CASE REPORT

New onset of recurrent urinary tract infection (in a low-risk patient) after a routine colonoscopy with polypectomy: A case study

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ABSTRACT

Urinary tract infections (UTIs) are prevalent nosocomial infections, contributing significantly to morbidity and healthcare costs. While colonoscopies are essential for colorectal cancer screening, they can occasionally lead to infections. This case study examines recurrent UTIs in a 77-year-old postmenopausal female following a routine colonoscopy with polypectomy. It highlights the potential role of translocated endogenous Escherichia coli. The case identifies risk factors and proposes strategies to mitigate colonoscopy-related complications, advocating for risk-identification tools to reduce morbidity. The role of Advanced Practice Registered Nurses (APRNs) in prevention and management is also explored.

Key Words: Advanced practice registered nurse, Bacterial translocation, Colonoscopy, Infection prevention, Nosocomial infection, Polypectomy, Urinary tract infection

1. CASE PRESENTATION

A 77-year-old postmenopausal woman presented with dysuria and bilateral flank pain. She reported a prior UTI treated with an unspecified antibiotic (suspected nitrofurantoin) two weeks earlier at another clinic. Nitrofurantoin exerts its antibacterial effects by targeting ribosomes and interrupting bacterial DNA, RNA, and cell wall synthesis. It also negatively impacts other bacterial metabolic activities.[1] Nitrofurantoin is also noted to have very low rates of microbial resistance.

A widow for 25 years, she denied sexual activity, douching, or sex-toy use. Her medical history included Her2+ breast cancer (post-unilateral mastectomy, lymph node exploration, radiation, chemotherapy; in remission on Aromasin, confirmed by a negative positron emission tomography scan six months prior), prediabetes (HbA1c 6.2%, managed with diet and exercise), and hypertension (controlled with amlodipine and lisinopril). She had one vaginal delivery 40 years ago, with no history of genitourinary surgeries or sexually transmitted diseases. Symptoms included dysuria, flank pain, pelvic tenderness on palpation, urinary frequency, and incomplete bladder emptying, but no fever, chills, urgency, hematuria, or malaise. In-house urinalysis showed positive nitrates, bacteria, and leukocyte esterase; culture confirmed E. coli, suggesting endogenous bacterial translocation from the gastrointestinal tract. She was treated with a five-day course of nitrofurantoin per evidence-based guidelines.[2] Three weeks later, she returned with recurrent dysuria and pelvic pain. Urinalysis again showed leukocyte esterase, bacteria, and nitrites; culture confirmed E. coli with resistance

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to multiple antibiotics.[3] She was prescribed ciprofloxacin (250 mg immediate-release tablets every 12 hours for three days), which temporarily resolved symptoms.

Three weeks later, symptoms recurred, prompting referrals to infectious disease and gynecology. Vaginal estrogen was offered to prevent recurrent UTIs, but the patient declined due to breast cancer concerns, despite education on its safety with aromatase inhibitors.[4] A 2023 study found no increased mortality risk with vaginal/localized estrogen use in breast cancer patients on aromatase inhibitors. The nested case-control study employed a cohort size of 15,198: 1,262 women who died from breast cancer complications (cases) compared to matched controls (10 per case) with breast cancer, estrogen exposure, and aromatase inhibitor or tamoxifen use. No statistical difference was observed between short-term or long-term estrogen exposure in those using aromatase inhibitors, tamoxifen, or both.[4]

Six weeks prior to her first UTI, she underwent a colonoscopy for altered bowel habits (urgency, diarrhea, dark stools for over six months), during which seven precancerous polyps were biopsied. She reported no prior UTIs and linked the infections to the colonoscopy, and was advised to undergo another colonoscopy in three years' time. She was advised to follow up with gastroenterology but was lost to follow-up. See Table 1 for a summary of the clinical timeline.

Table 1. Timeline of clinical events post-colonoscopy

Time Point	Event/Procedure	Symptoms (S/S)	Treatment (Tx)	Findings
Baseline (Week 0)	Colonoscopy with 7 polypectomies	Urgency, diarrhea, dark stools (past 6 months)	None	Precancerous polyps identified; follow-up colonoscopy recommended in 3 years
Weeks 4–6	First UTI diagnosis (prior clinic)	Dysuria, bilateral flank pain	Unspecified antibiotics (likely nitrofurantoin, 5 days)	Not reported (treated elsewhere)
Week 9	Clinic visit for recurrent UTI	Dysuria, flank pain, pelvic tenderness, frequency, incomplete bladder emptying	Nitrofurantoin (5 days)	Urinalysis: Nitrates (+), bacteria (+), leukocyte esterase (+); Culture: E. coli (+)
Week 12	Clinic visit for recurrent UTI	Dysuria, pelvic pain with deep palpation	Nitrofurantoin (5 days), then ciprofloxacin (250 mg every 12 hours, 3 days)	Urinalysis: Leukocyte esterase (+), bacteria (+), nitrites (+);Culture: E. coli (+) with antibiotic resistance; Vaginal estrogen offered (declined)

2. INTRODUCTION

The Institute of Medicine's landmark report, To Err Is Human, estimated 98,000 annual deaths in the U.S. from nosocomial and iatrogenic causes, underscoring the infection risks of medical procedures.[5] Colonoscopies, critical for colorectal cancer screening and diagnosis, are associated with complications, including bacterial infections.[6] Colonoscopy complications have been categorized as cardiopulmonary and sedation-related adverse events (with over 60% of cases), missed pathology (e.g., post-colonoscopy colorectal cancer), infections from endoscope transmission or endogenous bacterial translocation, and procedural issues like perforation, bleeding, post-polypectomy syndrome, splenic injury, or air embolism.[7] Common post-procedural symptoms include abdominal pain, nausea, and rectal bleeding.

A systematic review of 117 articles from North America and Western Europe estimated infection rates at 0.073% for lower gastrointestinal (GI) endoscopies, 0.123% for non-endoscopic retrograde cholangiopancreatography (ERCP) upper GI procedures, 0.2% for GI endoscopies, and 0.8% for ERCP.[8] Reusable endoscopes, polypectomy-related trauma, and bowel preparation-induced microbiota changes contribute to infection risks.[9] With approximately 15 million colonoscopies and seven million esophagogastroduodenoscopies (EGDs) performed annually in the U.S., and colorectal cancer as the fourth leading cause of cancer diagnoses and deaths, enhancing procedure safety is paramount.[10]

Infections following colonoscopies often involve multi-drug-resistant organisms, such as Pseudomonas and Enterobacteriaceae, linked to inadequate endoscope reprocessing.[6] Improper sterilization can lead to outbreaks of resistant bacteria, increasing morbidity.[11] Bowel preparation, a prerequisite for colonoscopy, disrupts the gut microbiota, potentially facilitating bacterial translocation to adjacent systems like the urinary tract.[9] These microbiota alterations may persist post-procedure, contributing to infection risk. In addition,

patient-specific factors, such as advanced age or comorbidities, may exacerbate susceptibility to post-colonoscopy infections, necessitating tailored risk assessments.[8]

The U.S. Preventive Services Task Force (USPSTF) recommends colonoscopies for persons aged 50–75 with an A grade (high certainty of substantial benefit). For persons aged 45–49 (B grade, moderate to substantial benefit), and for individuals aged 76–85 where a case-by-case assessment is needed (colonoscopy comes with a C grade, indicating small benefit).[12, 13] These recommendations highlight the need to minimize complications like infections.

3. Impressions

Recurrent uncomplicated UTIs are typically associated with risk factors including sexual activity, vulvovaginal atrophy, altered microbiota, prior UTIs, family history, or nonsecretor blood type.[14] This patient, celibate for 25 years, reported no vulvovaginal atrophy symptoms (e.g., vaginal dryness, pruritus, pain), prior UTIs, or changes in local bacterial flora, indicating a low risk for recurrent UTIs. Her unknown blood type status does not alter this assessment. The onset of recurrent UTIs six weeks post-colonoscopy, with E. coli as the causative organism, strongly suggests the procedure as the trigger.[15]

The recurrent nature of the patient's UTIs suggests a persistent pathway for bacterial translocation, with colovesical fistula as a plausible mechanism. Although rare post-colonoscopy, fistulas can result from iatrogenic trauma during polypectomy, particularly when multiple biopsies are performed, as in this case.[16] Fistulas, while more common in inflammatory conditions, can occur post-procedure due to mechanical stress on the colon wall.[17] Perforation, with a pooled prevalence of 0.8/1,000 post-polypectomy, is another potential cause, as micro-perforations may facilitate bacterial spread without overt symptoms.[18] The patient's postmenopausal status, while not a direct risk factor, may have compounded susceptibility due to reduced mucosal integrity in the pelvic region. These mechanisms underscore the need for vigilant post-procedure monitoring and risk-stratification tools to identify patients prone to such complications.

4. Role of the advanced practice nurse

Advanced Practice Registered Nurses (APRNs), working in primary care, play a critical role in referring patients for colonoscopies and managing post-procedure complications.[19] APRNs can assess patient risks before referral and monitor for infections afterward. The American Association of Colleges of Nursing (AACN) mandates that APRNs enhance quality and minimize harm through system effectiveness and individual performance.[20] They are trained to integrate research, theory, and practice to develop innovative approaches, such as risk-stratification tools for colonoscopy complications.[21]

In 2022, primary care nurse practitioners nearly equaled physicians in number and were more likely to serve underserved and remote areas, where morbidity and mortality rates are higher.[22, 23] Sensitizing APRNs to post-colonoscopy infection risks and equipping them with tools to identify and mitigate these issues can improve patient outcomes, particularly in vulnerable populations.

APRNs can implement risk-stratification tools, such as a pre-colonoscopy checklist assessing age, comorbidities (e.g., diabetes, immunosuppression), prior infections, and procedure complexity (e.g., multiple polypectomies).[8] For example, a scoring system could assign points for risk factors: age >75 (2 points), multiple polypectomies (2 points), or history of pelvic surgery (1 point). Patients with higher scores would warrant closer post-procedure monitoring or prophylactic antibiotics. Such tools, grounded in evidence,[8] empower APRNs to tailor interventions, reducing infection risks in high-risk groups like older adults or those in underserved areas.[25]

5. Conclusion

This case study highlights a rare complication: UTIs following colonoscopy. The patient's infections, caused by E. coli – a common gut bacterium – and starting soon after the procedure, suggest bacteria may have spread from the gut to the urinary tract during the colonoscopy.[15] Notably, the patient lacked typical risk factors for recurrent UTIs, thereby pointing to the colonoscopy as the likely trigger.

Clinicians should closely monitor post-colonoscopy patients, particularly postmenopausal women or those undergoing polypectomies, and consider prophylactic antibiotics for high-risk cases. Standardized monitoring protocols, risk-stratification tools, and updated clinical guidelines are needed to enhance procedure safety. Further research is needed to explore the prevalence and risk factors of post-colonoscopy infections to reduce morbidity and improve outcomes for patients.[24]

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Authors contributions

Dr. Ozioma C. Nwosu-Izevbekhai was responsible for the study design, data collection, drafting the manuscript, and revising it. The author read and approved the final manuscript.

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