Images in urology – Metastatic urothelial carcinoma of the right vastus lateralis following robotic-assisted radical cystectomy

Deron Britt, John Kim, Jennifer Tang, Chris Langley, Bobby Shayegan
[1]Department of Urology, McMaster University, Hamilton, ON, Canada

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Corresponding author: Dr. Deron Britt, Department of Urology, McMaster University, Hamilton, ON, Canada; deron.britt@medportal.ca

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INTRODUCTION

Treatment for non-metastatic bladder cancer

Open radical cystectomy (ORC) is the gold standard for treating non-metastatic muscle-invasive bladder cancer (T2-T4a) as well as high-risk T1 disease[1,2]. Although ORC remains the standard of care, recent meta-analyses have demonstrated no significant differences between ORC and robotic-assisted radical cystectomy (RARC) in regards to intraoperative and perioperative complication rates, as well as 5 year recurrence free survival, overall survival and recurrence patterns[3,4]. Recent systematic reviews have also demonstrated that RARC is not only a safe and effective procedure compared to laparoscopic radical cystectomy (LRC) and ORC, but also leads to lower rates of blood loss and transfusions[5].

Metastasis following robotic-assisted surgery

Metastatic spread following robotic-assisted surgery (RAS) has been documented in a number of surgical subspecialties. Port site metastasis is rare but well-documented following laparoscopic and RAS for biliary, gynaecologic, and urologic surgeries[,6,7]. In regards to metastasis following RARC, previous case reports have not only described port site metastasis, but also peritoneal carcinomatosis, extrapelvic lymph node involvement, and cutaneous metastasis[8,9]. In this case report, we present an unusual metastasis following RARC for MIBC.

CASE REPORT

We present a 72-year-old male who was initially seen in consult for a persistently elevated PSA with negative prostate biopsy. MRI prostate demonstrated a PiRADS 2 prostate lesion with an incidental finding of two polypoid lesions along the right posterior bladder wall measuring 2.1 cm highly suggestive for urothelial carcinoma. Initial cystoscopy established presence of right posterior wall papillary tumors and transurethral resection of bladder tumor (TURBT) was performed. Initial pathology confirmed low-grade non-invasive papillary carcinoma. Patient had multiple recurrences at the right lateral/posterior wall of the bladder with persistent low-grade pathology requiring repeat resection with TURBT and ongoing surveillance. His last follow-up cystoscopy demonstrated multiple bladder tumours along the right lateral wall and inter-trigone region. Repeat TURBT revealed high-grade invasive papillary carcinoma with muscle invasion (cT2). Preoperative CT of the abdomen and pelvis identified a 5.4 cm bladder mass located at the bladder dome, suggestive of submucosal/mural recurrence at previous resection sites, and a single indeterminate right external iliac lymph node. Therefore, initial staging was described as cT3N0 (query N1) M0. The patient underwent four cycles of neoadjuvant cisplatin and gemcitabine in preparation for cystectomy. This was followed by RARC with bilateral pelvic lymph node dissection and intracorporeal orthotopic ileal neobladder substitution. Final pathology demonstrated high-grade muscle-invasive urothelial carcinoma with macroscopic extravesical extension, negative margins and one out of 27 positive regional lymph nodes (pT3bN1M0). Six months postoperatively the patient presented for follow-up with persistent right leg pain. MR of the right femur demonstrated a single soft tissue mass measuring 5.7 cm within the right vastus lateralis (Figure 1). This was biopsied and proved to be metastatic high-grade urothelial carcinoma.

Follow-up CT of the chest, abdomen and pelvis (CAP) demonstrated abnormal sclerosis and remodelling of the right third rib and mildly enhancing bilateral inguinal nodes that were possibly metastatic in nature. A nuclear medicine (NM) bone scan revealed a hyperemic mass in the lateral aspect of the right thigh with increased bony uptake in the right femur as well as an additional lesion in the left iliac wing. Palliative combination chemotherapy was initiated with cisplatin/gemcitabine followed by carboplatin/gemcitabine therapy. Follow-up NM bone scan following chemotherapy treatment demonstrated slight progression of the right thigh mass and repeat CT CAP showcased a new 2.2 cm left iliac wing lesion not seen on previous imaging. Patient was started on IV pembrolizumab and at the time of follow-up appointment after 2 cycles stated that pain symptoms were well controlled and was tolerating treatment well with manageable pruritus on right leg.

DISCUSSION

At this time, known metastatic sites following ORC have previously involved lymph nodes, bone, lung, liver, and peritoneum, where as documentation of metastasis following RARC has been less exhaustive[10,11]. A recent systematic review showcased a 1.63% incidence of atypical recurrence following RARC[14]. Of these cases (63 of the 105 atypical recurrences), 60% involved peritoneal carcinomatosis, 15.2% involved extrapelvic lymph node metastasis, 10.5% involved port-site metastasis, 9.5% involved retroperitoneal nodal disease, and 3.8% involved multiple atypical recurrences[12].
While the growing evidence demonstrating the safety and efficacy of RARC lends support to its growing popularity, there remain ongoing concerns regarding the documented risk of atypical tumour recurrences associated with laparoscopic and RAS[13,]. While the exact mechanism by which these approaches increase the risk of atypical metastasis is unclear, previous reports have proposed that the insufflation and subsequent reduction of pneumoperitoneum that is required in laparoscopic abdominopelvic surgery may promote tumour seeding via aerosolization of remnant tumour cells[14]. Based on this potential mechanism, factors that may influence the risk of atypical recurrence during laparoscopic or RAS include the flow and pressure settings, the distance between the inflow trocar and the tumour, and the stability of the pneumoperitoneum[15]. While these variables may impact the risk of tumour spread within the abdominal and pelvic cavities, they do not provide an explanation for distant recurrence outside of the abdomen and pelvis, such as that seen within this case report. Further investigation is required to determine what risk factors might contribute to distant extrapelvic recurrence.

CONCLUSIONS

To our knowledge, this case report is the first to describe distant soft tissue recurrence of urothelial carcinoma of the bladder following RARC and highlights the oncologic risks specific to this increasingly popular procedure. Though rare and poorly understood, the potential for atypical recurrences occurring after RAS should be addressed preoperatively so that patients can acquire a more complete understanding of the risks associated with novel uro-oncologic procedures.

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FIGURES AND TABLES

Figure 1. Magnetic resonance imaging of the right femur demonstrating large soft tissue mass at junction of vastus lateralis/intermedialis in (A) sagittal; and (B) transverse.