JT, Rosen CA, *et al*. eds. Head and neck surgery otolaryngology. Philadelphia: Lippincott Williams & Wilkins. 187; 4: 97: 187.
2. Wu L, Li C, Pan L. Nasopharyngeal carcinoma: a review of current updates. Exp Ther Med 2018; 15(4):3687-92. https://doi.org/10.3892/etm.2018.5878
3. Adham M, Mat Lazim N, Carlos R. Clinical presentation of nasopharyngeal carcinoma. In: Abdullah B, Balasubramanian A, Mat Lazim N editors. An evidence-based approach to the management of nasopharyngeal cancer: from basic science to clinical presentation and treatment. London: Academic Press 2020; 93-109.
4. Walker NR, Mistry RK, Mazzoni T. Facial nerve palsy. StatPearls [Internet] Treasure Island (FL): StatPearls Publishing; 2022. https://www.ncbi.nlm.nih.gov/books/NBK549815/
5. Pieter NAL, Prawira AM. Nasopharyngeal carcinoma with a complication of facial nerve paresis. IJNPC 2021; 03(01):13-6.
6. Bhardwaj S, Mukutawat P, Bhardwaj S, Kumar N, Kaushal V. Facial nerve palsy: an atypical presentation of carcinoma nasopharynx. IJRESM 2020; 3(6):576-77.
7. Chhabda S, Leger DS, Lingam RK. Imaging the facial nerve: a contemporary review of anatomy and pathology. Eur J Radiol 2020; 126:108920. https://doi.org/10.1016/j.ejrad.2020.108920
8. Shah AB, Zulfiqar H, Nagalli S. Nasopharyngeal carcinoma. In: StatPearls [Internet] Treasure Island (FL): StatPearls Publishing; 2022 Jan-, https://www.ncbi.nlm.nih.g ov/books/NBK554588/. 2021;
9. Mahajan M, Abishek R, Guleria TC, Thakur J, Azad RK. Facial nerve palsy as a presenting feature of nasopharyngeal carcinoma: a rare case report. ASOL 2022; 4(9):29-31. https://doi.org/10.31080/ASOL.2022.04.0491
10. Salehiniya H, Mohammadian M, Hafshejani AM, Mahdavifar N. Nasopharyngeal cancer in the world: epidemiology, incidence, mortality and risk factors. WCRJ 2018; 5(1):e1046.
11. Leung KKY, Tong MCF. Assessment and staging of nasopharyngeal carcinoma. In: Abdullah B,

Balasubramanian A, Mat Lazim N editors. An evidence-based approach to the management of nasopharyngeal cancer: from basic science to clinical presentation and treatment. London: Academic Press 2020; 111-39.
12. Aninditha T, Soebroto AD, Nurhayati E. Komplikasi neurologis pada karsinoma nasofaring. eJKI 2018; 6(2):123-7. https://doi.org/10.23886/ejki.6.9813
13. Aydın S, Demir MG, Başak K. Preauricular metastasis of nasopharyngeal carcinoma. Causa Pedia 2020; 9(1):10-14.
14. Davies J, Al-Hassani F, Kannan R. Facial nerve disorder: a review of the literature. IJS Oncol 2018; 3(7):e65. https://doi.org/10.1097/IJ9.0000000000000065
15. Amouzegar EY. Nasopharyngeal carcinoma with intracranial involved. IJNPC 2020; 2(02):50-3. https://doi.org/10.32734/ijnpc.v2i02.3900