A rare case of a retrocrural lymph node metastasis from a chromophobe renal cell cancer: complete thoracoscopic resection with a new multi-joint articulating surgical instrument

Alexander Kern a,*, Christian Thomas b, Olaf Holotiuk c and Steffen Drewes a

a Department of Thoracic Surgery, Fachkrankenhaus Coswig, Coswig, Germany
b Department of Urology, University Clinic Carl Gustav Carus, Dresden, Germany
c Institute of Pathology, Dresden, Germany

Abstract

We report a rare case of a 69-year-old man with a solitary retrocrural lymph node metastasis in the posterior mediastinum of an oligo-metastatic chromophobe renal cell cancer that was radically resected in a curative intent using new articulating Artisential® instruments.

Keywords: Mediastinal lymph node metastasis • Chromophobe renal cell cancer • Surgeon-powered robotics • Articulating instruments

INTRODUCTION

Compared to clear cell RCC, the evidence of using tyrosine-kinase inhibitors and immunotherapeutics in chromophobe renal cell cancer (chRCC) is still limited [1]. Furthermore, recent data suggest that chRCC seems to be resistant to new immune checkpoint inhibitors [2]. Surgery plays a significant role for long-term survival in metastatic chRCC especially when offered in a multimodal approach. Here, we present a case of a chRCC patient with a solitary retrocrural lymph node metastasis that was radically resected using new articulating instruments.

CASE REPORT

A 69-year-old man underwent a right transperitoneal nephrectomy 14 months ago due to a chRCC (pT3 pN1(6/8 LK) L0 V1 Pn0 R0). Supracavalicular and paracaval/paraaortal lymphadenectomy due to lymph node recurrence had been performed after 2 and 12 months, respectively. With a remaining retrocrural lesion, the patient was referred to our department for complete resection.

CT scan revealed a 1.9 cm × 2.3 cm retrocrural mass, located between the front surface of the T12 thoracic vertebra, descending aorta, oesophagus and inferior cava vein (Fig. 1A). No other metastatic lesions were detected. Because of the open transperitoneal previous operations and expected adhesions, we chose the thoracic approach.

Due to confined anatomical spaces in the retrocrural area, we used the Artisential® device. It comprises a complete arsenal of articulating hand-held thoracoscopic instruments with 360 degrees of freedom of the end effector, similar to those known from surgical robotic systems [3]. This concept of hand-held articulating instruments has been termed surgeon-powered robotics. Clinical use of Artisential® in multiple surgical disciplines has been reported in several publications recently [3, 4].

We performed a right triportal VATS with CO 2 insufflation, and trocar positions are shown in Fig. 1B. After dissecting the oesophagus and aorta in the retrocrural region, we found that the mass adhered tightly to but did not invade the periost of T12 vertebra. Access to and dissecting in this narrow retrocrural space was facilitated by using the Artisential® forceps and dissector (Video 1). Moreover, a bendable bipolar energy device and a clip-applier have been used to divide thicker portions of tissue to avoid postoperative chylothorax (Fig. 2A–C). Due to the absence of other lymph node enlargements, a radical regional lymphadenectomy was performed only in positions 7–9 (Fig. 2D). The operative skin-to-skin time was 111 min. Pathological examination revealed a 2.8 cm × 2.1 cm × 1.9 cm solid mass. Homogeneous EpCAM expression and positive immunohistochemistry for CD117 and cytokeratin 7 confirmed a metastasis from a chRCC. Surgical margins were free of disease; no lymph node metastases were found in regions 7–9. The postoperative course was prolonged by a mild chylous secretion, which was treated conservatively by an MCT diet and administration of octreotid 3 × 100 μg subcutaneously for 7 days. The chest tube was removed on the
21st postoperative day and the patient was discharged on postoperative day 23.

DISCUSSION

Recently published data show that metastatic chRCC responds very poorly to new immune check-point inhibitors [2, 5]. Thus, in accordance with the current guidelines, solitary metastases of chRCC should be treated locally. Surgical therapy with complete resection (R0) is considered to be the treatment of choice regardless of the metastatic site. Mediastinal lymph node metastases can be located in hard-to-reach anatomical regions. Thus, resection is often difficult with conventional VATS instruments. By using wristed Artisential® instruments, access to narrow anatomical spaces is facilitated. Surprisingly, there has been only 1 report within literature on the use of Artisential wristed instruments in thoracic surgery, describing 6 cases [4]. In accordance with this report, we demonstrate for the first time that the fully articulating wristed motion provides full flexibility and high precision dissection also in mediastinal metastases of RCC, suggesting a superiority of this device compared to straight VATS instruments. A disadvantage of the instruments might be that one has to practice for a few hours in the dry laboratory before the first

Figure 1: Preoperative imaging and surgical technique. (A) CT scan showing the retrocrural mass located between the front surface of T12, aorta, oesophagus and inferior cava vein. (B) Trocar positions in the 6th and 8th intercostal spaces.

Figure 2: Intraoperative view. (A) Dissection of the tumour after the parietal pleura was incised; it adhered tightly to the front surface of T12. (B) View after dissection of paraaort al and paraesophageal spaces and further mobilization of the tumour; use of a clip applier to close lymphatic vessels securely. (C) The tumour is fully dissected. (D) Loco-regional lymphadenectomy (stations 7, 8 and 9).
One should consider the first 5 interventions as part of the adaptation process. Compared to robotic platforms, the Artisential VR instruments come at a lower cost because there are only costs for the instrument (single use). With robotic, in addition to the instruments, there are other high costs for acquisition, maintenance, draping material, cleaning and re-preparation of robotic instruments. Our case report supports further prospective studies investigating the value of this articulating device for VATS resections in difficult-to-reach anatomical regions in the thorax.

**Conflict of interest:** The author (Alexander Kern) works as a consultant for Artisential®. The other authors report no conflicts of interest.

**Reviewer information**

Interactive CardioVascular and Thoracic Surgery thanks Rui Haddad, Tevfik Kaplan and the other, anonymous reviewer(s) for their contribution to the peer review process of this article.

**REFERENCES**

[1] Ljungberg B, Albiges L, Abu-Ghanem Y, Bedke J, Capitanio U, Dabestani S et al. European Association of Urology guidelines on renal cell carcinoma: the 2022 update. Eur Urol 2022. https://doi.org/10.1016/j.eururo.2022.03.006.

[2] Abbosh P, Sundararajan S, Millis SZ, Hauben A, Reddy S, Geynisman DM et al. Molecular and genomic profiling to identify actionable targets in chromophobe renal cell cancer. Eur Urol Focus 2018;4:969–71.

[3] Min S-H, Cho Y-S, Park K, Lee Y, Park YS, Ahn S-H et al. Multi-DOF (degree of freedom) articulating laparoscopic instrument is an effective device in performing challenging sutures. J Minim Invasive Surg 2019;22:157–63.

[4] Trevis J, Chilvers N, Freystaetter K, Dunning J. Surgeon-powered robotics in thoracic surgery; an era of surgical innovation and its benefits for the patient and beyond. Front Surg 2020;7: 589565.

[5] Motzer RJ, Escudier B, McDermott DF, George S, Hammers HJ, Srinivas S et al. Nivolumab versus everolimus in advanced renal-cell carcinoma. N Engl J Med 2015;373:1803–13.