Cook’s Hernia: Renal Tumor Parasitic Vessels Herniating into Right Inguinal Canal

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Key Words
Kidney cancer • Parasitic vessel • Inguinal hernia

Abstract
We report the incidental findings and management of a hernia whose contents included renal tumor parasitic vessels in a 52-year-old male who presented with a 22 cm large right renal tumor. His initial complaints were right sided fullness and hematuria. Incidentally on CT scan, the patient’s large right renal mass was identified, as well as lower pole parasitic tumor vessels which were herniating into the patient’s right inguinal canal. Parasitic tumor vessels are often found on larger obscure tumors. Few side effects or associated problems have been reported from issues with the parasitic vessels other than excessive bleeding. Never before, to our knowledge, has an inguinal hernia with renal mass parasitic vessels herniating into it been documented. We named the hernia after the general surgeon, Dr. Craig Cook, MD, FACS, who assisted during the open radical nephrectomy and who reduced and repaired the right inguinal hernia. We present a case presentation and treatment rationale for this tumor and associated parasitic vessels herniation, along with a brief review of existing literature.

Introduction
Tumor driven angiogenesis in large tumors can lead to the production and proliferation of abnormal blood vessels [1]. These blood vessels can become “parasitic”, and invade nearby tissue. While parasitic blood vessels have been recorded in cancers such as renal cell carcinoma (RCC) [2, 3], glioblastoma [4], and hepatocellular carcinoma [5], to our knowledge, there has never been a case of parasitic blood vessels from a renal tumor invading the inguinal canal resulting in an inguinal herniation. The aim of this study is to report a unique case of parasitic blood vessels from a renal tumor herniating into the inguinal canal and its repair with a brief literature report.

Case Report
A 52-year-old Caucasian male non-smoker with a past medical history of hypertension, benign prostatic hyperplasia, and gastroesophageal reflux was presented to the office via referral from his primary care physician on 7/14/2017. He complained of gross hematuria that had started 2–4 weeks previously, 20 pound weight loss over the previous 2 months, and a distinct palpable abdominal mass. The patient denied flank pain, fever, chills, and dysuria,
along with no smoking history or family history of cancer. Previously, a CT was performed that revealed a large right renal mass. In addition to the mass, the CT scan also noted a medium right inguinal hernia full of parasitic vessels going up into the patient’s right renal mass (fig. 1). The CT scan was reviewed with the patient, and the possibility of metastatic disease was discussed. An MRI was deferred due to lack of inferior vena cava involvement evidence. Due to the large size and likely metastatic nature of the renal mass, an open radical nephrectomy via exploratory laparotomy was offered for both palliative and cytoreductive reasons. In addition to the radical nephrectomy, general surgeon was asked to join the procedure to repair the herniation of the parasitic vessels into the inguinal canal. After successful removal of the renal mass and kidney, the general surgeon repaired the inguinal hernia. After reduction and removal of the herniated vessels as needed, a standard closure with multiple layers intra-abdominally was performed without need for mesh due to the smaller size of the inguinal hernia.

After nephrectomy, pathology was positive for a 21 cm chromophobe type RCC (fig. 2). In addition, some perirenal fat invasion, with one perihilar lymph node that was positive made the tumor stage pT3aN1M0. The National Comprehensive Cancer Network guidelines for a stage III kidney cancer were discussed. A repeat CT scan 3 months later was repeated which showed increasing bulky areas around the nephrectomy bed site as well as 1 or 2 enlarging lymph nodes. The possibility of radical lymphadenectomy or medical therapy to prolong the spread of the cancer were discussed with the patient, as well as seeking out potential clinical trials. The patient chose to seek out a clinical trial and was referred to the local cancer institute for a clinical trial for which he met criteria.

**Discussion**

It is not uncommon for larger renal tumors to develop parasitic blood vessels. These blood vessels are typically abnormal [1] and must be carefully ligated before removal of the kidney to prevent excessive bleeding [6]. While a parasitic vessel is not uncommon in a renal tumors of this size, to our knowledge, there is no record of a parasitic vessels from a renal tumor herniating into the inguinal canal.

Inguinal hernias are much more common in men due to increased susceptibility of the inguinal canal remaining patent, residual from development as the testes pass through the canals into the scrotum [7]. Inguinal hernias

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Fig. 1. A, B Coronal CT scan showing parasitic vessels from the right renal mass; C Transverse view of the parasitic vessels in the right inguinal canal.

Fig. 2. A, B View of 21 cm chromophobe type RCC post nephrectomy; C View of parasitic vessels from the renal tumor.
are most commonly susceptible to herniation from the bowel. There are other unique and rare cases of other organs herniating into the inguinal canal. Examples include herniation of the appendix or Amyand hernia [8], herniation of only a portion of the bowel or Richter’s hernia [9], and even herniation of a Meckel diverticulum or hernia of Littre [10]. As in each of these unique cases mentioned, the hernia is often named after the surgeon who first described this or fixed this type of hernia, so are we, naming our herniation of renal tumor parasitic vessels into the inguinal canal or Cook’s hernia after the primary general surgeon, Dr. Craig Cook, MD, FACS, who fixed the hernia in this case report. As in any hernia case, the herniation of the body part generates considerations that must be addressed by the physician. In our case, with parasitic vessels, the most significant considerations were the need to prevent any bleeding while removing and ligating the parasitic vessels or residual weakness of the inguinal canal resulting in recurrence of an inguinal herniation.

We present, to our knowledge, the first case report describing herniation of renal tumor parasitic vessels into the inguinal canal and a standard to fix it via an intra-abdominal approach without mesh.

Statement of Ethics

The patient provided a consent for this case report and agreed to the publication of details and figures related to the case.

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