

Transdiaphragmatic nephrectomy with synchronous pulmonary and anterior thoracic wall mass metastasectomy in a young male with metastatic renal cell carcinoma; a single-incision approach

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Abstract

Renal cell carcinoma represents approximately 3% of all cancers, with the highest incidence occurring in the western world. Around 33% of the patients experience metastatic disease at diagnosis. Since the approval of the first targeted therapy, the treatment of metastatic renal cell carcinoma (mRCC) has positively changed, but the surgical treatment of the primary tumor, and metastases if possible, is sometimes crucial in selected patients controlling the burden of cancer sites with the intention to improve survival. We, herein, report on a case of a young male patient presented in the emergency room with gross hematuria which underwent transdiaphragmatic nephrectomy with synchronous pulmonary and anterior thoracic wall mass metastasectomy with a single thoracic incision due to mRCC. Achieving a full response in patients with mRCC is extremely rare only with medical treatment. The role of complete surgical metastasectomy is questioned, but there are several studies that support its efficacy in achieving metastases free status prolonged overall survival and better quality of life. The therapeutic treatment plan for these patients should be discussed within dedicated multidisciplinary cancer centers and focus on each patient individually and they should be offered a closed follow-up strategy.

Keywords: Metastasectomy, metastatic renal carcinoma, nephrectomy, transdiaphragmatic

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INTRODUCTION

Renal cell carcinoma (RCC) represents approximately 3% of all cancers, with the highest incidence occurring in the western world. Over the last few decades, there has been an annual increase of about 2% in incidence worldwide having as a result 99,200 new RCC cases and 39,100 kidney

cancer-related deaths within the European Union in 2018.^[1] Around 33% of the patients experience metastatic disease at diagnosis, which usually have a poor prognosis with overall survival (OS) ranging from 7% to 75% at 2 years.^[2] In metastatic RCC (mRCC), the most common histology

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is clear cell carcinoma (approximately 80%) with papillary and chromophobe histology to follow. Since the approval of the first targeted therapy, the treatment of mRCC has positively changed and survival has remarkably increased. However, surgical treatment of the primary tumor, and metastases if possible, is sometimes crucial in selected patients controlling the burden of cancer sites with the intention to improve survival. We, herein, report on a case of a young male patient presented in the emergency room with gross hematuria which underwent transdiaphragmatic nephrectomy with synchronous pulmonary and anterior thoracic wall mass (with infiltration of the 6th and 7th thoracic ribs) metastasectomy with a single thoracic incision due to mRCC.

CASE REPORT

A 37-year-old male was admitted to the emergency department of our hospital complaining of hematuria and lower urinary tract symptoms for a week and a painful palpable nonremovable mass in the lower left sides of the chest noticed within a month. On arrival, he was tachycardic with normal and stable blood pressure.

He states no previous health problems or past operations. Abdominal examination was unremarkable and laboratory tests disclosed an elevated C-reactive protein (148 mg/L) and low hematocrit level (32%). Urinalysis showed no abnormalities and the virology reference sample was negative.

The patient was then subjected to kidney ultrasound scan, abdominal and chest computed tomography (CT) scan with intravenous contrast.

Ultrasound in the emergency department demonstrated a heterogeneous formation measuring 6.5 cm in the middle of the left kidney. Color Doppler showed internal vascularity. A well-defined mass of the left kidney, measuring 7 cm × 6.5 cm × 6 cm was identified in the abdomen CT scan. The neoplasm was located on the renal parenchyma with the invasion of the pelvicalyceal system and in contact with the posterior abdominal wall. The CT scan also demonstrated peri-adrenal fat stranding and hyperdense elements in the kidney pelvis probably due to clots [Figure 1]. A left paraaortic lymph node was measured 1.5 cm on the level of the left kidney.

The CT scan of the chest demonstrated a node (m.d. 1 cm) at the upper lobe of the left lung and a mass on the left chest wall, measuring 4 cm × 6 cm with osteolytic lesions located on the left anterior arches of the 6th and 7th thoracic ribs [Figure 2].

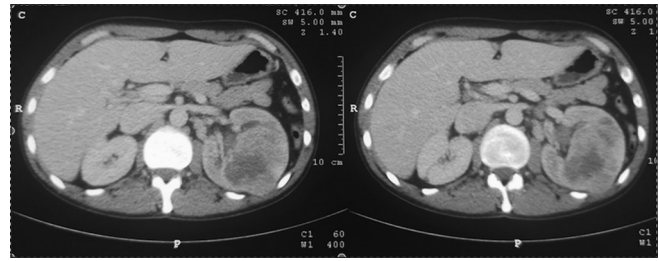


Figure 1: Computed tomography scan showing a mass of the left kidney and hyperdense elements in the kidney pelvis probably due to clots

A Couvelaire catheter was inserted, followed by washing and removing blood clots. The patient was admitted to the urology department under monitoring. A magnetic resonance imaging of the brain was performed on the same day with negative results for lesions.

The surgical plan was decided after consultation with thoracic surgeons and oncologists and explained to the patient. The patient gave his written consent and was consequently transferred to the operating room where under combined general with epidural (Th12-O1) anesthesia, a left lateral thoracotomy was performed. First, a radical left nephrectomy with resection of the left paraaortic lymph node was performed with a transdiaphragmatic approach for entering the retroperitoneal space [Figure 3]. Second, a full-thickness chest wall resection of the mass on the left thoracic wall was performed (pleura, intracostal muscles, and parts of 5th, 6th, and 7th left ribs) with macroscopically 3 cm negative margins. A wedge-AL excision of the pulmonary lesion of the left upper lobe was consequently performed. In the end, a thoracic mesh (GORE® DUALMESH® Biomaterial, nominal thickness 2 mm/width 18 cm/length 24 cm) was placed to cover the deficit of the chest wall and a doubled bülau was placed on the left side [Figure 4].

The clinical condition of the patient improved, and he was hemodynamically stable and afebrile during his hospital stay. The Foley catheter was removed on the 2nd postoperative day and the bülau catheter on the 6th. He was dismissed 8 days postoperatively with instructions for close follow-up in the outpatient clinic and recommendation for oncological evaluation. The patient was recruited in a clinical trial of targeted therapy with ipilimumab and nivolumab under close follow-up with oncologists and urologists.

The pathology report verified the diagnosis of renal cell carcinoma (clear-cell subtype, grade IV, pT4N0Mx). The paraaortic lymph node was negative for malignancy. The metastases of the lung and the anterior thoracic wall mass were fully removed with negative surgical margins.

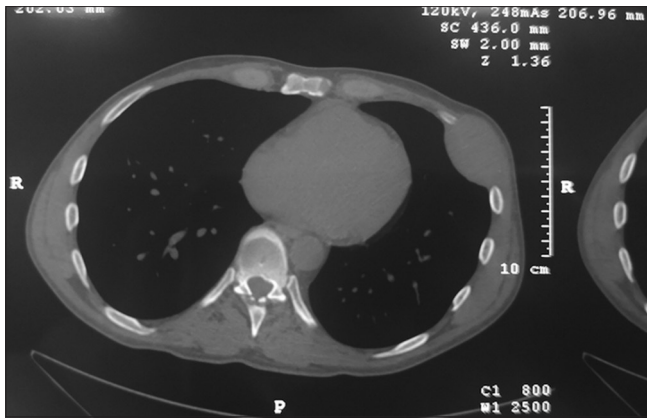


Figure 2: Computed tomography scan of the chest showing a mass on the left chest wall with osteolytic lesions



Figure 3: Transdiaphragmatic approach for radical left nephrectomy and lymph node resection through the left lateral thoracotomy

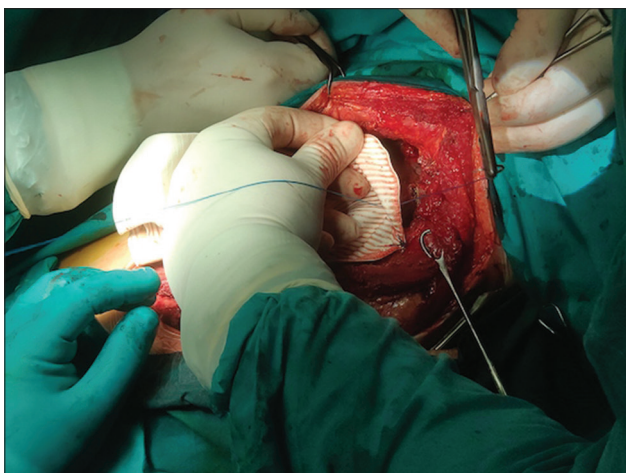


Figure 4: Placing a thoracic mesh (GORE® DUALMESH® Biomaterial) to cover the deficit of the chest wall

At 6- and 12-month follow-up, the patient performed abdomen and chest CT scans with no sign of relapse.

DISCUSSION

mRCC is fatal and has a very low percentage of OS even

during the 1st year after diagnosis. In the last few years, systemic therapy using vascular endothelial growth factor and mammalian target of rapamycin targets and recently immune checkpoint inhibitors have turned around the treatment of advanced RCC. The therapeutic treatment plan has been modified with these drugs accounting for shrinkage of 20%–30% of tumor size, as well as augmented progression-free survival and OS.^[3] Achieving full response or cure from the disease only with medical treatment is extremely rare.

In 1939, the first metastasectomy for mRCC was performed and since then, many studies reported the effectiveness of surgery in the therapeutic plan for mRCC. There are no randomized clinical trials studying the role of complete surgical metastasectomy (SM), although many observational studies have concluded in favor of surgical removal of metastases and primary tumor. However, many of them were influenced by selection bias for patients undergoing SM, including better performance status, disease features, and the organ where metastases were noticed.^[4]

In the present case, surgical treatment was urgent due to the life-threatening gross hematuria. Taking into consideration, all risk factors is a major issue in deciding the right therapeutic plan for mRCC patients considered for cytoreductive nephrectomy and SM. With respect to primary renal tumor characteristics and the urgency due to gross hematuria, our multidisciplinary team favored the option of complete SM and every aspect was fully explained to the patient. Our patient was in a favorable group of candidates for surgical metastasectomy as he had a good performance status and relatively limited burden of metastatic disease and achievable metastases free status.

According to organ site, in all studies, lung SM was planned aiming to resect all lesions to achieve cure with 1-, 3-, 5-, and 10-year OS rates of 84%, 59%, 43%, and 20%, respectively, in a recent meta-analysis.^[5] Morbidity and mortality rates were relatively small and complications reported in less than 15% of cases.

Bone metastasectomy along with targeted therapy accounted for superior OS (31.8 months, 95% confidence interval [CI] 16.0–47.6) when compared to targeted therapy alone (7.6 months, 95% CI 5.8–9.3). Bisphosphonate treatment in patients who underwent SM for bone metastases resulted in better OS, whereas sarcomatoid features and high Fuhrman/International Society of Urological Pathology grade had adverse events.^[6] As expected, negative margins in the pathology report after SM were related with better survival compared to positive margins or intralesional curettage and stabilization only.

CONCLUSION

SM should always be considered in specific patients with mRCC as it may offer a better quality of life and longer OS. The therapeutic treatment plan for these patients should be discussed within dedicated multidisciplinary cancer centers and focus on each patient individually having always all risk factors in mind. They should always be offered a closed follow-up strategy and be fully aware of all aspects of the treatment plan.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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