

# Individualized treatment of nasopharyngeal carcinoma with lung metastasis in an elderly patient: A case report

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Received February 5, 2025; Accepted July 17, 2025

DOI: 10.3892/ol.2025.15234

**Abstract.** Nasopharyngeal carcinoma (NPC) is a common head and neck malignancy, particularly in southern China, with distant metastasis posing significant treatment challenges, particularly in elderly patients. This case report details the successful management of a 90-year-old male with NPC and lung metastasis. The patient underwent intensity-modulated radiotherapy for the nasopharyngeal tumor (70 Gy/35 fractions) with concurrent oral capecitabine, followed by stereotactic body radiotherapy (60 Gy/12 fractions) and immunotherapy (tislelizumab) for progressive lung lesions. Maintenance therapy with capecitabine was continued and the patient achieved stable disease with minimal adverse effects. This case highlights the efficacy of individualized multimodal therapy, including precision radiotherapy, chemotherapy and immunotherapy, in an elderly patient with NPC with metastasis, offering a potential framework for similar cases.

## Introduction

Nasopharyngeal carcinoma (NPC) is a common head and neck malignancy in southern China, with distinct geographical and ethnic characteristics (1). Its development is closely linked to Epstein-Barr virus (EBV) infection, genetic susceptibility and environmental exposure, among other contributing factors (2). In low-risk populations, the incidence of NPC peaks moderately at 15-24 years of age, plateaus or slightly declines at 35-39 years and reaches a second, higher peak at ~65-79 years (3). With the aging population, the number of elderly patients with NPC is gradually increasing. However, these patients often face significant treatment challenges due to declining physical function and multiple comorbidities and they are frequently excluded from clinical studies (4). As a result, there is no consensus on

the treatment of elderly patients with NPC. Patients of very high age with NPC are rare in clinical practice. This case report details the successful treatment of a ~90-year-old patient with NPC with lung metastasis, aiming to provide a reference for the treatment of similar patients.

## Case report

*Case presentation.* An 89-year-old male presented at Shanghai Fourth People's Hospital (Shanghai, China) in February 2023 with a 6-month history of recurrent blood-stained nasal discharge. The patient had a history of cerebral infarction for eight years but denied any major cardiopulmonary diseases or allergies. Nasopharyngeal computed tomography (CT) revealed a mass in the right nasopharynx (Fig. 1A) and a biopsy confirmed NPC (keratinizing squamous cell carcinoma). IgA against EBV Zta protein was positive (EBV antibody test; Shanghai Kecheng Bio). There are no specific tumor markers for nasopharyngeal carcinoma and the patient did not undergo tumor marker testing. Chest CT showed a nodule in the left upper lobe (25x22 mm) (Fig. 2A). Regarding the patient's lung condition, it is worth mentioning that no pulmonary nodules were found during the patient's previous comprehensive medical check-up half a year ago, which included pulmonary CT imaging. However, concurrently with the diagnosis of NPC, a neoplastic lesion in the lung was detected. Due to the patient's advanced age, the family members, after careful consideration of the risks associated with puncture for pathological biopsy, elected to forgo further biopsy. Based on the principle of a single oncologic process, the lung lesion was clinically diagnosed as a metastatic focus, and further evaluation led to a diagnosis of NPC (cT1N0M1, lung metastasis), with a Performance Status score of 2. Patients with PS 2, defined as symptomatic but completely ambulatory or with <50% of their time in bed during the day (5).

## Treatment process

*Radiotherapy for nasopharyngeal tumor.* Considering the patient's advanced age, asymptomatic lung lesion and a history of cerebral infarction that did not affect daily activities, a multidisciplinary team decided to proceed with radiotherapy for the nasopharyngeal tumor. The history of cerebral infarction did not influence the treatment decision-making. From February to March, 2023, the patient received intensity-modulated radiotherapy with the following

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**Key words:** nasopharyngeal carcinoma, lung metastasis, elderly patient, radiotherapy, immunotherapy, stereotactic body radiotherapy

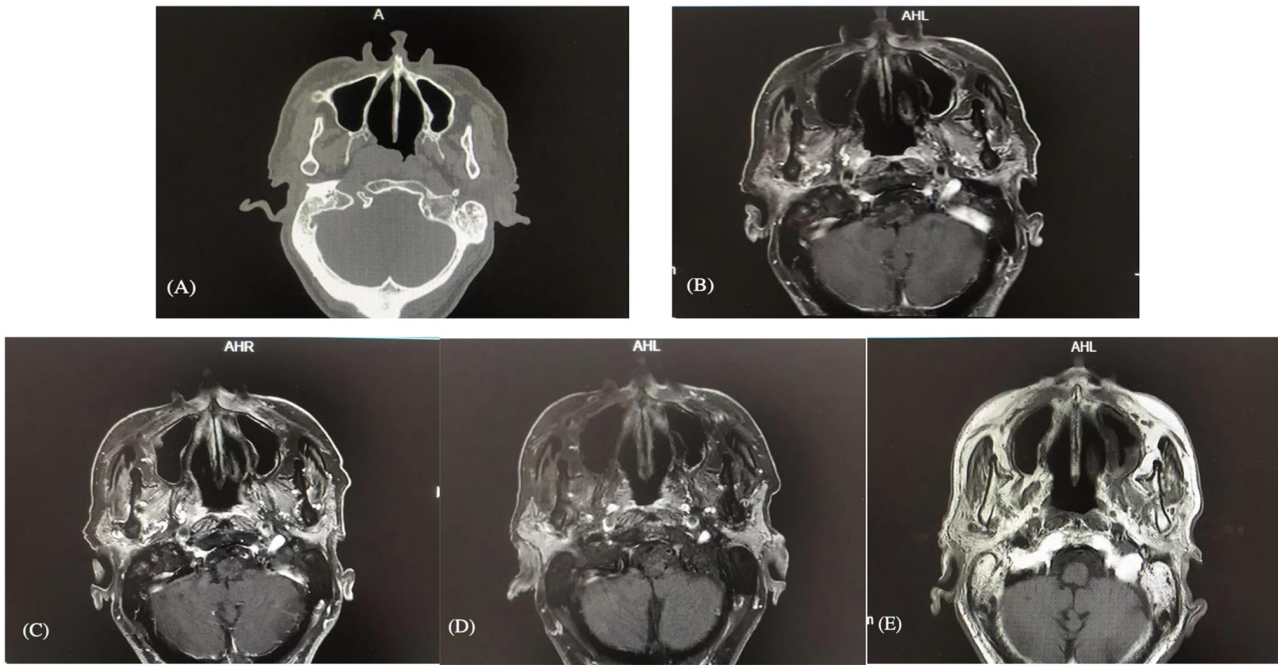


Figure 1. (A) Nasopharyngeal CT examination before radiotherapy; (B) nasopharyngeal magnetic resonance examination one month after radiotherapy; (C) nasopharyngeal magnetic resonance examination six months after radiotherapy; (D) nasopharyngeal magnetic resonance examination one year after radiotherapy; (E) nasopharyngeal magnetic resonance examination one and a half years after radiotherapy.

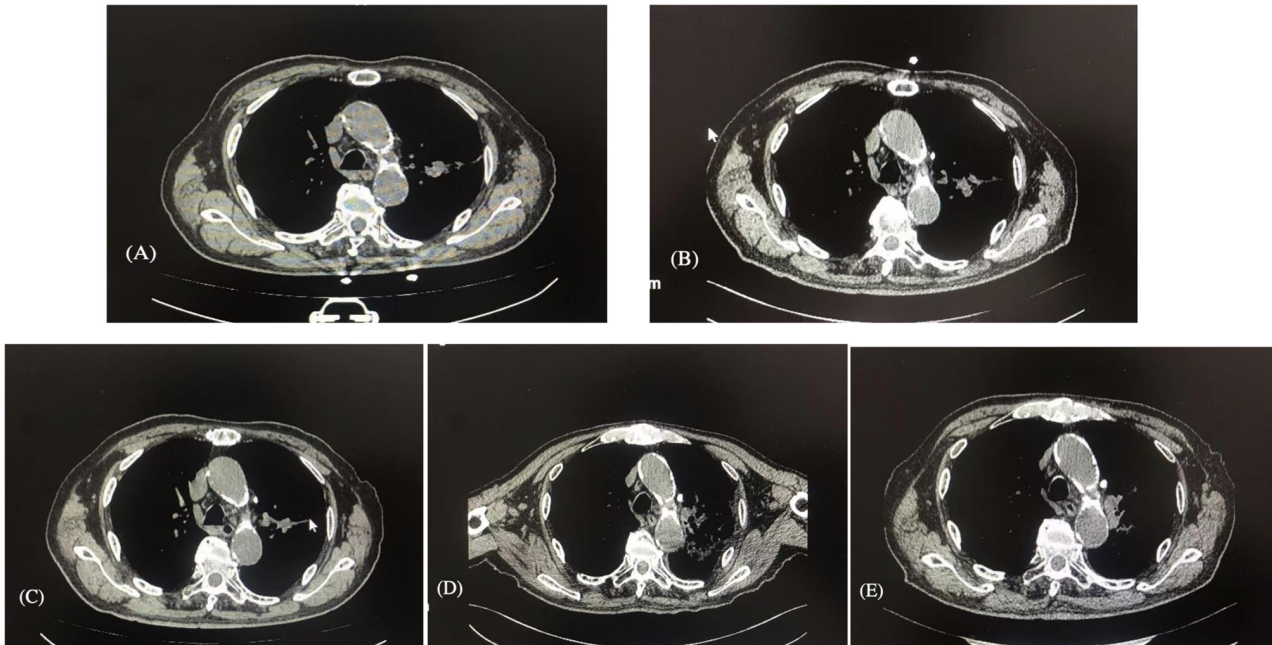


Figure 2. (A) Lung CT scan taken during the initial visit; (B) lung CT images before radiotherapy; (C) lung CT one month after radiotherapy; (D) lung CT six months after radiotherapy; (E) lung CT one year after radiotherapy.

doses: PGTV (nasopharyngeal tumor): 70 Gy in 35 fractions (Fx); and PCTV (nasopharynx + cervical lymphatic drainage area): 60 Gy in 30 Fx. Concurrent oral capecitabine (1.5 g twice daily) was administered to enhance local control. The patient tolerated the treatment well, with only oral mucositis as an adverse effect, which was managed symptomatically without interrupting radiotherapy. The blood-stained nasal discharge gradually resolved.

*Treatment of lung lesion.* On August 23, 2023, follow-up nasopharyngeal magnetic resonance imaging (MRI) showed slight thickening of the left nasopharynx, consistent with post-radiotherapy changes (Fig. 1B). Chest CT revealed a nodule in the right upper lobe (29x23 mm), indicating progression of the lung lesion (Fig. 2B). Given the patient's tolerance to prior treatment, stereotactic body radiotherapy (SBRT) was administered to the lung lesion from August 28 to September

12, 2023, with a dose of 60 Gy in 12 Fx. Concurrently, to enhance systemic antitumor effects, the patient received two cycles of immunotherapy with tislelizumab (200 mg intravenously) on September 4 and September 26, 2023.

**Maintenance therapy.** Following the above treatments, the patient continued maintenance therapy with oral capecitabine (1.5 g twice daily), underwent nasopharyngeal MRI and pulmonary CT every 6 months, and was regularly monitored for disease progression. Since capecitabine was used as a radiosensitizer during radiotherapy without any adverse reactions, it was chosen for maintenance therapy <6 months later, which did not involve any drug resistance. The main reasons for selecting capecitabine for maintenance therapy were its tolerable adverse reactions and the convenience of outpatient follow-up without the need for hospitalization.

**Treatment outcomes and follow-up.** After comprehensive treatment, the blood-stained nasal discharge resolved completely and oral mucositis gradually healed. Follow-up observations showed that the patient remained in a good general condition with retained self-care ability. Nasopharyngeal MRI and pulmonary CT findings indicated that nasopharyngeal and lung lesions remained stable without new metastatic foci (Figs. 1C-E and 2C-E). The patient underwent examinations at the Department of Otorhinolaryngology, Shanghai Fourth People's Hospital prior to treatment, but did not undergo nasopharyngeal MRI. Only nasopharyngeal CT was performed, which had little impact on the staging based on the examination results. After radiotherapy, nasopharyngeal MRI was conducted and the findings were consistent with the pre-treatment staging (Fig. 1B). The patient undergoes follow-up evaluations every 6 months. As of the time of manuscript submission, the patient remains alive with no evidence of disease progression and continues to receive oral capecitabine maintenance therapy.

## Discussion

The present study reported on the case of an elderly patient with NPC with lung metastasis. Treatment decisions were carefully tailored based on the patient's age, physical condition and tumor characteristics.

The nasopharynx is a critical anatomical region adjacent to vital structures such as the brainstem, spinal cord and parotid glands (6). According to the recommendations of NPS treatment guidelines, radiotherapy is the primary modality for patients with early-stage and locally advanced NPC (7). Precise target delineation during radiotherapy is essential to ensure adequate dose delivery to the tumor and potential lymphatic drainage areas while minimizing damage to surrounding normal tissues (8). Severe complications, such as brainstem injury leading to neurological dysfunction (9), radiation-induced myelopathy causing paralysis (10) and parotid gland damage resulting in xerostomia (11), must be avoided. Currently, the treatment of elderly patients with NPC still refers to the NPC diagnosis and treatment guidelines. In the present case, advanced radiotherapy techniques and meticulous planning enabled effective dose delivery (PGTV 70 Gy/35 Fx, PCTV 60 Gy/30 Fx) with only mild and manageable oral mucositis, demonstrating the feasibility and safety of precision radiotherapy in elderly patients.

NPC exhibits a strong propensity for metastasis, with ~5-8% of patients presenting with distant metastases at the time of diagnosis (12). The lungs rank among the most frequent sites of distant metastasis in NPC cases (13). Patients with exclusive pulmonary metastases demonstrate significantly superior overall survival (OS), whereas those with solitary pulmonary metastases achieve a disease-free survival exceeding 60 months (14,15).

When the lung lesion progressed, SBRT was employed due to its unique advantages for localized lung lesions. SBRT delivers high-dose radiation in a short period, precisely targeting tumor cells while sparing surrounding normal lung tissue, thereby reducing the risk of radiation pneumonitis and preserving respiratory function (16). Combined immunotherapy, such as tislelizumab, activates the immune system to recognize and attack tumor cells, targeting both the lung lesion and potential systemic micrometastases, synergizing with SBRT (17).

A previous study reported that the positive rate of programmed cell death ligand 1 (PD-L1) in NPC is as high as 90% or higher (18). In the present case, the patient's family refused PD-L1 testing of the patient but consented to concurrent chemoradiotherapy with immunotherapeutic agents. Relevant studies reported that monotherapy with programmed cell death 1 antibodies in recurrent/metastatic NPC achieved objective response rates of 20.5 to 34.0%, 1-year progression-free survival rates of 19.3 to 33.0% and 1-year OS rates of 59.0 to 63.0% (19-21). The incidence rate of immune-related adverse events was 15%, primarily manifesting as rash, liver dysfunction, stomatitis and anemia. Only one patient developed sepsis leading to death. Given the lack of clinical data on the application of immunotherapy in elderly patients with NPC, these studies provide clinical evidence for the application of immunotherapy in patients with NPC, including elderly patients. Currently, there is no relevant literature on the application of immunotherapy in elderly patients, to the best of our knowledge. In the present study, the choice of two cycles of immunotherapy for the patient was intended for radiosensitization during radiotherapy. Immunotherapy was discontinued after radiotherapy, and oral chemotherapy was selected for maintenance therapy due to the patient's reluctance to be hospitalized.

Delayed diagnosis, presence of comorbidities and poor performance status further increase the complexity of managing elderly patients with NPC (22,23). A study has shown that the incidence of comorbidities in elderly patients with NPC ranges from 22.4 to 58%, with comorbidities significantly associated with worse OS (24). The Charlson Comorbidity Index (25) and Adult Comorbidity Evaluation-27 scale (26) are currently the most commonly used assessment tools. Comorbidities have a significant impact on the survival of elderly patients with NPC and should be a primary consideration in treatment decision-making (27).

Throughout the treatment, close monitoring and timely adjustments ensured the patient tolerated the intensive anti-tumor therapy, achieving favorable short-term outcomes. Currently, only limited literature (or specific studies) exists on geriatric NPC, and there are no specific reports on treatment-related adverse reactions in patients. The treatment of elderly patients with NPC with metastasis remains a clinical challenge. The present case provides a successful example

of individualized treatment and further cases are needed to optimize therapeutic strategies.

In conclusion, for elderly patients with NPC with lung metastasis, an individualized comprehensive treatment strategy, including precision radiotherapy, concurrent chemotherapy, immunotherapy and maintenance therapy, can effectively control tumor progression and prolong survival while preserving quality of life. This approach preliminarily shows clinical application potential and warrants broader application. The single-case nature of this study and the absence of a control group limit the generalizability of the present findings. Further research with a larger sample size is warranted to validate the conclusions.

### Acknowledgements

Not applicable.

### Funding

This study was funded by the Subject Boosting Plan of Shanghai Fourth People's Hospital (grant no. SY-XKZT-2021-1014).

### Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

### Authors' contributions

TTC designed the study, wrote and revised the manuscript, checked and confirmed the authenticity of the raw data and approved the final version of the manuscript for publication. TTC has agreed both to be personally accountable for the author's own contributions and for the accuracy and integrity of any part of the submitted work.

### Ethics approval and consent to participate

The study was approved by the Ethics Committee of Shanghai Fourth People's Hospital (approval no. 2021-099-001). The patient and their family members were fully informed about the treatment modality and provided signed informed consent.

### Patient consent for publication

Informed consent was obtained from the patient for the publication of this case report, including the publication of all images, clinical data and other data included in the manuscript.

### Competing interests

The author declares that they have no competing interests.

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