Oncology, Nuclear Medicine and Transplantology
(eISSN 3105-8760)

Original Article

Histological Findings of Patients with Locally Advanced Colorectal Cancer After En Bloc Resection of the Urinary Bladder, Ureter or Prostate

Anuar Zhanapiya[1], Meiram Mamlin[1,2]

[1]*School of Medicine, Nazarbayev University, Astana, Kazakhstan*
[2]*Department of Multidisciplinary Surgery, National Research Oncology Center, Astana, Kazakhstan*

Received: Dec 10, 2025
Accepted: May 31, 2026

Corresponding author's email:
anuar.zhanapiya@nu.edu.kz

meiram.mamlin@gmail.com

Citation: Zhanapiya A, Mamlin M. Histological Findings of Patients with Locally Advanced Colorectal Cancer After En Bloc Resection of the Urinary Bladder, Ureter or Prostate. Oncology, Nuclear Medicine and Transplantology. 2026;2(2):onmt019. https://doi.org/10.63946/onmt/18720

ABSTRACT

This study was conducted to investigate histological outcomes of patients with locally advanced colorectal cancer involving the urinary bladder, ureters or prostate. Initial cohort included 45 patients but 10 patients were eliminated from the study due to absence of medical records or non-confirmed colon adenocarcinoma. Finally, the study included 35 patients who underwent colon surgery plus either partial or complete bladder resection, partial ureter resection or prostate resection in time period between 2016 and 2025. Data on patient characteristics and results of histological examination were collected retrospectively. Among patients, who underwent colon surgery plus cystectomy (n=27), only in 48% cases confirmed histological invasion was detected. Overall R0 resection was achieved in 94% cases. These data correspond to literature reviewed findings. True lower urinary tract invasion occurred in approximately half of locally advanced colorectal cancer cases, while en bloc resection achieved high R0 rates, supporting resection when invasion is uncertain.

Keywords: Locally Advanced Colorectal Cancer; Bladder Invasion; Ureter Invasion; Cystectomy; Multivisceral Resection

Introduction

The locally advanced colorectal cancer tends to adhere or invade the neighboring organs and tissues including the urinary bladder, ureters and prostate. Given that it is usually difficult for surgeon to differentiate intra-operatively between inflammatory process and true invasion to nearby organs, there are several surgical options to perform including colon resection plus either partial or total cystectomy, uretectomy, prostate resection and multivisceral resections such as pelvic exenteration. The gold standard treatment for locally advanced colorectal cancer is en bloc resection of all involved organs. The research study by Carne et al. showed that only en bloc resection of colorectal cancer with suspected bladder invasion reliably prevented local recurrence, whereas simple separation of adhesions led to 100% recurrence, highlighting the importance of radical en bloc surgery (Carne et al., 2004). According to retrospective study, true histologic bladder invasion is often overestimated preoperatively and it was found that partial cystectomy provides comparable oncologic outcomes to total cystectomy but with fewer complications and better functional results (Kondo et al., 2019). Another cohort study has shown that en-bloc resection for colorectal cancer with suspected lower urinary tract involvement is safe, achieves high R0 rates, and provides acceptable oncologic outcomes, while true invasion is less frequent than expected (Hartwig et al., 2016). It has been shown that partial cystectomy offers similar oncologic outcomes but significantly fewer complications compared to total cystectomy, making it the preferred option when bladder invasion is suspected but not extensive (Tsang and Lau, 2022). The recent study demonstrated that partial cystectomy provides comparable oncologic outcomes to total cystectomy while preserving bladder function, with low local recurrence, supporting an organ-sparing approach when bladder invasion is limited (Nakamori et al., 2024). The major aim of this article is to verify frequency of true histological invasion to urinary bladder, ureter or prostate due to colorectal cancer. These data could be used for determining cases when organ-sparing tactics or en bloc resection could be used.

Methods

This study was approved by the Institutional Review Board of the National Research Oncology Center (Astana, Kazakhstan Republic). The research study included patients, who underwent multivisceral surgery for locally advanced colorectal adenocarcinoma with clinically suspected invasion into urinary bladder, ureter or prostate between January 2016 and June 2025 in the department of multidisciplinary surgery at the National Research Oncology Center (Astana, Kazakhstan Republic). Exclusion criteria included histological cancer forms other than adenocarcinoma and missing patients' medical records. All patients underwent preoperative evaluations and all treatment strategies were discussed during multidisciplinary team conferences.

Results

According to Figure 1, there are 35 patients that were finally selected from the initial cohort group (45 patients), including 17 patients with bladder involvement, 7 patients with ureter involvement, 1 patient with prostate involvement, 10 patients with both bladder and ureter involvement.

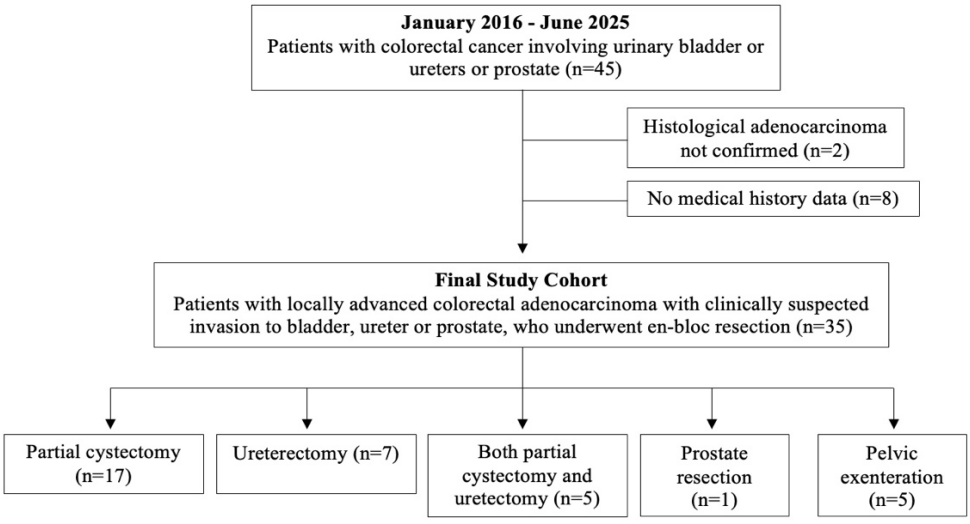

Figure 1. Patient selection flowchart

According to Figure 2, 27 patients underwent en-bloc colon resection and cystectomy for clinically suspected bladder involvement: 22 patients underwent partial cystectomy and 5 patients underwent total cystectomy as part of pelvic exenteration procedure. Among 27 patients, histological confirmation of bladder invasion was detected for 13 patients (48%).

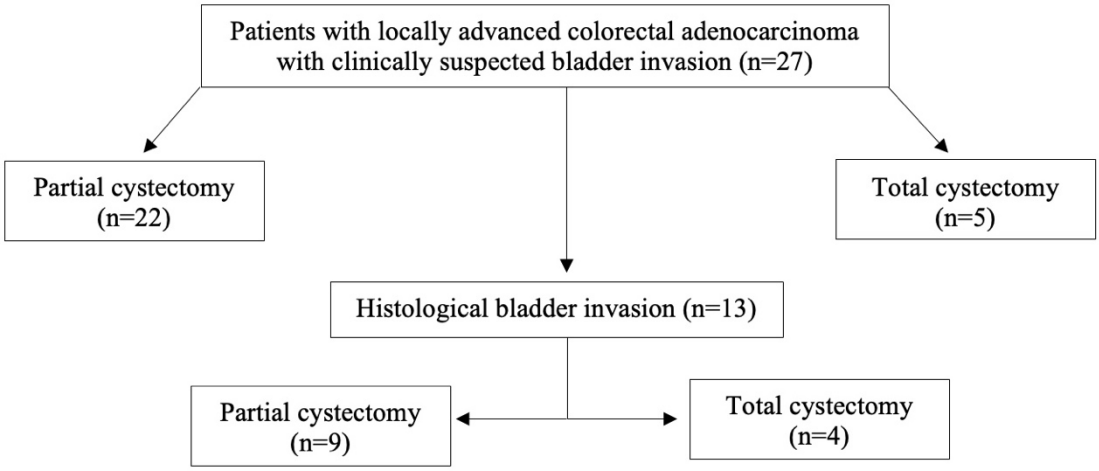

Figure 2. Histological outcomes for patients who underwent cystectomy

According to Figure 3, there are 12 patients who underwent colon surgery plus uretectomy: 7 patient underwent ureterctomy and 5 patients both cystectomy and uretectomy. Histological examination revealed only involvement of ureters in peritumorous inflammation but not invasion.

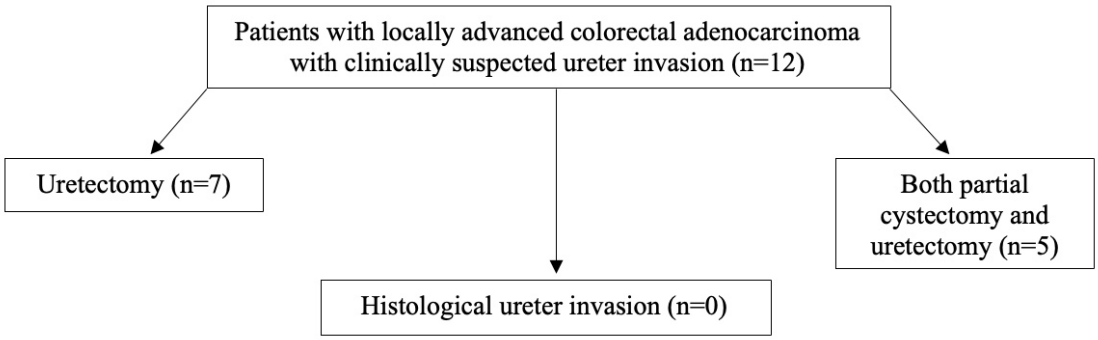

Figure 3. Histological outcomes for patients who underwent uretectomy

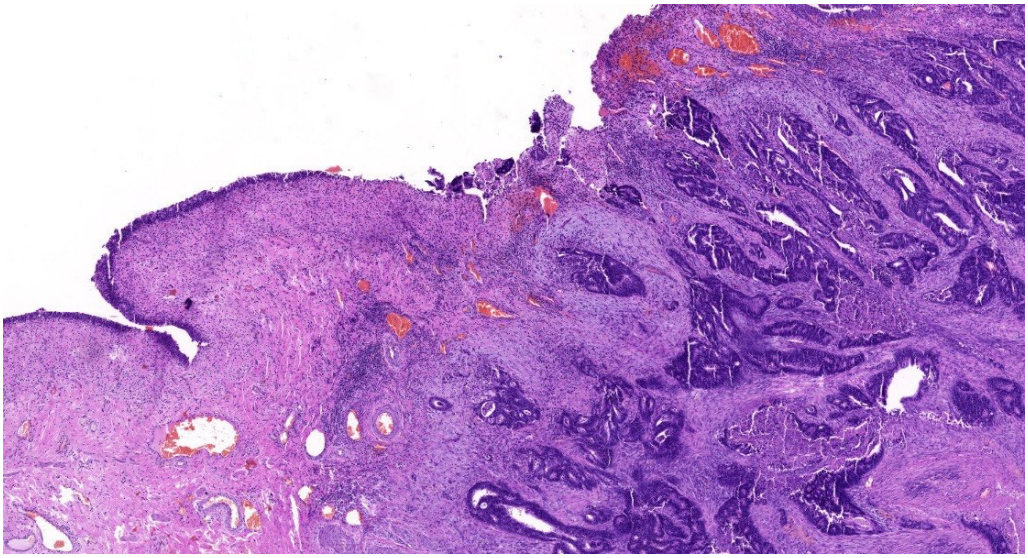

Figure 4. Histological findings demonstrating urinary bladder invasion. Urinary bladder wall is shown on the left side, colorectal adenocarcinoma is shown on the right side.

Discussion

According to the results of this study, among 27 patients who underwent en bloc colon resection and cystectomy (either partial or complete) for clinically suspected bladder involvement, histological confirmation of bladder invasion was detected for 13 patients (48%). Overall R0 resection was achieved in 94% cases (31/33). The similar results were reported by other research studies. For example, according to the FRENCH research group's multicenter retrospective study that included 117 patients with a clinically suspected bladder invasion from a locally advanced colon cancer, histologically confirmed bladder invasion was reported to present in 47% cases (Vuillermet et al., 2020). The FRENCH study also reported R0 resection rate of 87%. Interestingly, the FRENCH research group made conclusion that local recurrence is increased by clinically suspected bladder invasion even in the absence of histologically confirmed bladder invasion (Vuillermet et al., 2020). According to another study, in which 31 patients undergoing en bloc resection of colorectal cancer with lower urinary tract involvement, histologically confirmed urinary tract invasion was found in 52% (Hartwig et al., 2016). The discrepancy between suspected and true invasion raises an important clinical question regarding the extent of resection. Although nearly half of the patients ultimately did not have histologic bladder invasion, en bloc removal ensured optimal oncologic radicality and likely contributed to the high R0 rate. This supports the current paradigm that, when organ invasion cannot be confidently excluded, an en bloc resection remains justified. R0 findings confirms that aggressive but anatomically appropriate en bloc resection enables high rates of margin-negative resection, the strongest predictor of long-term oncologic outcomes. Data from Nahas et al. demonstrate that multivisceral en block resection in T4b colorectal cancer yields acceptable morbidity (37.1%) and low perioperative mortality (1.9%) while achieving R0 margins in ~72% and 5-year oncologic outcomes comparable to standard resections (Nahas et al., 2017). This study has several limitations such as small sample size, retrospective nature and absence of long-term survival analysis.

Conclusion

In locally advanced colorectal cancer with suspected invasion of the lower urinary tract, true histological invasion was confirmed in only half of the cases, yet en bloc resection allowed a very high R0 rate. These findings support proceeding with multivisceral resection when invasion cannot be ruled out, while highlighting the need for better preoperative methods to distinguish true invasion from inflammatory adhesions.

Abbreviations used

CRC – colorectal cancer

Acknowledgements

Acknowledgements: Not applicable.

Ethics approval and consent to participate: This study was approved by the Institutional Review Board of the National Research Oncology Center (Astana, Kazakhstan Republic).

Authors' contributions: All authors: Writing, reviewing, and editing.

Funding: No funding.

Competing interests: No competing interests.

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