



Original Research

Outcomes of Total Joint Arthroplasty Subsequent to Ostomy: A Case Series

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ABSTRACT

Background: Ostomy surgery is associated with a high rate of postoperative complications and poses several theoretical concerns for subsequent total joint arthroplasty (TJA). There is concern that ostomy may negatively impact nutrition or increase risk of known gastrointestinal (GI) complications such as obstruction, constipation, or diarrhea, particularly with the use of postoperative opioids. There is also concern that the open nature of the ostomy may increase the risk of infection. This case series reports outcomes and assesses the risk associated with TJA in patients with previous surgical history of intestinal ostomy.

Methods: This is an institutional review board-approved retrospective case series of patients with surgical history of ostomy who underwent total hip or total knee arthroplasty. Cohort consisted of 14 cases in 10 patients and was examined to report individual TJA and ostomy procedural details and outcomes. **Results:** Of the 14 cases, none required GI clearance or prophylaxis outside of standard perioperative antibiotics prior to TJA surgeries, and all TJAs resulted in good outcomes. Four cases (29%) had a complication, although only 2 of these were GI complications and none were life-threatening or required further surgery. The first of the 2 experienced increased ostomy output, and symptoms were resolved promptly with rehydration. The second experienced decreased ostomy output, and symptoms were resolved promptly with changes in prn pain medications. Other complications were postoperative urinary tract infection and syncopal episode.

Conclusions: TJA can be performed safely in the setting of ostomy with major consideration being risk of diarrhea or constipation during postoperative period.

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Introduction

Ostomy surgery is now performed on approximately 100,000 Americans each year due to numerous gastrointestinal (GI) problems, including increasing rates of colorectal and diverticular cancers, and is associated with a high rate of postoperative complications (70%) [1]. Such complications known to occur years after the postoperative period include parastomal hernia, subcutaneous prolapse, stromal prolapse, retraction, stomal stenosis, obstruction, and infection. The majority of these complications are associated with aspects of initial ostomy placement procedure and

routine stomal care. There is little research regarding subsequent nonostomy-related procedures [2,3].

However, there are a number of theoretical concerns and no published papers examining the risk associated with total joint arthroplasty (TJA) in patients with surgical history of intestinal ostomy. It is well known that patients with poor nutrition are at increased risk of complications [4]. There is concern that the open nature of the ostomy may increase the risk of infection. Additionally, the ostomy may increase risk of known GI complications such as obstruction, constipation, or diarrhea, particularly with the use of postoperative opioids.

This case series reports outcomes and assesses the risk associated with TJA in patients with previous surgical history of intestinal ostomy. It aims to address the question of whether TJA can be performed safely in this population and identify major considerations.

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Material and methods

This is an institutional review board-approved retrospective case series of patients with surgical history of ostomy who underwent total hip arthroplasty (THA) or total knee arthroplasty (TKA). The patient list was built from the electronic medical records of one tertiary academic medical center starting from April 2022 and continuing retrospectively until January 1, 2005, when the electronic medical record was implemented. Patients with surgical history of TJA, including THA or TKA, and preceding intestinal ostomy were included in this study. Patients were excluded from the cohort if the ostomy was reversed prior to TJA. The final cohort consisted of 14 cases in 10 patients and was examined to report individual TJA and ostomy procedural details and outcomes. Ostomy details included date of procedure, surgery performed, whether ostomy was permanent or temporary, indication for ostomy, and any revision surgeries that occurred. TJA details included age at time of TJA, date of surgery, specific joint replaced, GI clearance obtained, and TJA intraoperative and postoperative complications (within 90-day postoperative period).

Results

The patient cohort consisted of 14 joint arthroplasties in 10 patients ranging in age from 64 to 88 years at the time of TJA. Date of initial ostomy operation spanned from 1991 to 2018. TJA dates span from 2007 to 2021. Charts were reviewed, and individual results were formatted in [Appendix Table 1](#).

Of the 14 cases, 13 reported histories of permanent ostomies: five colostomies, 7 ileostomies, and one unspecified ostomy location of small bowel. Permanent ostomies were indicated by a variety of diagnoses including ischemic bowel, rectal, and colon cancers, colitis, and perforated diverticulitis. Four cases reported histories of ostomy revision prior to TJA. The remaining one patient (one case) suffered a singular trauma requiring both temporary ileostomy to manage mesenteric hematoma with hemoperitoneum and subsequent TJA to repair left femoral neck fracture (performed prior to ostomy reversal). Ostomy and TJA operations were completed during the same hospitalization.

No patients had preoperative GI clearance or prophylaxis outside of standard perioperative antibiotics prior to TJA surgeries, and all TJAs resulted in good outcomes. Of the 14 joints replaced, 9 were knees and 5 were hips. Hip arthroplasty cases included 2 anterior approaches and 3 posterior approaches. Patient charts made no indication of accounting for ostomy placement in decision of THA surgical approach.

There were no reported intraoperative complications or serious/life-threatening postoperative complications. Four reported minor complications within the 90-day postoperative period, with 2 of these being GI-related. The first of the 4 was admitted to the Emergency Department (ED) due to a syncopal episode during physical therapy on postoperative day 23, which was assumed to be related to known cardiac history and required no intervention. The second patient with postoperative complication was admitted to the ED 2 months postoperatively due to high ostomy output and cramping with resulting acute on chronic renal failure/dehydration; symptoms resolved with hydration and electrolytes. This patient additionally developed bilateral lower leg edema 1 week later, which was treated without further complications. The third patient was admitted to the ED on postoperative day 18 due to fecal impaction likely resulting from opioid (hydrocodone/acetaminophen) intake; symptoms resolved with magnesium citrate and discontinuation of opioids. Tramadol and acetaminophen were used to manage pain for duration of inpatient stay, and oxycodone was prescribed prn upon discharge. The fourth patient developed a

urinary tract infection (UTI) on postoperative day 9 with culture positive for *P. aeruginosa* while recovering in inpatient rehabilitation and was treated with ciprofloxacin initially. The UTI then recurred on postoperative day 28 requiring further treatment with ciprofloxacin. This patient was subsequently evaluated for recurrent UTIs by nephrology, resulting in diagnosis of prostate hypertrophy. The remaining 10 cases indicated no complications, readmissions, or nonroutine outpatient visits within the 90-day postoperative period.

Discussion

Ostomy surgery is now performed for a number of indications, including colon and rectal cancers, abdominal trauma, intestinal obstruction or perforation, and inflammatory bowel disease. This procedure is well known to cause frequent complications, several of which may occur years after the initial procedure [2]. However, there is no data specifically on the results of TJA in the setting of ostomy. This case series represents the largest case series of TKA/THA in this patient population to our knowledge. Four of the 14 (29%) cases had a complication, although only 2 of these were GI complications, and none of the complications were life-threatening or required further surgery. However, certain perioperative and postoperative practices may increase risk of obstruction or infection in ostomy patients.

Though not considered a true ostomy complication, changes in ostomy output can also cause cramping, bloating, significant discomfort, and electrolyte imbalance. Constipation or decreased ostomy output can be caused by dietary changes, medications, or obstruction. Our case series describes one patient admitted to the ED on postoperative day 18 due to decreased ostomy output resulting from fecal impaction. Symptoms likely resulted from opioid (hydrocodone/acetaminophen) intake and resolved with magnesium citrate and discontinuation of opioids. Tramadol and acetaminophen were used to manage pain for duration of inpatient stay, and oxycodone was prescribed prn upon discharge. Patient was not readmitted within postoperative period. This case supports the use of typically recommended pain medication regimens that do not increase risk of constipation. Such options include immediate-release formulas, liquid medications, or parenteral routes of administration.

Increase in ostomy output from an established normal baseline is termed "postadaptation diarrhea" and is caused by usual diarrhea etiologies in addition to Crohn's recurrence, small intestine bacterial overgrowth, ostomy malfunction, bile acid deficiency, or hypersecretory pseudo-obstruction. Presentation is frequently more severe due to lack of compensatory colonic fluid absorption. Opportunistic infection by *Clostridioides difficile* is specifically noted to cause postadaptation diarrhea in ostomy patients with a higher mortality rate compared to that of *C. difficile* colitis [5]. High ostomy output and cramping were noted in one patient from our case series; however, symptoms were associated with acute on chronic renal failure/dehydration and resolved with hydration and electrolytes. This patient was not readmitted during postoperative period. Our case series noted zero infections with *C. difficile*; however, such risk should be noted with use of antibiotics.

All patients in this series received perioperative prophylactic antibiotics; however, none of the patients received an extended course, which is a practice gaining in popularity [6]. Given that an ostomy may be a theoretical risk for infection, extended antibiotics may be considered. However, it is important to be aware that antibiotic use has been suggested to increase risk of ostomy infection, with the most common source being *Candida albicans*. *Candida albicans* is native to the gut and may overgrow in the peristomal skin in response to antibiotic use [3]. Notably, our case

series describes no case of ostomy infection secondary to TJA and found no specific antibiotic regimens initiated or avoided during preoperative, perioperative, or postoperative periods. While this study primarily focused on 90-day complications, these patients had a mean 15-month follow-up, and there were no subsequent prosthetic joint infections.

Ostomy presence is also known to have a significant impact on quality of life, both improving quality compared to such alternatives as fecal incontinence or cancer progression while also negatively altering lifestyle and personal image (especially when impacted by complications). TJA, however, is well known to improve quality of life by increasing patient mobility and decreasing pain. The opportunity to undergo TJA safely could restore a degree of quality of life in ostomy patients by offering additional lifestyle flexibility with little to no change in complication risk.

Limitations to this study include its retrospective design, limited number of patients, and inclusion of cases from only one institution. Additionally, there is a mix of THAs and TKAs included, and this case series spanned over 14 years. This study also lacks patient-reported outcome measures, as most of the surgeries were performed prior to the institution of patient-reported outcome measures use in all TJA patients.

Conclusions

This case series reports on 14 cases in 10 patients with surgical history of ostomy who have undergone subsequent TKA or THA. No cases reported GI clearance, and there were no specific antibiotic regimens initiated or avoided during preoperative, perioperative, or postoperative periods. It does not seem that obtaining GI clearance would have mitigated the GI complications, although this is something that could potentially be considered given that there were 2 related complications in this cohort. In the case of increased ostomy output, symptoms were resolved promptly with rehydration. In the case of decreased ostomy output, symptoms were resolved promptly with changes in prn pain medications. No TJA procedures reported intraoperative complications or serious/life-threatening postoperative complications. Nevertheless, in this cohort, there was a 29% rate of complications. Therefore, it may be prudent to obtain preoperative GI consultation. Possible

postoperative changes in ostomy output and potential preventative measures related to fluid intake and pain medication should be discussed with patients in detail. The primary recommendation for constipation management in ostomy patients is maintenance of adequate fiber and fluid intake. Bulk-forming laxatives may be used as well for refractory symptoms. Risk associated with alternative agents (such as other laxatives) differs depending on type of ostomy (ileostomy vs colostomy) [7]. Use of pain medication regimens that do not increase risk of constipation can be considered, and ostomy output should be monitored closely. Such findings indicate TJA can be performed safely in the setting of ostomy with major consideration being risk of diarrhea or constipation during postoperative period.

Conflicts of interest

D. Schmitt is a paid consultant for HipInsight. N. Brown receives royalties from Corin and Link; is a paid consultant for Depuy, Corin, and Link; is a board/committee member of American Academy of Orthopaedic Surgeons Orthopaedic Knowledge Update evaluation committee.

For full disclosure statements refer to <https://doi.org/10.1016/j.artd.2023.101220>.

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Appendix

Appendix Table 1

Summarized findings of 14 individual case reports of TJA subsequent to intestinal ostomy.

Age (at time of TJA)	TJA joint	Ostomy date	Temporary vs permanent ostomy	Ostomy procedure	Ostomy indication	TJA date	GI clearance for TJA	Postoperative complications (within 9 d of TJA)	Other information
83	left knee	1/22/08	permanent	Subtotal colectomy with end ileostomy	Ischemic bowel	8/25/10	none	none	
83	right knee	1/22/08	permanent	Subtotal colectomy with end ileostomy	Ischemic bowel	9/15/10	none	none	
87	right hip (posterior)	08/98 ^a	permanent	Abdominoperineal resection with end colostomy in 08/98, repair of parastomal and incisional hernias with colostomy revision on 7/3/12	Rectal cancer in 1998, incarcerated parastomal and incisional hernias with complete bowel obstruction in 2012	6/4/14	none	none	
67	left knee	10/12/11	permanent	Total proctocolectomy with posterior vaginectomy and end ileostomy	Crohn's colitis nonresponsive to medical management; rectovaginal fistula	3/7/16	none	Readmitted to ED on 3/30/2016 due to syncope episode during PT, likely associated with known cardiac issues	
67	right knee	10/12/11	permanent	Total proctocolectomy with posterior vaginectomy and end ileostomy	Crohn's colitis nonresponsive to medical management; rectovaginal fistula	10/3/16	none	none	
82	right hip (posterior)	1991 ^a	permanent	Abdominoperineal resection in 1991, complete colectomy with ileostomy 11/17/00	Colon cancer (both procedures)	4/11/11	none (emergent)	Readmitted 6/7/11 due to high ileostomy output/cramping, acute on chronic renal failure/dehydration due to high ostomy output, discharged after supportive care (hydration and electrolytes). Developed bilateral lower leg edema (L > R) on 6/17/11 which improved with prednisone.	MRI showed right femoral neck fracture with possible metastatic lesion to the right proximal femur; patient was sent to ER same day as scan.
64	left knee	9/27/18	permanent	Total colectomy with end ileostomy and excision of prior mesh	Medically refractory colitis	6/12/20	none	Readmitted to ED 6/30/20 due to fecal impaction while taking Norco 5mg q4 and daily Senokot stool softener; symptoms resolved with magnesium citrate; tramadol and acetaminophen used to manage pain during hospital stay; discharged 7/3/20 and given prescription for oxycodone prn.	
88	right hip (posterolateral)	5/21/08	permanent	Abdominoperineal resection with exclusion of the small bowel from the pelvic with omental pedicle flap	Rectal cancer	4/8/13	none	UTI on 4/17/23 while in inpatient rehabilitation with culture positive for <i>P. aeruginosa</i> ; treated with ciprofloxacin. UTI recurred on 5/6/13 and was treated in the outpatient setting with second course of Ciprofloxacin. Evaluated by urology for recurrent UTI and diagnosed as hypertrophy of prostate with urinary	

Appendix Table 1 (continued)

Age (at time of TJA)	TJA joint	Ostomy date	Temporary vs permanent ostomy	Ostomy procedure	Ostomy indication	TJA date	GI clearance for TJA	Postoperative complications (within 9 d of TJA)	Other information
71	left hip (anterior)	3/1/98 ^a	permanent	Complete colectomy with ileostomy	Crohn's disease	4/26/21	none	obstruction and other lower urinary tract symptoms. none	
68	left hip (incision lateral to anterior superior spine)	8/31/07	temporary (reversed 2/27/08)	Extended right hemicolectomy with ileostomy.	Distal transverse colon and splenic flexure mesenteric hematoma with hemoperitoneum (due to trauma)	9/7/07	none (emergent)	none	GI and orthopedic operations performed during same hospital stay due in injuries caused by same trauma; orthopedic operation performed once medically stable.
74	right knee	10/19/09 ^a	permanent	Partial colectomy and end colostomy 10/19/09, colostomy revision 10/31/16	Perforated diverticulitis; revised due to parastomal hernia	6/3/19	none	none	
74	left knee	10/19/09 ^a	permanent	partial colectomy and end colostomy 10/19/09, colostomy revision 10/31/16	Perforated diverticulitis; revised due to parastomal hernia	7/29/19	none	none	
75	right knee	1/6/15	permanent	Abdominoperineal resection	Rectal cancer	6/13/17	none	none	
76	left knee	1/6/15	permanent	Abdominoperineal resection	Rectal cancer	10/23/18	none	none	

^a Indicates unknown exact date (year confirmed in Epic chart but month or date undocumented or unconfirmed).