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Case Report

Implantation of Colorectal Cancer from the Upper Urinary Tract to the Bladder via Urine

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ABSTRACT

Although the implantation of urothelial carcinoma from the upper urinary tract to the bladder occurs frequently, the involvement of cancers of other histologic types is rare. Here, we present an unusual case of intravesical recurrence, following ureteral invasion, by colorectal cancer. A 69-year-old woman developed a local recurrence of colorectal cancer involving the sigmoid colon and left ureter. The patient underwent a sigmoidectomy and left nephroureterectomy. Six months later, bladder tumors were observed, and a transurethral resection was performed. Histological examination of the bladder tumors revealed adenocarcinoma consistent with the findings of the colorectal cancer that had been previously resected. The most probable mechanism of intravesical recurrence would be the implantation of colorectal cancer cells from the upper urinary tract to the bladder via urine.

Introduction

The implantation of upper urinary tract urothelial carcinoma (UTUC) to the bladder occurs frequently, with intravesical recurrence developing in 40-50% of patients after a radical nephroureterectomy [1]. In contrast, the implantation of other histological types of cancer from the upper urinary tract to the bladder is rare. Colorectal cancer is one of the most common cancers, accounting for the highest proportion of female patients who die from cancer in Japan [2]. Although several studies have reported the recurrence of colorectal cancer in the urinary bladder after a partial cystectomy, intraluminal spread from the upper urinary tract to the bladder remains unreported [3, 4]. Here, we describe an unusual case of an intravesical recurrence following ureteral invasion by colorectal cancer and discuss the possible mechanism involved.

Case Report

A 67-year-old woman underwent a high anterior resection, small intestine resection, appendectomy, and right salpingo-oophorectomy for locally advanced colorectal cancer developed from the rectosigmoid colon. Histological examination revealed an adenocarcinoma (Figure 1a) that had invaded the appendix and right fallopian tube, and that was accompanied by lymph node metastasis.

A year later, computed tomography (CT) revealed a local recurrence with left hydronephrosis. Although chemotherapy temporarily reduced the tumor, it grew again to involve the sigmoid colon, left ureter, and left internal iliac artery by the time the patient turned 69 (Figure 2a). Urinary cytology revealed positively staining carcinoma cells, although it was difficult to identify the histological type. We performed a ureteroscopy and tumor biopsy to distinguish this cancer from a primary UTUC. The ureteral tumor was observed to have spread into the ureteral lumen

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(Figure 3a) and was histologically diagnosed as an adenocarcinoma (Figure 1b) that suggested the invasion of recurrent colorectal cancer. Systematic bladder biopsies were also performed at this time, with no subsequent cancer found in the bladder. After this, a combined operation, including sigmoidectomy, left nephroureterectomy, left salpingo-oophorectomy, and left internal iliac artery resection, was performed. Histological examination of a recurrent tumor, including lesions that had invaded the ureteral lumen, revealed adenocarcinoma consistent with findings of a primary colorectal cancer.

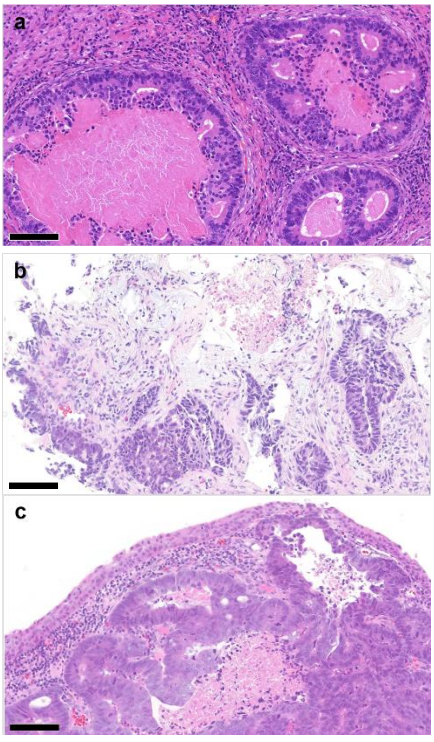
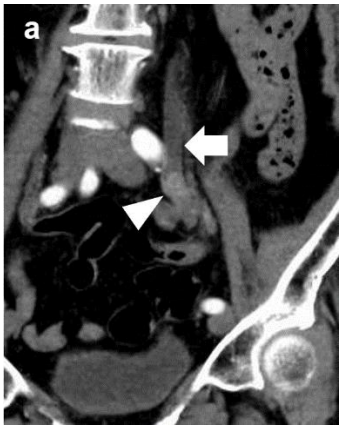


Figure 1: Microscopic findings of a **a)** primary colorectal cancer, **b)** ureteral tumor, and **c)** bladder tumor. **a)** The adenocarcinoma cells formed cribriform glands containing dirty necrosis and showed infiltrative growth with a desmoplastic reaction. Bar: 100μm. **b)** The ureteral tumor was composed of adenocarcinoma cells forming irregular and cribriform glands with a desmoplastic reaction and dirty necrosis, consistent with the findings of the primary colorectal adenocarcinoma. Bar: 100μm. **c)** Recurrent colorectal adenocarcinoma cells were observed under normal urothelium in a resectioned specimen of the bladder tumor. Bar: 100μm.



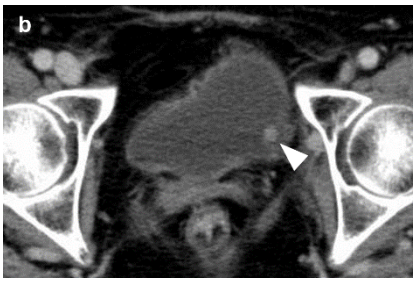


Figure 2: Computed tomography findings of a **a)** ureteral tumor and **b)** bladder tumor. **a)** The tumor (arrowhead) had invaded into the left ureteral lumen (arrow). **b)** A tumor was observed on the left lateral wall of the bladder (arrowhead).

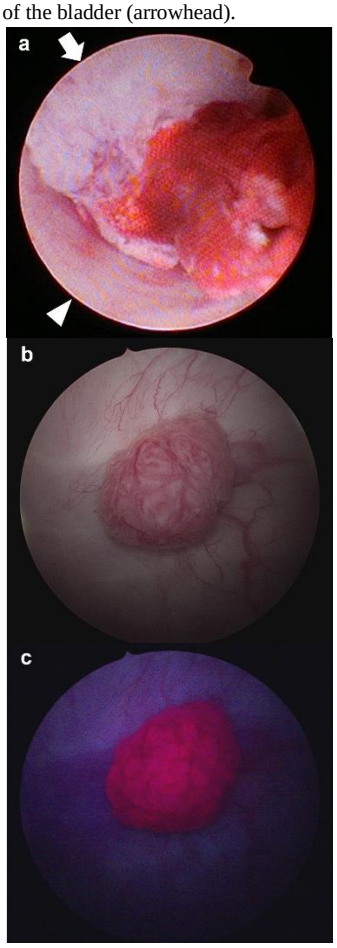


Figure 3: Endoscopic findings of a **a)** ureteral tumor, **b)** bladder tumor (white light), and **c)** bladder tumor (blue light). **a)** Ureteroscopy revealed that the ureteral tumor (arrow) had spread into the ureteral lumen (arrowhead). **b)** Cystoscopy revealed that the bladder tumor was smooth, pedunculated, nodular, and 1 cm in size. **c)** The bladder tumor fluoresced red in a photodynamic diagnosis using 5-aminolevulinic acid.

Six months later, a follow-up abdominal CT revealed three tumors, 1 cm in size, in the bladder (Figure 2b). White light cystoscopy revealed smooth, pedunculated nodular tumors (Figure 3b). The patient underwent photodynamic diagnosis (PDD)-assisted transurethral resection of the bladder tumor (TURBT) using 5-aminolevulinic acid (5-ALA). The tumors showed red fluorescence following cystoscopy with blue light (Figure 3c). All tumors were histologically diagnosed as

adenocarcinoma, consistent with the findings of the colorectal tumors that had been previously resected (Figure 1c). At the time of writing, cancer recurrence has not been observed four months after TURBT.

Discussion

Ureteral intraluminal spread of carcinoma originating from extraurinary lesions has been reported in only a few cases of colon and endometrial cancers but not in other types of cancers [3, 5]. A prior study reported bladder recurrence, after a partial cystectomy, after an en bloc resection of a colorectal cancer adherent to the urinary bladder [4]. In these cases, the mechanism of cancer spread is assumed to be due to direct invasion, exposure to cancer by surgical implantation, or a preoperative colovesical fistula [3-5]. Intravesical recurrence of urothelial carcinoma after radical nephroureterectomy for UTUC is observed frequently in about 40-50% of patients within three months to three years after surgery [1, 6]. The mechanism of intravesical recurrence of UTUC has been described as the implantation of tumor cells from the upper urinary tract into the bladder or a multicentric development from urothelium [7, 8].

In the present case, it was interesting to note that adenocarcinoma that directly invaded the ureter recurred in the bladder six months after the operation similar to primary UTUC. The most probable mechanism of intravesical recurrence would be the ureteral intraluminal spread of colorectal cancer cells via urine since an initial urinary cytology had revealed positively staining carcinoma cells and that cancer had not been found in the bladder prior to nephroureterectomy. PDD using 5-ALA has been used clinically by applying the biological features of protoporphyrin IX, a fluorescent substance that accumulates in cancer cells [9]. Recently, PDD using 5-ALA has attracted much attention as a diagnostic method for observing bladder cancer lesions by fluorescence emission [10]. The results of the present case suggest that metastatic bladder tumors with histological types other than urothelial carcinoma show red fluorescence levels as high as those in primary bladder urothelial carcinoma with PDD.

Conclusion

We herein report an unusual case of intravesical recurrence following colorectal cancer involvement in the upper urinary tract. The most probable mechanism of bladder recurrence is the implantation of colorectal cancer cells from the upper urinary tract via urine.

Data Availability

All data generated or analysed during this study are included in this published article and available from the corresponding author on reasonable request.

Conflicts of Interest

None.

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None.

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