

CASE SERIES AND REPORTS

Parapharyngeal metastases from thyroid cancer: surgical management of two cases with minimally-invasive video-assisted technique

Metastasi dello spazio parafaringeo da carcinoma della tiroide: trattamento chirurgico di due casi con tecnica video-assistita mini-invasiva

L. GIORDANO, F. PILOLLI, S. TOMA, M. BUSSI

Otorhinolaryngology Unit, Head and Neck Department, "San Raffaele" Hospital and Vita-Salute University, Milano, Italy

SUMMARY

Metastases to parapharyngeal or retropharyngeal lymph nodes are rare in well-differentiated thyroid cancers. A review of English literature found only 112 cases reported in the last two decades, with an incidence of parapharyngeal lymph nodes metastases ranging from 0.43 to 2.5%. Surgical resection is the most effective treatment for patients with parapharyngeal lymph node metastasis from thyroid carcinoma. We describe two cases of thyroid cancer parapharyngeal lymph node metastases that were surgically removed using a traditional transcervical approach, with the help of a minimally-invasive video-assisted technique. A video-assisted minimally-invasive transcervical approach is a new technique for excision of sizable benign tumours and selected malignant tumours. The endoscopic technique allows clear identification of critical surgical landmarks that guide the dissection through the correct cleavage plane in a nearly bloodless surgical field, thus decreasing the rate of complications. In both patients postoperative follow-up showed no sequelae and recurrence after 20 and 15 months from surgery.

KEY WORDS: Thyroid cancer • Parapharyngeal space metastases • Video-assisted transcervical approach

RIASSUNTO

Le metastasi dei tumori tiroidei ben differenziati nello spazio parafaringeo o nei linfonodi retrofaringei rappresentano una rara condizione. La nostra revisione della letteratura documenta solo 112 casi descritti negli ultimi vent'anni, con una incidenza di metastasi parafaringee che si attesta tra lo 0,43 e il 2,5%. Il trattamento di scelta di tali secondarismi è rappresentato dall'exeresi chirurgica. In questo lavoro descriviamo due casi di metastasi parafaringee da carcinoma papillare della tiroide trattati chirurgicamente mediante un approccio trans-cervicale associato all'ausilio di una tecnica video-assistita mini-invasiva. L'approccio trans-cervicale mini-invasivo video-assistito è una nuova tecnica che trova indicazione nell'exeresi di tumori benigni e di selezionati tumori maligni dello spazio parafaringeo. La tecnica endoscopica permette una chiara identificazione dei punti di repere e dei piani di clivaggio, consentendo una meticolosa dissezione in un campo chirurgico quasi esangue. La metodica risulta pertanto gravata da un ridotto tasso di complicanze post-operatorie con uguale radicalità oncologica. In entrambi i pazienti il follow-up post-operatorio non ha mostrato sequele né segni di recidiva a distanza di 20 e 15 mesi dall'intervento.

PAROLE CHIAVE: Carcinoma tiroideo • Metastasi dello spazio parafaringeo • Approccio trans-cervicale video-assistito

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Introduction

Well-differentiated thyroid cancers are characterised by a 20-50% rate of regional lymph node metastases¹, which are usually found in the internal jugular and recurrent laryngeal chain^{2,3}. Metastases to retropharyngeal lymph nodes (RPLN) or parapharyngeal lymph nodes (PPLN) are rare. To the best of our knowledge, only 112 cases of PPLN and RPLN metastases have been reported during the last two decades, and the reported incidence of PPLN metastases of well-differentiated thyroid cancers varies widely, from 0.43% to 2.5%⁴⁻⁶.

Complete surgical removal is the only curative treatment

in such cases^{4,7}. We describe two cases of thyroid cancer PPLN metastases that were surgically removed using a traditional transcervical approach with the help of a minimally-invasive video-assisted technique to improve the limited working space.

Case reports

In the past 10 years, 2 patients underwent surgical treatment for PPLN thyroid papillary carcinoma metastases at San Raffaele Scientific Institute in Milan, Italy. Both patients were female and had no symptoms related to the parapharyngeal masses.

Case 1

A 53-year-old Caucasian woman presented with a complex history of papillary thyroid carcinoma diagnosed in April 1987. The patient had undergone right hemithyroidectomy with selective neck dissection (levels II-IV and VI) in another hospital. Histopathological analysis demonstrated a pT2 PN1a papillary thyroid carcinoma. In the same year, completion total thyroidectomy was performed on the left lobe. Radioactive iodine treatment (RAI) was then performed one year later. In June 2000, the patient underwent revision of the III right Robbin's level for a single nodal relapse, followed by RAI. In 2011, a new recurrence was suspected due to elevated thyroglobulin. Positron emission tomography (PET) – computed tomography showed a right parapharyngeal area of increased glucose uptake. Contrast-enhanced MRI demonstrated a 36-14-19 mm well-circumscribed heterogeneous mass in the right parapharyngeal retrostyloid space that compressed the internal carotid artery, without infiltration. Transcervical fine needle aspiration cytology (FNAC) performed on the parapharyngeal mass was strongly suggestive for metastasis of papillary thyroid carcinoma.

The lesion was treated with radiotherapy (70 Gy) from October 2011 to December 2011. In February 2012, PET imaging and MRI demonstrated persistence of the mass. In April 2012, the patient was finally referred to our centre. We performed a right transcervical approach to the parapharyngeal space with a 56 mm skin incision. Under direct endoscopic visualisation, using 0° and 30° Hopkin's telescopes, the tumour was carefully separated from surrounding tissues. Tumour excision was performed following an extracapsular dissection plane upwards and circumferentially. The tumour was removed en bloc. The drain was removed on postoperative day 4 and the patient was discharged the day after. No complications were observed. Histopathological diagnosis was papillary thyroid carcinoma metastasis.

The patient underwent postoperative RAI. MRI and scintigraphy have shown no evidence of tumour recurrence at 20 months after surgery.

Case 2

In October 2012, a 42-year-old woman was referred to our centre for multiple right neck lymph nodal metastases and right PPLN localisation of papillary thyroid carcinoma. In March 2012, the patient had undergone subtotal thyroidectomy for papillary thyroid carcinoma (pT1b cN0) in another centre. In September 2012, a cervical swelling was noted and FNAC suggested the presence of papillary thyroid carcinoma. Subsequent MRI showed multiple pathological lymph nodes in levels II, III, IV and VI on the right side, along with residual thyroid tissue in the right tracheo-oesophageal space in close contact with the aberrant right subclavian artery (luscian artery), and a right parapharyngeal mass.

A long 140 mm incision was performed to obtain wide surgical access. Revision thyroidectomy was technically complex due to the tight adhesions between the residual thyroid tissue, the oesophagus and the aberrant subclavian artery. Right selective neck dissection of levels II, III, IV and VI was performed. The PPLN was excised with the assistance of a video-endoscope. The 2 drains were removed on postoperative day 3 and the patient was discharged the day after. No postoperative complications were observed. Post-operative MRI follow-up has shown no evidence of tumour recurrence at 15 months after surgery.

Discussion

The potential for PPLN and RPLN metastatisation of oropharyngeal and hypopharyngeal carcinomas is well known, although PPLN and RPLN thyroid carcinoma metastatisation is a rare occurrence. Desuter et al.⁴ reported that only 0.43% (3/696) of thyroid papillary carcinomas had parapharyngeal node metastasis. Wang et al.⁶ presented 25 PPLNs tumours in a series of 5381 thyroid cancers (0.43%). As described by Kainuma⁸, recurrent cases of RPLN or PPLN metastasis are predominant.

Wang et al.⁶ reported the largest single centre series of RPLN and PPLN metastases (25 patients, 22 papillary carcinomas, 2 medullary carcinomas, and 1 follicular carcinoma). They identified 3 types of presentation of PPLN metastases:

1. nodal relapse in PPLN after previous surgical treatment (16/25, 64%);
2. cervical and parapharyngeal node involvement as the initial presentation of thyroid carcinoma (5/25, 20%);
3. PPLN metastasis as the only nodal involvement at first diagnosis (4/25, 16%).

The authors emphasised that, in the first two types of presentation, neck dissection and/or widespread cervical lymph node metastases might alter the direction of lymphatic drainage, and increase retropharyngeal drainage resulting in PPLN metastasis.

In 1938, the anatomist Rouvier⁹ described a lymphatic connection between the upper pole of the thyroid and the retropharyngeal lymphatic system, which occurred in one fifth of the cadaver dissection specimens he analysed. This lymphatic vessel was called the postero-superior collecting vessel. The retropharyngeal space communicates with the parapharyngeal space (PPS) through a dehiscence of the superior constrictor fascia, permitting potential lymphatic spread from the RPLN into the PPLN. These observations provide a satisfactory explanation for PPLN metastasis from occult thyroid carcinomas¹⁰.

Since parapharyngeal metastases are usually asymptomatic and difficult to examine clinically, all patients with thyroid cancer who have previously undergone neck dissection or who have widespread cervical lymph node metastases should be studied with accurate preoperative head and neck imaging. Ultrasonography can define thy-

roid disease and lymphadenopathy of the neck, but it cannot investigate the parapharyngeal and retropharyngeal spaces. Contrast-enhanced CT scan can show characteristic features such as a cystic mass or calcifications in the PPS⁶, but it is not normally recommended due to associated delay in I-131 therapy. Magnetic resonance contrast enhanced imaging is not routinely performed, but it avoids the limitations inherent to iodinated contrast agents.

The anatomic complexity of the PPS space has led to the development of various surgical approaches: transcervical, transparotid, transmanibular, transoral, and orbitozygomatic-middle fossa approach¹¹. The transcervical approach was first described in 1964 by Ballantyne¹². In patients with isolated and small (< 2.5 cm) metastases, a transoral approach using ultrasound guidance or the da Vinci surgical robotic system can offer adequate oncological resection and adequate prevention of complications¹³.

Since the first endoscopic approaches in thyroid surgery^{14 15}, video-assisted procedures are improving functional and aesthetic outcomes in head and neck surgery. This technique was used successfully in submandibular sialoadenectomy¹⁶, in parathyroid gland sialoadenectomy¹⁷, in parathyroidectomy¹⁸ and for neck dissection¹⁹.

In this report, we describe two cases of rare parapharyngeal metastasis from thyroid carcinoma treated with a minimally-invasive video-assisted transcervical approach to support a traditional open technique. According to the

NCCN guidelines for thyroid carcinoma²⁰, we usually perform neck dissection in case of suspected lymph node metastases documented by ultrasound and/or cytology, and in lymph nodal metastases palpable at surgical exploration for tumours greater than 4 cm or with extracapsular extension. The first endoscopic PPS approach was published in 2010 for drainage of paediatric abscess²¹. Subsequent reports were published with transoral²² and transcervical²³ endoscopic approaches for benign PPS tumours. Traditional transcervical approaches allow very limited surgical exposure: the parapharyngeal space is located 4-5 cm deep to the cervical incision and surgeon works in a deep, dark and narrow tunnel. Digital exploration and digitoclasia are helpful, but visual control is not possible during these interventions.

The goal of our video-endoscopy assisted technique was to evaluate the advantages of endoscopic visualisation of the PPS rather than to obtain the best cosmetic result. Moreover, 0° and angled telescopes can support an open traditional approach by allowing constant monitoring of the relationship between the PPS mass and surrounding vessels or cranial nerves, adding a minimal amount of extra surgical time. The close visual control and the image magnification allow the surgeon to precisely follow the tumour surface and facilitate recognition of the correct cleavage plane.

Our video-assisted technique simplifies the identification of small vessels, allowing accurate haemostasis. Furthermore, when using a suction-dissector it is possible to

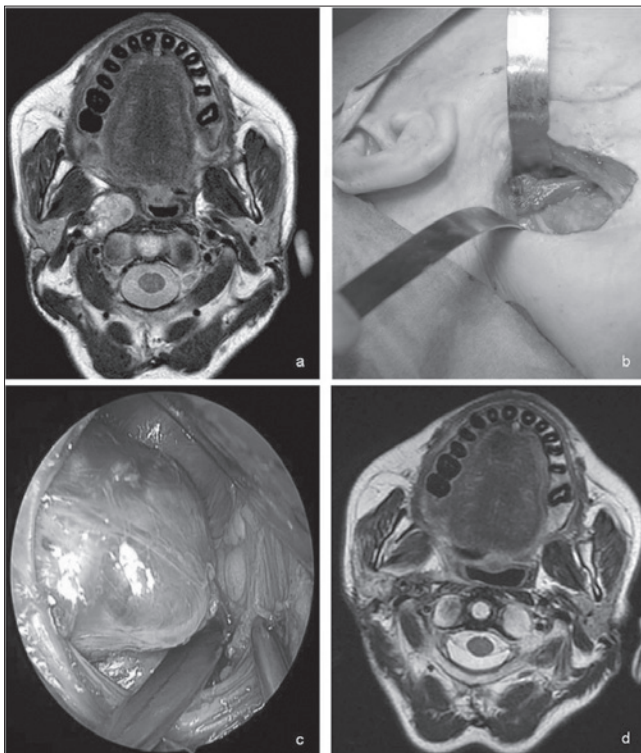


Fig. 1. Preoperative MRI (a), right transcervical approach with a short skin incision (b), endoscopic extracapsular tumour dissection (c), 20 months after surgery MRI (d).

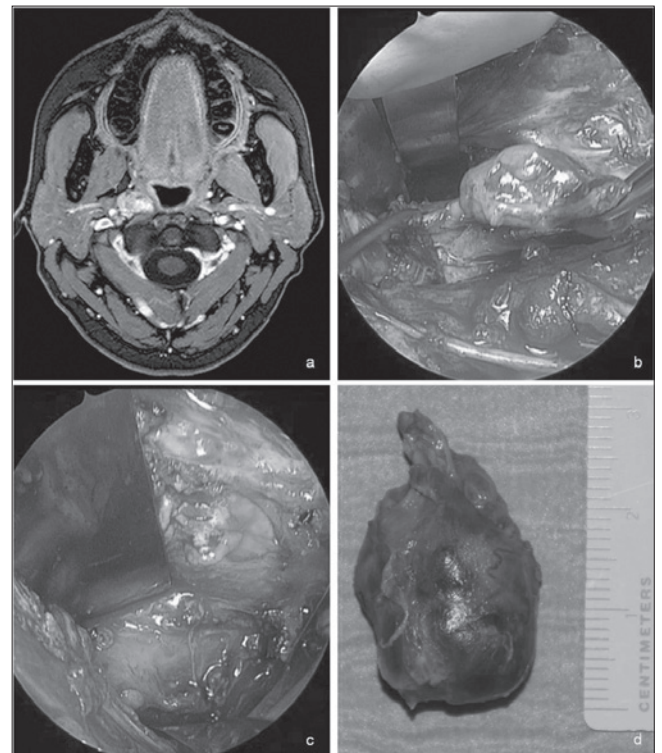


Fig. 2. Preoperative MRI (a), video-assisted right parapharyngeal mass dissection (b), endoscopic view after tumour excision (c), excised tumour (d).

work in a near-bloodless surgical field, due to one-hand simultaneous or alternate dissection and aspiration. Early or late minor or major sequelae were not observed in either of the present cases.

Conclusion

Presence of parapharyngeal metastases should be considered at the time of diagnosis of thyroid carcinoma, even if their occurrence is rare. In addition, differential diagnosis of a mass in the PPS should include metastasis from occult thyroid carcinoma. Ultrasonography of the neck cannot properly investigate parapharyngeal and retropharyngeal spaces, and for this reason CT or MRI are mandatory, especially in patients with widespread cervical lymph node metastatisation or with a history of prior neck dissection. A video-assisted minimally-invasive transcervical approach is a new technique for excision of sizable benign tumours and selected malignant tumours. The technique allows clear identification of critical surgical landmarks that guide the dissection through the correct cleavage plane in a nearly bloodless surgical field, thus decreasing the rate of complications.

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Address for correspondence: Leone Giordano, Otorhinolaryngology Unit, "San Raffaele" Hospital, via Olgettina 60, 20132 Milan, Italy. Tel. +39 02 26433522. Fax +39 02 26433508. E-mail: giordano.leone@hsr.it