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Case Report

Renal metastasis from esophageal adenocarcinoma: A rare recurrence [☆]

Indranil Balki, MD, David Wang, MD*

Department of Medical Imaging, Western University, Schulich School of Medicine and Dentistry

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ABSTRACT

Esophageal cancer, consisting primarily of squamous cell carcinoma and adenocarcinoma pathology, is a leading cause of morbidity and mortality worldwide with rates of metastasis at time of diagnosis up to 50%. Renal metastasis is rare, with most pathological diagnosis yielding squamous cell carcinoma. We present the unique case of a 78-year-old man with biopsy proven adenocarcinoma metastasis to the kidney on routine surveillance following initial esophagectomy, chemoradiation and adjuvant immunotherapy. Imaging features of the solitary renal metastasis highly mimicked a primary renal cell carcinoma. Additional unique features included renal pelvis invasion and disease recurrence despite adjuvant immunotherapy. This case underscores the role of routine surveillance in this patient population, varied radiologic appearance, and importance for pathologic diagnosis.

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Introduction

Esophageal cancer is one of the leading causes of morbidity and mortality worldwide. It has demonstrated an over 6-fold increased incidence over the last decade and has a 5-year survival rate as low as 10%-15%. [1] Unfortunately, most diagnoses are made at an advanced stage, with patients usually presenting with progressive dysphagia, gastroesophageal reflux, hoarseness and weight loss. Major pathological subtypes include squamous cell carcinoma (more prevalent in East Asia, Africa, southern Europe) and adenocarcinoma (North America, northern Europe). Depending on the subtype, a number of risk factors have been established. These include ad-

vanced age (>50 years), smoking, alcohol consumption and increased BMI. More modern research has also implicated various genetic mutations in the development of squamous cell esophageal carcinoma [1]. Following clinical suspicion, diagnosis is generally made with upper GI endoscopy and pathologic sampling with staging done via computed tomography (CT) and positron-emission tomography-computed tomography (PET-CT). Depending on the stage of disease and various patient factors, treatment consists of trimodality therapy; surgical intervention (endoscopic resection or esophagectomy) as well as concurrent chemoradiation.

In patients with locally advanced cancer, 3-year recurrence rates can be as high as 20% [1]. The rates of metastases range up to 50% at initial diagnosis [2], with most common sites be-

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* Corresponding author: Department of Medical Imaging, St. Joseph's Hospital, 268 Grosvenor St, London, ON, N6A 4V2.

E-mail address: david.wang@sjhc.london.on.ca (D. Wang).

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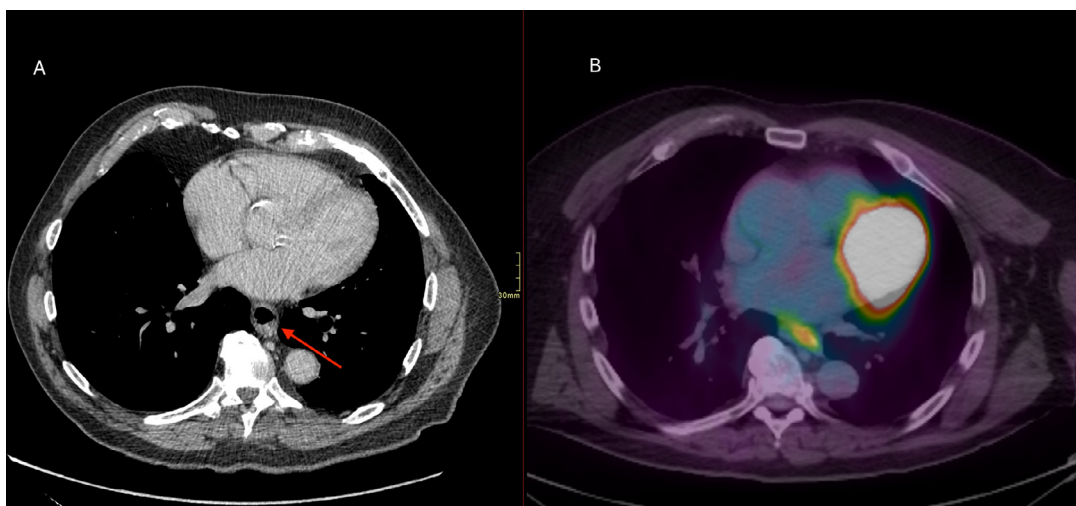


Fig. 1 – Axial contrast-enhanced CT image (A) from April 2021 demonstrated distal esophageal wall thickening (arrow). Axial positron emission tomography (PET) image (B) showed corresponding increased FDG uptake with SUV max up to 4.9.

ing liver, lungs, bones and adrenal glands, with predominantly hematogenous spread [3]. Post-treatment imaging follow up varies [4], and at our institution consists of CT scans every 3-6 months for the first 2-3 years and then annually to 5 years.

One rare site of metastasis is to the kidneys, with only a handful of case reports and series in literature. In these reports, the vast majority of pathologic diagnoses yield squamous cell carcinoma. Interestingly, the radiological appearance can be confused for a primary renal cell carcinoma. Herein, we present a unique case of esophageal adenocarcinoma metastasis to the kidney discovered on routine surveillance. To our knowledge, this is the only reported case of esophageal adenocarcinoma metastasis to the kidneys presenting with extensive local invasion into the renal vein and IVC and renal pelvis, yielding an interesting discussion on the imaging differential diagnosis as well as implications on surveillance and follow up.

Case report

Initial presentation

In 2021, a 78-year-old Caucasian male was referred to our center for a recent esophagogastroduodenoscopy (EGD), which demonstrated a 3 cm, fungating, wide-based lesion 30 cm into the esophagus. His only symptoms were intermittent dysphagia 3-4 times per week with solids. There was no known family history of cancer. He had a 7.5 pack year smoking history and routine alcohol use (up to 8 drinks/week). He had known Barrett's metaplasia and esophagitis dating back to 2002, for which he was prescribed Omeprazole.

CT of the thorax/abdomen/pelvis revealed circumferential wall thickening of the distal esophagus, near the GE junction, correlating with the EGD findings (Fig. 1). There was no evidence of distant disease on initial staging CT or PET-CT. His

tumor was not amenable to submucosal resection due to the size and suspected muscular involvement. The patient underwent trimodality therapy including concurrent chemoradiation with carboplatin and paclitaxel (June-July 2021). Thereafter he had a transhiatal total esophagectomy, gastric pull-up (August 30, 2021) with ypT1N1 staging (1 of 16 lymph nodes involved with excellent response to treatment and clear margins). He was given adjuvant nivolumab (starting November 2021 for 6 cycles).

Recurrence

On follow up, the patient had no evidence of cancer recurrence until he underwent repeat imaging at the start of March 2023. At that time, he presented with a few episodes of gross hematuria and peripheral edema. There was no flank pain or obstructive urinary symptoms. His creatinine was elevated to 128 (baseline 80s).

CT of the abdomen/pelvis showed a 9 cm infiltrating mass involving the upper pole of the right kidney associated with renal vein and IVC invasion (Fig. 2) as well as extension into the renal pelvis and proximal ureter (Fig. 3). There was new associated adjacent lymphadenopathy. CT of the thorax also revealed multiple new pulmonary nodules and new mediastinal lymphadenopathy. On PET-CT, there was avid FDG uptake in the renal mass, pulmonary nodules and lymphadenopathy. These imaging findings were initially favored to represent a primary renal cell carcinoma with metastases over recurrent esophageal cancer. However, biopsies of a 2R paratracheal node and the renal lesion both revealed adenocarcinoma consistent with recurrent esophageal cancer.

The multidisciplinary care team felt that a palliative cytoreductive surgery requiring venous resection was high risk, and not appropriate given the guarded prognosis. He was therefore started on carboplatin and capecitabine in conjunction with nivolumab and external beam radiation therapy (EBRT).

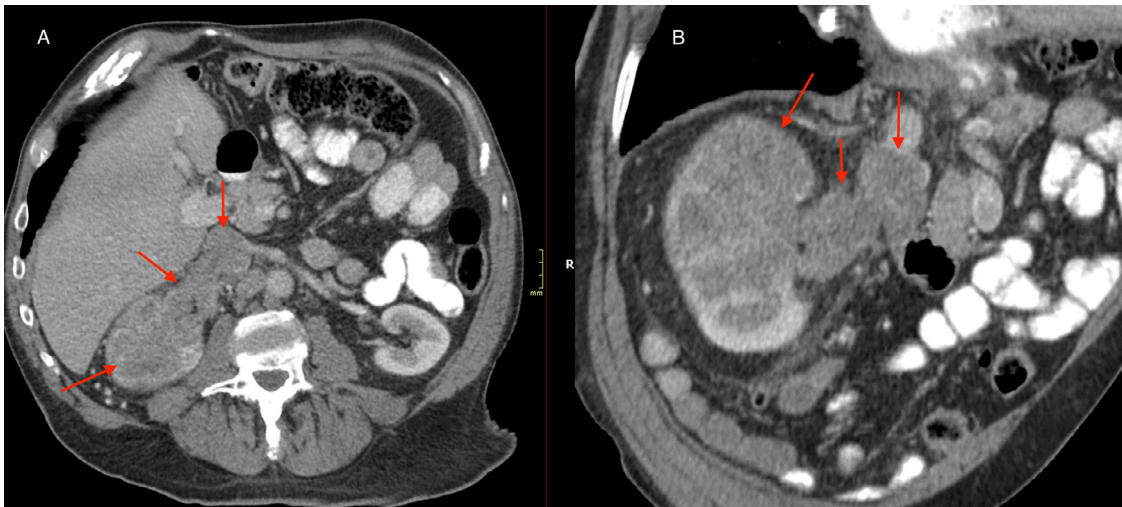


Fig. 2 – Axial (A) and coronal oblique (B) multiplanar reformatted contrast-enhanced CT images from March 2023 showed an infiltrative mass involving the upper pole of the right kidney associated with renal vein and IVC invasion (arrows).



Fig. 3 – Axial contrast-enhanced CT image from March 2023 demonstrated local invasion of the right renal pelvis and proximal ureter (arrows) by the renal mass with associated mild peri-nephric and peri-ureteric stranding.

CT of the thorax/abdomen/pelvis in July 2023 showed a mixed response with decreased size in the renal mass but with some enlarging pulmonary nodules. There was persistent tumor thrombus within the right renal vein and IVC.

Further follow up imaging in September 2023 demonstrated mild overall progression of intrathoracic and intra-abdominal metastases. The renal mass appeared more infiltrative, replacing more of the normal underlying renal parenchyma, and there was progression of perinephric free fluid and soft tissue stranding. His palliative carboplatin, capecitabine, and nivolumab was switched to subsequent line ramucirumab and paclitaxel.

Discussion

Herein, we present the unique case of an esophageal adenocarcinoma metastasis to the kidney. To our knowledge, this is only the second such reported case with adenocarcinoma pathology in literature and the first to describe concurrent renal vein and IVC invasion as well as extension into the proximal collecting system. The imaging diagnosis for a solitary, solid renal mass with renal vein and IVC invasion overwhelmingly favors renal cell carcinoma (RCC). However, there are a spectrum of pathologies that can invade the renal vein and/or IVC. Rarely, relatively benign entities can demonstrate vascular extension and include renal angiomyolipoma (generally fat-containing) and adrenal pheochromocytoma. Malignant tumors that demonstrate IVC invasion/involvement include hepatocellular carcinoma, adrenocortical carcinoma and primary leiomyosarcoma of the IVC. IVC invasion in transitional cell carcinoma (TCC) has also been rarely reported. The finding of proximal collecting system tumor involvement also yields an interesting differential. Benign considerations include renal angiomyolipoma and rarely, renal pelvis hemangioma. Malignant pathologies include TCC and, less commonly, RCC.

Although esophageal cancer metastases to kidneys have been described, they are usually bilateral, with multiple lesions less than 3 cm in size [5]. In that respect, our case is one of the few cases of a large unilateral metastasis, joining only a handful of previously described reports from Japan [6]. While renal metastasis has been considered rare, only found in 1% of staging imaging studies [7], rates have been found as high as 13% during autopsies [5]. As in our case, this may be due to relatively low patient symptomatology. Therefore, in advanced and late stages of esophageal carcinoma, we may be underestimating the true rate of renal metastasis.

Amongst the subtypes of esophageal cancer, adenocarcinoma has been growing in prevalence in western countries [1]. While the general rates of metastasis have not been found to

greatly differ amongst these 2 pathological subgroups, [7] the rates of renal metastasis seem to greatly favor squamous cell carcinoma in literature [8]. As far as we know, only one prior case report of esophageal adenocarcinoma metastasis to the kidney has been reported. The etiology for predilection towards squamous cell pathology is unclear at this time.

Amongst the previous case reports, this is also the only case of renal metastasis in a patient who received adjuvant immunotherapy. The landmark CHECKMATE 577 trial found that addition of nivolumab in patients who underwent tumor resection and received neoadjuvant chemoradiotherapy with high recurrence risk resulted in prolonged disease-free survival [9]. In our case, the patient developed distant metastases at 21 months, slightly lower than the median distant metastasis-free survival in CHECKMATE 577 (28 months). He was also deemed not an operable candidate due to the technical surgical challenges relating to extensive local vascular and collecting system invasion as well as the presence of multiple pulmonary metastases. This is in contrast to the case from Mao *et al.* [10], where solitary adenocarcinoma metastases to the kidney and brain were successfully treated with chemoradiation and surgery, conferring survival of over 9 years.

Conclusion

We present the case of an esophageal cancer recurrence with solitary metastasis to the right kidney and vascular invasion, with imaging highly mimicking a primary renal cell carcinoma. Additional relatively unique features include renal pelvis invasion, adenocarcinoma pathology and recurrence of disease in the kidney despite adjuvant immunotherapy. This case underscores the role of routine surveillance in this patient population, the varied radiologic appearance and importance for pathologic diagnosis.

Patient consent

The authors attest that patient informed consent was obtained for preparation of this manuscript. An agreement was

signed by the patient providing consent for images and clinical information relating to the case to be reported for a medical publication. The patient was made aware that every effort will be made to conceal their identity, but that anonymity is not guaranteed. The patient was made aware that he had full right to refuse to sign the consent form and that this would not affect patient care in any way.

REFERENCES

- [1] Huang FL, Yu SJ. Esophageal cancer: risk factors, genetic association, and treatment. *Asian J Surg* 2018;41:210–15 Preprint at. doi:10.1016/j.asjsur.2016.10.005.
- [2] Ghazy HF, El-Hadaad HA, Wahba HA, Abbas R, Abbas OA. Metastatic esophageal carcinoma: prognostic factors and survival. *J Gastrointest Cancer* 2022;53:446–50.
- [3] Chang KP, Huang CP, Chang H. Solitary renal metastasis of esophageal squamous cell carcinoma mimicking primary renal neoplasm: a case report and literature review. *Biomedicine (Taipei)* 2016;6:35–9.
- [4] Chidambaram S, Sounderajah V, Maynard N, Markar SR. Evaluation of post-operative surveillance strategies for esophageal and gastric cancers: a systematic review and meta-analysis. *Dis Esophagus* 2022;35:doac034.
- [5] Nam KS, Jung K, Park MI, Park SJ, Moon W, Kim SE, *et al.* Esophageal cancer with solitary renal metastasis treated with multidisciplinary therapy: a case report and mini review of the literature. *Korean J Helicobact Upper Gastrointest Res* 2017;17:39.
- [6] Dev K, Gurawalia J, Nayak S, Sadasivan B. Unilateral renal metastases after definitive chemoradiation in squamous cell carcinoma of esophagus: a case report and review literature. *Asian J Oncol* 2016;02:046–8.
- [7] Mariette C, Finzi L, Piessen G, Van Seuning I, Triboulet JP. Esophageal carcinoma: prognostic differences between squamous cell carcinoma and adenocarcinoma. *World J Surg* 2005;29:39–45.
- [8] Lin Y-S, Chiu K-Y, Hung S-W, Li H-N. Renal metastasis of esophageal squamous cell carcinoma—a case report and literature review. *Arch Clin Med Case Rep* 2018;2:24–30.
- [9] Kelly RJ, *et al.* Adjuvant nivolumab in resected esophageal or gastroesophageal junction cancer. *N Engl J Med* 2021;384:1191–203.
- [10] Mao YS, Suntharalingam M, Krasna MJ. Management of late distant metastases after trimodality therapy for esophageal cancer. *Ann Thorac Surg* 2003;76:1742–3.