CASE REPORT

Tumour seeding as a result of intraperitoneal perforation during transurethral resection of non-muscle invasive bladder cancer

Antonio Cusano, Greg Murphy, Peter Haddock, Joseph Wagner

Department of Urology,
Hartford Hospital, Hartford,
Connecticut, USA

Correspondence to

Peter Haddock,
peter.haddock@hcchealth.org

Accepted 8 September 2014

SUMMARY

The goals of transurethral resection of bladder tumour (TURBT) for urothelial carcinoma are pathological staging and the removal of all visible tumour tissue. Typically, a deep and extensive resection beyond the basement membrane, including some muscularis propria, is performed. However, this also carries a risk of perforating the bladder wall, creating the ideal circumstances to facilitate peritoneal or abdominal metastases. Small, asymptomatic bladder perforations occur frequently and are associated with gender: female, decreasing body mass index, higher tumour stage, deeper infiltration and higher resection weight. Since many of these perforations are extraperitoneal, heal spontaneously and do not elicit any significant perioperative symptoms, they remain undiagnosed. Even in cases of intraperitoneal perforation, peritoneal tumour recurrence has been rarely reported. We report on the unusual case of a 61-year-old woman who underwent TURBT for non-muscle invasive urothelial carcinoma that was complicated by intraperitoneal bladder perforation requiring open repair.

BACKGROUND

Transurethral resection of bladder tumour (TURBT) combined with intravesical chemotherapy is the standard treatment for non-muscle invasive urothelial carcinoma.^{1–9} The most commonly reported complication following TURBT is bleeding followed by bladder perforation, which occurs in up to 6.5% of resections.^{4 10 11} The main oncological concern associated with bladder perforation is the potential for extravesical recurrence due to tumour seeding.^{1–4} Perforation can also delay the time to complete resection and prevent immediate intravesical chemotherapy—both of which may increase the likelihood of recurrence, progression and metastasis. There are relatively few clinical reports of extravesical recurrence from seeding.^{1 4 5 10} We report on a rare case of extravesical recurrence in the left paracolic gutter in a 61-year-old woman who underwent a TURBT for non-muscle invasive urothelial carcinoma complicated by intraperitoneal bladder perforation and open repair.

CASE PRESENTATION

A 61-year-old, Asian woman with an unremarkable medical history initially presented to an outside hospital with gross, painless haematuria. She denied fever, lower urinary tract symptoms, vaginal symptoms or bleeding and any recent foreign travel.

INVESTIGATIONS

At presentation, the patient received an initial workup. Serum chemistries were unremarkable. Urine cytology was suspicious for urothelial carcinoma. An ultrasound performed at an outside hospital revealed a 4 cm bladder mass. Office cystoscopy was not performed given the obvious need for resection.

DIFFERENTIAL DIAGNOSIS

Gross haematuria: The diagnosis is urothelial cancer until proven otherwise. Kidney stones, urinary tract infections, benign prostatic hyperplasia, renal cell carcinoma can present with gross haematuria. Nephrology consultation may be warranted if urological evaluation is negative.

TREATMENT

Cystoscopy revealed a large sessile bladder tumour on the posterior wall/dome of the bladder. Retrograde pyelograms were unremarkable. Prior to completing the TURBT, an intraperitoneal bladder perforation was noted. Immediate exploratory laparotomy revealed a bladder perforation, which was repaired with two layers of absorbable suture. There was no associated visceral injury. A large bore catheter and an intraperitoneal Jackson-Pratt drain were inserted to facilitate drainage. The drain was removed prior to discharge, and a cystogram 14 days later revealed no evidence of leak.

Pathology revealed high-grade transitional cancer, stage T1 with lamina propria invasion, but no evidence of muscularis invasion. The patient was offered cystectomy (particularly given the difficult tumour location) or re-resection. The patient chose re-resection with mitomycin, which was performed 1 month after her catheter was removed. Complete resection was achieved, and pathology again demonstrated high-grade transitional cancer, stage T1 with lamina propria invasion, but no evidence of muscularis invasion. At this point, the patient was offered cystectomy, combination chemotherapy/radiation or intravesical treatment with BCG under the SWOG guideline with maintenance.¹² She chose the latter.

Six cycles of BCG treatment were initiated. Surveillance cystoscopies every 3 months for the first year and every 6 months the second year showed no evidence of recurrence, and urine cytologies were unremarkable as the patient received maintenance BCG in accordance to SWOG guidelines.¹² Routine surveillance CT imaging performed

CrossMark

To cite: Cusano A, Murphy G, Haddock P, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-206631

Figure 1 CT scan revealing a 1.0×0.6×1.3 cm metastasis from seeding in the left paracolic gutter (arrow).

18 months after initial presentation revealed a 1.0×0.6×1.3 cm soft tissue density along the abdominal wall in the left paracolic gutter (figure 1). This was biopsied under CT guidance and pathology was consistent with high-grade transitional cell carcinoma. Chest CT and bone scan were normal.

After discussing chemotherapy, radiation, and surgery as possible treatment options, the patient underwent laparoscopic resection of the solitary metastatic lesion; no other disease was identified.

OUTCOME AND FOLLOW-UP

The patient was discharged on postoperative day one and had an uneventful postoperative course. She declined systemic chemotherapy and continues on maintenance BCG in accordance with SWOG protocol.¹² She will continue with surveillance cystoscopies and cytologies every 6 months. We are planning repeat imaging with a chest/abdomen/pelvic CT every 6 months as well.

DISCUSSION

Non-muscle invasive urothelial carcinoma can be managed effectively using a combination of transurethral resection and adjuvant intravesical treatment.⁴ Typically, progression to muscle-invasive disease precedes metastasis via haematogenous or lymphatic spread.¹³

Intraperitoneal perforation is a rare and serious complication of TURBT, which can be complicated by increased leakage, systemic absorption of irrigation fluid and by bowel injury. Intraperitoneal bladder perforation requires immediate treatment to prevent complications such as peritonitis, uraemia, acidosis, hypervolaemia due to irrigant fluid absorption, and to rule out concomitant bowel injury.

There are several published reports of extravesical recurrence following bladder perforation. A retrospective review of 2821 patients with superficial bladder cancer who underwent TURBT reported bladder perforations in 36 cases (1.3%), of which 30 were extraperitoneal and 6 were intraperitoneal.¹¹ While the length of follow-up was not specified, there were no extravesical recurrences.

Conversely, 34 perforations, of which four required open repair and subsequently were found to have extravesical recurrence, were reported in a review of 3410 TURBT procedures.⁴ Golan *et al*¹ also presented a recent review of 4144 TURBT patients, of which 15 had bladder perforations and two had extravesical recurrence. In a comparative study, patients with bladder cancer with perforation showed a trend towards an increase in recurrence and progression and a decrease in

survival.¹⁰ However, since perforation and recurrence appear to be a relatively rare clinical event, it is difficult to draw conclusions from small patient cohorts from retrospective series.

The mechanistic basis for metastatic spread after perforation is not clear. Golan *et al*¹ reports two cases of recurrence. One patient was found to have a metastasis in the lung. Another patient with muscle invasive disease was reported to have pelvic lymph node and liver metastasis. However, It could be argued that haematogenous and lymphatic spread caused these metastases.

It is relatively rare to diagnose metastatic disease in patients with T1 bladder cancer.^{13 14} The lung, bone and liver are common sites of metastasis in the setting of muscle invasive bladder cancer. Intraperitoneal abdominal wall metastases are rare but not unheard of after perforation.⁵ While the fact that our patient presented with a solitary metastasis 2 years postsurgery would seem to be a good prognostic sign, the patient was offered systemic chemotherapy to address a concern that multiple sites of seeding may have occurred. To the best of our knowledge, this is the first case report of metastasectomy in this unique clinical situation. Additional studies are warranted to investigate the causative factors that result in the tumour seeding of other tissues following bladder perforation during TURBT for urothelial carcinoma, as well as the most appropriate treatment paradigm in this clinical setting.

Learning points

- Bladder perforation is a serious potential complication of transurethral resection of bladder tumour that requires immediate repair, potentially leaving the tumour incompletely resected. This can delay definitive treatment, lead to disease progression, and has the potential to facilitate direct tumour seeding at other sites.
- Our study highlights a patient in which peritoneal recurrence occurred as a result of direct tumour seeding following intraperitoneal bladder perforation during surgery for a non-muscle invasive tumour.
- Laparoscopic metastasectomy for peritoneal urothelial carcinoma metastasis is feasible.

Contributors JW conceived the idea of the study and was responsible for the design of the study. AC, PH and GM were responsible for undertaking for the data analysis. The initial draft of the manuscript was prepared by PH and AC and then circulated repeatedly among all authors for critical revision.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Golan S, Baniel J, Lask D, *et al*. Transurethral resection of bladder tumour complicated by perforation requiring open surgical repair—clinical characteristics and oncological outcomes. *BJU Int* 2011;107:1065–8.
- 2 Mydlo JH, Weinstein R, Shah S, *et al*. Long-term consequences from bladder perforation and/or violation in the presence of transitional cell carcinoma: results of a small series and a review of the literature. *J Urol* 1999;161:1128–32.
- 3 Bus MT, Cordeiro ER, Anastasiadis A, *et al*. Urothelial carcinoma in both adnexa following perforation during transurethral resection of a non-muscle invasive bladder tumor: a case report and literature review. *Expert Rev Anticancer Ther* 2012;12:1529–36.
- 4 Skolarikos A, Chrisofos M, Ferakis N, *et al*. Does the management of bladder perforation during transurethral resection of superficial bladder tumors predispose to extravesical tumor recurrence? *J Urol* 2005;173:1908–11.

- 5 Kim JH, Yang WJ. Delayed spontaneous perforation of urinary bladder with intraperitoneal seeding following radical transurethral resection of invasive urothelial cancer: a case report. *BMC Res Notes* 2014;7:167–9.
- 6 Balbay MD, Cimentepe E, Unsal A, *et al.* The actual incidence of bladder perforation following transurethral bladder surgery. *J Urol* 2005;174:2260–2.
- 7 El Hayek OR, Coelho RF, Dall'oglio MF, *et al.* Evaluation of the incidence of bladder perforation after transurethral bladder tumor resection in a residency setting. *J Endourol* 2009;23:1183–6.
- 8 Herkommer K, Hofer C, Gschwend JE, *et al.* Gender and body mass index as risk factors for bladder perforation during primary transurethral resection of bladder tumors. *J Urol* 2012;187:1566–70.
- 9 Guideline for the management of non-muscle invasive bladder cancer: (stages Ta, T1 and Tis): 2007 update. AUA Guidelines. 12 February 2014. <http://www.auanet.org/education/guidelines/bladder-cancer.cfm>
- 10 Comploj E, Dechet CB, Mian M, *et al.* Perforation during TUR of bladder tumours influences the natural history of superficial bladder cancer. *World J Urol* Published Online First: 29 Oct 2013. doi:10.1007/s00345-013-1197-x
- 11 Collado A, Chéchile GE, Salvador J, *et al.* Early complications of endoscopic treatment for superficial bladder tumors. *J Urol* 2000;164:1529–32.
- 12 Lamm DL, Blumenstein BA, Crissman JD, *et al.* Maintenance bacillus Calmette-Guérin immunotherapy for recurrent TA, T1 and carcinoma in situ transitional cell carcinoma of the bladder: a randomized Southwest Oncology Group Study. *J Urol* 2000;163:1124–9.
- 13 Vazina A, Dugi D, Shariat SF. Stage specific lymph node metastasis mapping in radical cystectomy specimens *J Urol* 2004;171:1830–4.
- 14 Herr HW, Donat SM, Dalbagni G. Can restaging transurethral resection of T1 bladder cancer select patients for immediate cystectomy? *J Urol* 2007;177:75–9.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow