Comprehensive Treatment of Mediastinal Neuroendocrine Tumor: A Case Report

Qi Yu
Zhengzhou University First Affiliated Hospital
Zhen Li (lzlyct620@163.com)
Zhengzhou University First Affiliated Hospital
Xinwei Han
Zhengzhou University First Affiliated Hospital

Case report

Keywords: neuroendocrine tumor, transcatheter arterial chemoembolization, drug-eluting bead

Posted Date: October 1st, 2021

DOI: https://doi.org/10.21203/rs.3.rs-942209/v1

Abstract

Neuroendocrine tumors in the mediastinum are relatively rare. We report a patient with mediastinal neuroendocrine tumor that was successfully resected after descending stage by drug-eluting embolic transcatheter arterial chemoembolization had been performed. No tumor recurrence was found in the 1-year follow-up after surgical resection.

Introduction

Neuroendocrine tumors (NETs) are thought to arise from cells throughout the diffuse endocrine system. NETs comprise a broad family of tumors, where the most common are in the gastrointestinal tract, lung, thymus and pancreas. Primary mediastinum is rare. Here, a summary and analysis of clinical data is presented from a patient with giant mediastinal neuroendocrine tumor that was successfully resected after descending stage by drug-eluting embolic transcatheter arterial chemoembolization (DEE-TACE) had been performed. No tumor recurrence was found in the 1-year follow-up after surgical resection.

Case Presentation

A 32-year-old male patient was admitted with symptoms such as chest tightness, chest pain, cough and panic. Computed tomography (CT) had shown that the mediastinum and right lung occupied a space, measuring about 11 cm × 17 cm, with uneven enhancement (Fig. 1a). Then, etoposide and cisplatin chemotherapy were used for 5 cycles. After three months, the CT scan revealed that the tumor was slightly smaller than before, measuring about 10 cm × 14 cm, but uneven enhancement was still seen (Fig. 1b). Multidisciplinary consultation showed that the tumor was huge and close to the pericardium, so it was difficult to remove. Considering the abundant blood supply of the tumor, it was deemed feasible to perform surgical resection after transcatheter arterial chemoembolization.

Using a transfemoral approach, a 5-F Cobra (Cook Medical Products, Bloomington, IN, USA) catheter was used to examine the bronchial artery, internal thoracic artery and phrenic artery for angiography (Fig. 2). Then the responsible vessels were intubated with 2.7-F PROGREAT® microcatheter (Terumo Interventional Systems, Tokyo, Japan). Through the microcatheter, 40 mg of docetaxel and a vial of 300–500 μm diameter CalliSpheres microspheres (Suzhou Hengrui Callisyn Biomedical Co., Ltd., Suzhou, Jiangsu Province China) loaded with 100 mg of oxaliplatin were injected to occlude each tumor artery until angiographic tumor staining disappeared. Then, the 5-F vertebral catheter (Cook Medical Products, Bloomington, IN, USA) was used to intubate the right internal mammary artery, where the tumor staining area could be visualized by angiography. Embolization was subsequently performed with the above method. It must be noted that the embolic agent should be injected slowly to avoid nontargeted embolization. The patients were given symptomatic treatment after operation to reduce edema and prevent infection.

One month after embolization, CT scan showed a considerable reduction in tumor size and blood supply. After a further round of DEE-TACE consolidation treatment had been completed, CT scan showed a considerable reduction in tumor size (8.5 cm × 13 cm) and complete necrosis of the tumor (Fig. 1c). After the surgical consultation, the tumor load was significantly reduced, so it was decided to move forward with the tumor resection and right upper lobectomy. Postoperative pathology revealed a mediastinal neuroendocrine tumor along with chronic inflammation of the upper lobe of the right lung and interstitial fibrosis. One month after resection, CT scan showed no residual tumor. The life quality of the patient was significantly improved, without chest tightness, chest pain, or other symptoms. At 1-year of follow-up, he had no tumor recurrence.

Discussion

NETs mainly occur in stomach, intestine and pancreas, but primary mediastinum is rare. Because the symptoms and signs of NETs are not typical, the clinical manifestations are complex. Most patients have local spread or distant metastasis when diagnosed and lose the chance for radical operation[1]. The treatment strategy for mediastinal NET is still inconclusive, but surgical resection is still the standard treatment. For patients with highly and moderately differentiated (G1/G2) tumors that cannot be surgically removed and with locally advanced and distant metastases, a combination of systemic and local therapies should be adopted. In this case report, the tumor was considered to be at the G2 stage. An etoposide and cisplatin regimen was used for chemotherapy, but the effect was not good. Considering that the tumor was huge, surrounded by blood vessels, and difficult to surgically remove, embolization was decided to quickly reduce the tumor burden.

Transcatheter arterial chemoembolization (TACE) has been previously used for the treatment of liver cancer, and the technology has been widely used in extrahepatic tumors[2]. Drug-eluting embolic microspheres can be loaded with chemotherapy drugs, and therefore they can embolize the tumor blood vessel bed and while releasing drugs. According to National Comprehensive Cancer Network guidelines for neuroendocrine tumors, etoposide/cisplatin or etoposide/carboplatin are used as first-line drugs[3]. There is no clear plan for second-line treatment, but fluorouracil or capecitabine combined with oxaliplatin or irinotecan can be considered[4]. Furthermore, oxaliplatin is the only platinum drug that can be loaded by CalliSpheres microspheres. Microspheres that ranged 300_500 μm in diameter were chosen to avoid possible fistula or dangerous anastomosis.

Conclusion

Neuroendocrine tumors originating from the mediastinum are rarely reported. DEE-TACE down-stage treatment of mediastinal neuroendocrine tumors may be safe and effective.

Abbreviations

NET	Neuroendocrine tumor
DEE-TACE	Drug-eluting embolic transcatheter arterial chemoembolization
TACE	Transcatheter arterial chemoembolization
CT	Computed tomography

Declarations

Ethical Approval and Consent to participate

This report was approved by the institutional review board

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal

Availability of supporting data

Not applicable

Competing interests

The authors declare that they have no competing interests

Funding

Not applicable

Authors' contributions

Collection and assembly of data and drafting of the article: Q.Y; Critical revision of the article for important intellectual content: Z.L., XW.H.

Acknowledgements

Not applicable

References

1. Dasari A, Shen C, Halperin D, Zhao B, Zhou S, Xu Y, Shih T, Yao JC: **Trends in the Incidence, Prevalence, and Survival Outcomes in Patients With Neuroendocrine Tumors in the United States**. *JAMA Oncol* 2017, **3**(10):1335-1342.

2. Li Z, Ji K, Bai L, Wang C, Hu Y, Shi Y, Zhan P, Song L, Li X, Duan X *et al*: **A novel application of drug-eluting transarterial chemoembolization in treating non-liver cancers**. *Medicine (Baltimore)* 2020, **99**(31):e20878.
3. Shah MH, Goldner WS, Halfdanarson TR, Bergsland E, Berlin JD, Halperin D, Chan J, Kulke MH, Benson AB, Blaszkowsky LS *et al*: **NCCN Guidelines Insights: Neuroendocrine and Adrenal Tumors, Version 2.2018**. *Journal of the National Comprehensive Cancer Network : JNCCN* 2018, **16**(6):693-702.
4. Okita NT, Kato K, Takahari D, Hirashima Y, Nakajima TE, Matsubara J, Hamaguchi T, Yamada Y, Shimada Y, Taniguchi H *et al*: **Neuroendocrine tumors of the stomach: chemotherapy with cisplatin plus irinotecan is effective for gastric poorly-differentiated neuroendocrine carcinoma**. *Gastric cancer : official journal of the International Gastric Cancer Association and the Japanese Gastric Cancer Association* 2011, **14**(2):161-165.

Figures

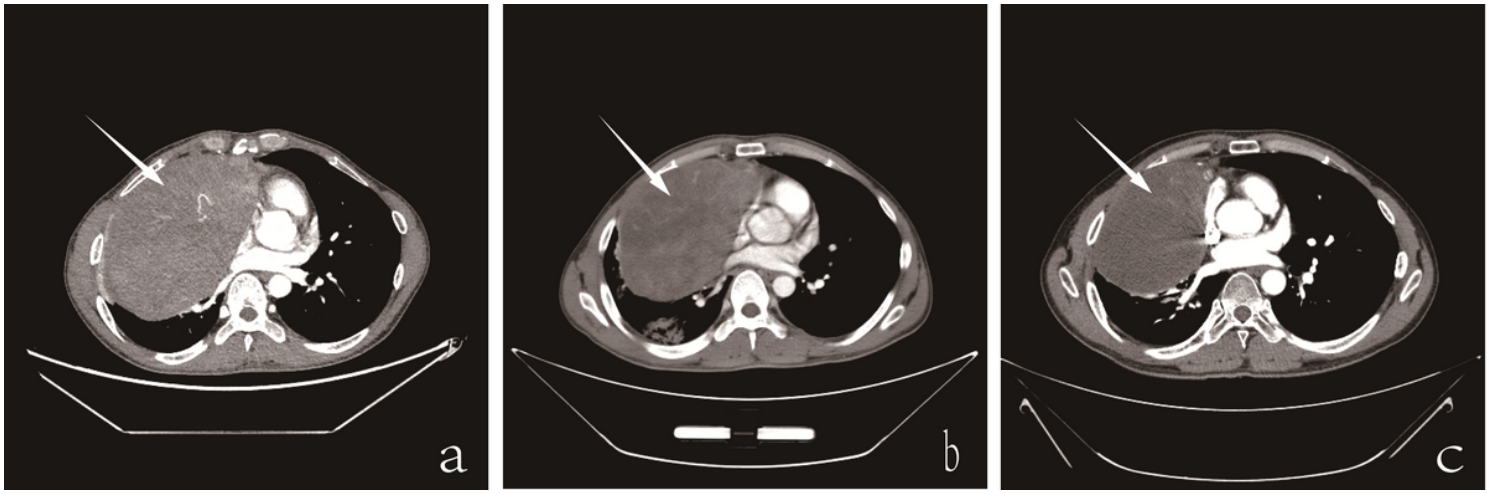

Figure 1

(a) A 11 cm × 17 cm mass located in the right lung and mediastinum. (b) 3 months after chemotherapy, CT scan showed that the mass had shrunk (10 cm × 14 cm). (c) CT image obtained after the third DEE-TACE revealed a considerable tumor reduction to 8.5 cm × 13 cm in size and complete necrosis of the tumor (arrow).

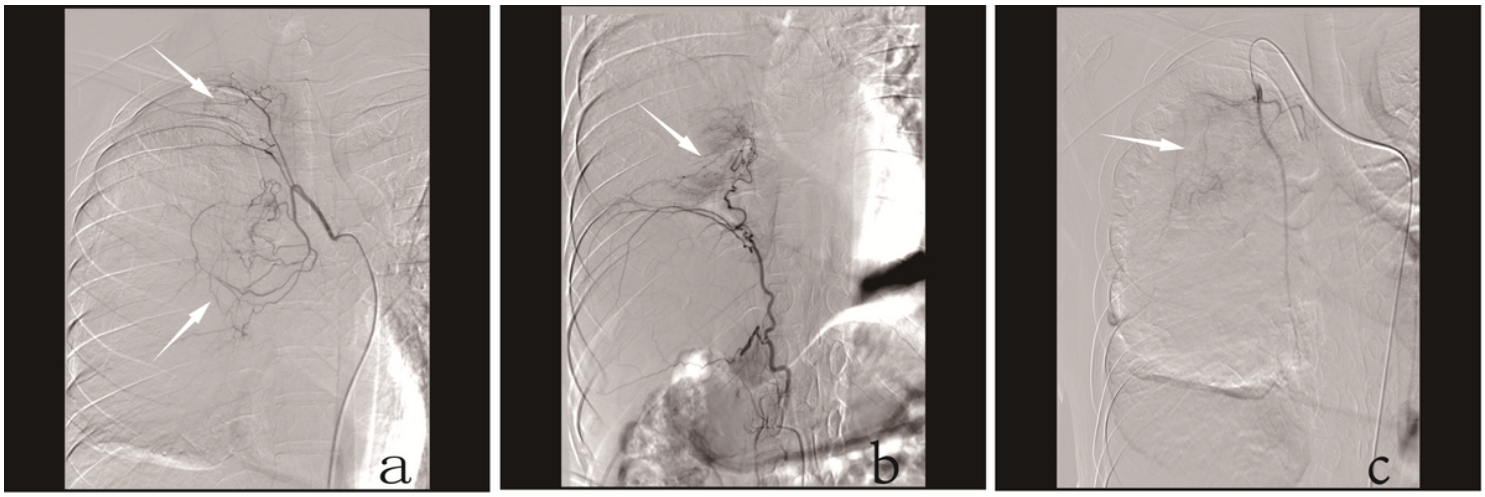

Figure 2

Angiographic image during the first DEE-TACE showed the bronchial artery (a), phrenic artery (b) and internal thoracic artery (c) as a tumor-feeding vessel (arrow).