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A Case Of Thyroid Papillary Carcinoma Invading The Trachea: Management With Tracheal Stenting

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Клинический случай папиллярной карциномы щитовидной железы с инвазией в трахею: стентирование трахеи

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一例甲状腺乳头状癌侵入气管的病例：气管支架的管理

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Papillary carcinoma of the thyroid gland has a favourable prognosis and good survival rate, in addition to being the most common malignant tumour of the gland. Extrathyroidal extension and invasion are features of this tumour. Early diagnosis is important as surgical resection may not be possible in advanced cases, depending on the invasion findings. In this report, we present a papillary thyroid carcinoma case with mediastinal and tracheal invasion, which we managed with bronchoscopy and tracheal stenting before referral to oncology.
Key words: Papillary thyroid carcinoma, tracheal invasion, mediastinal invasion, tracheal stent

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Папиллярная карцинома щитовидной железы имеет благоприятный прогноз и высокие показатели выживаемости, а также является наиболее распространенной злокачественной опухолью щитовидной железы. Экстратиреоидное распространение и инвазия могут быть характерны для этой опухоли. Ранняя диагностика имеет ключевое значение, так как в запущенных случаях хирургическая резекция может быть невозможна по причине значительной инвазии. В данной статье мы представляем случай пациентки с папиллярной карциномой щитовидной железы с инвазией в средостение и трахею, которой были выполнены бронхоскопия и стентирование трахеи перед направлением в онкологическое учреждение.
Ключевые слова: папиллярная карцинома щитовидной железы, инвазия трахеи, инвазия средостения, трахеальный стент

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甲状腺乳头状癌是甲状腺最常见的恶性肿瘤，具有良好的预后和较高的生存率。肿瘤的特征包括腺外扩展和侵袭。早期诊断很重要，因为在晚期病例中，手术切除可能无法进行，具体取决于侵袭的发现。在本报告中，我们介绍了一例甲状腺乳头状癌伴纵隔和气管侵袭的病例。在转诊至肿瘤科之前，我们通过支气管镜检查和气管支架对其进行了处理

关键词：甲状腺乳头状癌，气管侵袭，纵隔侵袭，气管支架

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Introduction

Papillary carcinoma is the most common type among thyroid cancers and is known to have excellent prognosis and high survival rates [1]. Most of the patients with this tumour are asymptomatic and, extrathyroidal extension and invasion of important structures are uncommon [2]. In this report, we describe a rare case of papillary thyroid carcinoma (PTC), presenting as an antero-superior mediastinal mass with tracheal invasion and encasing of major mediastinal structures and great vessels. Bronchoscopic assessment and then tracheal stenting were performed before referral to oncology for definitive treatment.

Case report

A 59-year-old female patient presented with hoarseness and positional breathlessness progressing for more than a year. She was a never-smoker without any comorbidities and with good performance score. In physical examination, stridor and hoarseness were present, along with palpable thyroid enlargement and distended superficial veins at the anterior chest wall and lower neck region. A chest X-ray showed an enlarged irregular mediastinal shadow and the subsequent CT scan demonstrated a large (10.3x 9.4x 6,5 cm) heterogeneous antero-superior mediastinal mass with mixed cystic and soft tissue components. Tracheal compression was prominent, with suspicion of tracheal wall invasion. The lesion was also abutting the oesophagus, encasing the arcus aorta and great vessels, and causing evident displacement. Collateral vascularity were present at the anterior chest wall, very likely secondary to the left brachiocephalic vein invasion (Figure 1). Imaging details and clinical findings were consistent with the progression of the tumour in the mediastinal region with invasion of major structures.

In the FDG-PET/CT scan, the cystic component was non-avid, but the solid part of the mass showed high avidity with an SUVmax value of 37.5 (Figure 2). Blood tests were insignificant with normal Beta-human chorionic gonadotropin and LDH levels. Thereafter, a CT-guided needle aspiration biopsy was performed, which revealed papillary carcinoma of the thyroid gland. The consideration of surgical resection for such an advanced tumour was already related with high mortality and unresectable tumour. In addition to these, major surgical complications were probable, leading to permanent disabilities such as tracheostomy, compromise of left upper extremity functions, stroke, and loss of voice. A rigid and flexible bronchoscopy procedure was performed to assess tracheal invasion and stenosis. It showed normally functioning vocal cords, high grade tracheal narrowing beginning 15 mm below the cords and it was not possible to pass through the stenosis with the flexible bronchoscope. Obvious signs of tracheal invasion in the mid tracheal portion was also present. Surgical resection was not indicated considering the invasion features in the CT scan, and the bronchoscopy findings. Therefore, a covered metallic tracheobronchial stent (20x60 mm, silicon-covered, knitted nitinol) was placed in the narrowed tracheal segment, via rigid bronchoscopy. Patient's breathing improved significantly, and the stridor was resolved (Figure 3). The patient was then referred to the oncology discipline for treatment. Unfortunately, the patient's survival was limited to less than two months. The treatment period which could include one course of radiotherapy was complicated by a lower respiratory tract infection and deterioration of clinic picture, which led the patient to pass away eventually.

Discussion

The context of papillary thyroid carcinoma being locally invasive was discussed previously by McCaffrey et al in a study consisting of 262 patients, all of whom received treatment for invasive papillary thyroid carcinoma. Tracheal invasion, which was present in 37% of these cases, was highlighted as one of the significant factors influencing survival together with oesophageal invasion [3]. Tracheal invasion of PTC was also discussed in a case report, emphasising the importance of early detection and the indisputable value of bronchoscopy in both diagnosis and treatment planning [4]. It is suggested that preoperative bronchoscopy should be performed for thyroid cancer patients with suspicion of invasion and with signs of vocal cord paralysis [5]. In our case, rigid and flexible bronchoscopy let us detect the invasion and place the tracheal stent for the stenosis.

Mediastinal extension and invasion of great vessels by PTC is rare and demonstrated probably first time by Patel in a case report. In this case, the tumour was invading the vena cava superior and brachiocephalic vein and treated surgically [6]. Similar cases with PTC causing superior vena cava syndrome were discussed later, but only in a limited number of case reports, most of them describing complex surgical resections [7–9]. Despite successful surgical resections and papillary thyroid carcinoma's indolent

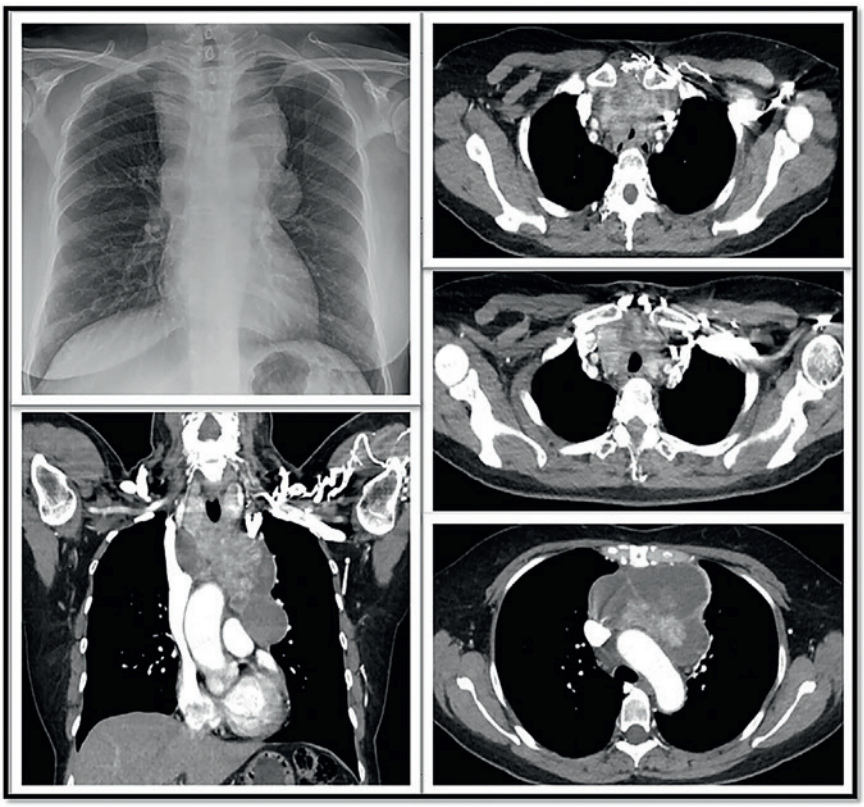

Figure 1. Chest X-ray and CT scan images demonstrating the mass lesion
Рисунок 1. Рентгенограмма и компьютерная томограмма органов грудной клетки, демонстрирующие объемное образование

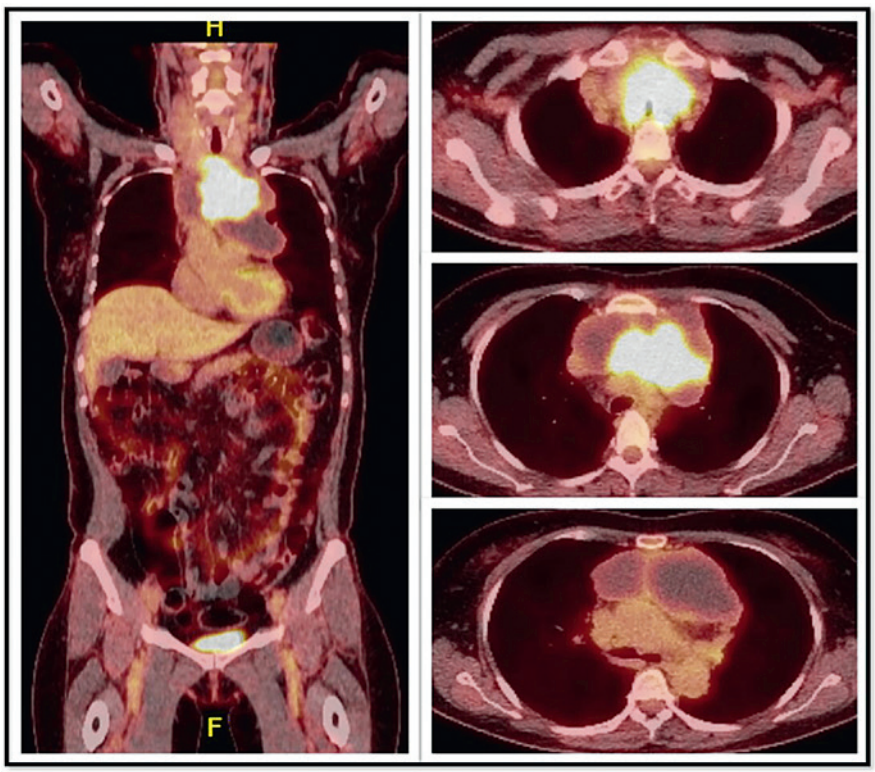

Figure 2. PET/CT scan showing avidity in the solid component of the lesion with the non-avid appearance of cystic parts
Рисунок 2. ПЭТ/КТ-изображение, демонстрирующее накопление радиофармпрепарата в солидном компоненте поражения с неавидными кистозными участками

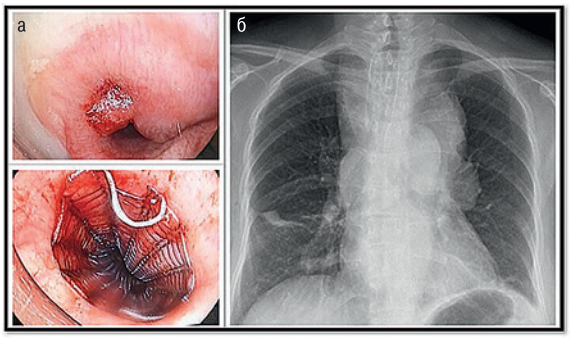

Figure 3. Bronchoscopy and post-bronchoscopy images: a – Tracheal narrowing with invasion and placed tracheal stent, b – Postoperative X-ray showing the tracheal stent in place

Рисунок 3. Бронхоскопия и постбронхоскопические снимки: а – сужение трахеи инвазивной опухолью и установленный трахеальный стент, б – послеоперационная рентгенограмма, на которой виден установленный трахеальный стент

character, vascular invasion was associated with poor prognosis and recurrence [9].

In our case, the tumour demonstrated a mixture of cystic and solid parts which was shown to be present in PCT with mediastinal involvement. Naveen et al. presented a case of large cystic mediastinal lesion which appeared to be a mediastinal lymph node metastasis secondary to papillary thyroid cancer in final histopathology [10]. In another case of papillary thyroid cancer, presenting as a giant mediastinal cyst, Young et al. described their successful surgical resection. They emphasized that the cystic component has a limited amount of tumour cells, making it difficult to obtain a diagnosis [11]. A similar feature was mentioned by Suemitsu et al, as they described a big cystic mediastinal PTC invading the right main bronchus. They associated the lack of malignant cells in the cystic tumour with aggressive pathological features leading to necrosis [12].

For patients with airway symptoms due to papillary thyroid carcinoma, bronchoscopy and stenting can be an option for palliation and symptom relief, when surgical resection is not possible. Tsutsui et al. published their study of bronchoscopic stenting in 35 patients with thyroid carcinoma of which 71% was papillary type. They underlined significant palliation with stenting and mentioned fewer complications with self-expandable metallic stents compared to silicon ones [13]. Hopkins C et al. also described tracheal stenting for invasive PTC in their case report and demonstrated the efficacy with significant improvement in lung function tests [14]. In our case, immediate improvement of stridor was achieved after stenting, but unfortunately due to the short survival, there was no chance to observe the long term efficiency of the metallic stent.

Conclusion

Papillary carcinoma is a type of thyroid gland cancer well known for its good prognosis. Presentation with mediastinal extension and invasion of the trachea is rare. We emphasise the importance of early diagnosis for this tumour, which plays a crucial role in providing radical treatment. In advanced cases with tracheal invasion or stenosis, where surgical resection is not possible, airway stenting is an appropriate option for palliation and symptomatic relief.

References

1. *Clark OH. Thyroid cancer and lymph node metastases. J Surg Oncol. 2011;103(6):615–618*
2. *Ortiz S, Rodríguez JM, Soria T. et al. Extrathyroid spread in papillary carcinoma of the thyroid: clinicopathological and prognostic study. Otolaryngol Head Neck Surg 2001;124:261–65. DOI: 10.1067/mhn.2001.113141*
3. *McCaffrey TV, Bergstralh EJ, Hay ID. Locally invasive papillary thyroid carcinoma: 1940-1990. Head Neck. 1994;16(2):165–72. doi: 10.1002/hed.2880160211. PMID: 8021137.*
4. *Zhang J, Fu C, Cui K, Ma X. Papillary thyroid carcinoma with tracheal invasion. Medicine 2019;98:38(e17033). DOI: 10.1097/MD.0000000000017033*
5. *Randolph GW, Kamani D. The importance of preoperative laryngoscopy in patients undergoing thyroidectomy: voice, vocal cord function, and the preoperative detection of invasive thyroid malignancy. Surgery 2006;139:357–62. DOI : 10.1016/j.surg.2005.08.009.*
6. *Patel PC, Millman B, Pellitteri PK, Woods EL. Papillary thyroid carcinoma presenting with massive angioinvasion of the great vessels of the neck and chest. Otolaryngol Head Neck Surg. 1997;117(6):S117–20. doi: 10.1016/s0194-5998(97)70076-7. PMID: 9419122.*
7. *Ingle SA, Karnik ND, Pradhan NN. et al. Papillary carcinoma of thyroid presenting as posterior mediastinal mass with superior vena cava syndrome. J Assoc Physicians India. 2004;52:1004-5. PMID: 15884466.*
8. *Shirah BH, Shirah HA, Al hassan AK, Elnour AE. Retrosternal metastatic papillary thyroid cancer causing superior vena cava syndrome: A very rare presentation, Annals of Vascular Surgery 2017., doi: 10.1016/j.avsg.2017.08.025.*
9. *Motohashi S, Sekine Y, Iizasa T. et al. Thyroid cancer with massive invasion into the neck and mediastinal great veins. Jpn J Thorac Cardiovasc Surg. 2005;53(1):55–57. doi: 10.1007/s11748-005-1012-8. PMID: 15724506.*
10. *Naveen S, Chauhan S, Raghavan N, et al. A large superior mediastinal mass."Terrible Thyroid Cancer". J Endocrinol Metab. 2016;6:27–9. doi: http://dx.doi.org/10.14740/jem325w*
11. *Young J, Granfield A, Mazzaglia PJ, Okereke I. Papillary thyroid cancer presenting as a giant mediastinal cyst. Glob Surg. 2015;2:95–96. DOI: 10.15761/GOS.1000129*
12. *Suemitsu R, Takeo S, Hamatake M. et al. Thyroid cancer with a cystic mediastinal tumor invading the right main bronchus. Ann Thorac Surg. 2010;89(1):296–98. doi: 10.1016/j.athoracsur.2009.02.084. PMID: 20103264.*
13. *Tsutsui H, Kubota M, Yamada M. et al. Airway stenting for the treatment of laryngotracheal stenosis secondary to thyroid cancer. Respirology. 2008;13(5):632-8. doi: 10.1111/j.1440-1843.2008.01309.x. Epub 2008 May 29. PMID: 18513246.*
14. *Hopkins C, Stearns M, Watkinson AF. Palliative tracheal stenting in invasive papillary thyroid carcinoma. J Laryngol Otol. 2001;115(11):935–37. DOI: 10.1258/0022215011909413. PMID: 11779317.*

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