J Wound Ostomy Continence Nurs. 2021;48(1):39-43.
Published by Lippincott Williams & Wilkins

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The Use of a Stoma Rod/Bridge to Prevent Retraction

A Systematic Review

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ABSTRACT

PURPOSE: We evaluated evidence related to the use of a rod (bridge) to prevent stoma retraction during loop ostomy construction.

METHODS: We completed a systematic review of the literature. We searched MEDLINE, EMBASE, and COCHRANE databases up to December 4, 2019. We posed the following question based on a PICO format. Do adult patients undergoing ostomy surgery experience less stomal retraction when compared to patients managed without placement of a stoma rod?

FINDINGS: Our initial search returned 182 articles; after reading studies in full, 5 articles were identified that collectively enrolled 1058 participants. Four studies were randomized controlled trials and one was a prospective cohort study. Meta-analysis could not be performed because of the small number of studies and the heterogeneity of outcomes measurements. The incidence of stoma retraction ranged between 0%-8% in patients managed with a rod and 0.78%-8.2% in patients with no rod. The number of reported adverse events was low. Placement of a stoma rod was associated with more adverse outcomes than in patients managed without a rod. Adverse events included local edema, stoma necrosis, skin necrosis, peristomal moisture-associated skin damage (irritant dermatitis), peristomal abscess, bleeding, and mucocutaneous separation.

CONCLUSIONS: Stoma rod does not seem to reduce the risk of stoma retraction and might result in other adverse events.

IMPLICATIONS: We recommend avoidance of stoma rod/bridge placement during ostomy surgery.

KEY WORDS: Defunctioning stoma, Loop ileostomy, Loop stoma, Stoma bridge, Stoma retraction, Stoma rod.

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Authors Contribution: *J.M. conceived and designed the study. E.G. and J.M. acquired the data; E.G. and J.M. analyzed the data; E.G., J.M., Z.A., S.P., N.C.B., and F.R. interpreted the data; E.G., J.M., Z.A., S.P., N.C.B., and F.R. contributed to the writing of the manuscript and to its critical revision; E.G., J.M., Z.A., S.P., N.C.B., and F.R. approved the final version of the manuscript.*

The authors have no conflicts of interest to disclose.

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DOI: 10.1097/WON.0000000000000730

INTRODUCTION

Loop ileostomies and colostomies are generally used by general and colorectal surgeons for fecal diversion in order to protect an anastomosis or to decompress a dilated colon. Though placement of a rod is relatively simple, complications may occur and some may require surgical revision. The reported prevalence of such complications varies; the largest series we found reported a stoma complication rate of 34% in 1616 patients.[1-3] The most frequent complications are stomal necrosis or retraction, parastomal hernia, and peristomal skin irritation.[3-5]

In order to avoid stoma retraction, which may lead to devastating consequences such a generalized peritonitis, many surgeons propose use of a stoma rod acting as a bridge for additional stoma support.[4] Among the different techniques that have been described to create a stoma rod, the most frequent are a plastic rod, a local skin flap, a Jackson-Pratt drain, a Robinson catheter, subcutaneous sutures, or fascial bridges.[6-9] We searched the literature and found no guidelines concerning the use of a stoma bridge or rod and limited evidence regarding outcomes or complications of patients managed with or without a stoma rod or bridge. The objective of this systematic review was to evaluate the impact of the use of a stoma rod during confection of a diverting loop ileostomy or colostomy on stoma retraction.

TABLE 1.
Literature Search Strategy

	Search Terms	Occurrences
MEDLINE	(rod[All Fields]) AND (("ileostomy"[MeSH Terms] OR "ileostomy"[All Fields]) OR ("colostomy"[MeSH Terms] OR "colostomy"[All Fields]) OR ("surgical stomas"[MeSH Terms] OR ("surgical"[All Fields] AND "stomas"[All Fields]) OR "surgical stomas"[All Fields] OR "stoma"[All Fields]) OR ("ostomy"[MeSH Terms] OR "ostomy"[All Fields]))	73
EMBASE	Rod AND (ileostomy OR colostomy OR stoma OR ostomy)	94
COCHRANE	rod:ti,ab,kw AND (ileostomy:ti,ab,kw OR colostomy:ti,ab,kw OR ostomy:ti,ab,kw OR stoma:ti,ab,kw)	15

METHODS

A systematic review was performed in accordance with the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) statement.[10] The MEDLINE (through PubMed), EMBASE, and Cochrane Central Register of Controlled Trials (CENTRAL) were searched using combinations of terms including "rod" and "ileostomy" or "colostomy" or "ostomy." The exact search strategy is summarized in Table 1. All studies, in English or French, including adult patients undergoing a loop ileostomy or colostomy, irrespective of the underlying pathology and the surgical indication, were considered as eligible. The search was performed up to December 4, 2019. Articles were initially screened based on titles and abstracts. Two authors (E.G. and J.M.) performed the database searches. Potentially relevant papers were explored after their full texts had been obtained. Any discrepancies were resolved by consensus.

The population we studied included adults undergoing ostomy surgery. The intervention was use of a rod versus no use of a rod. Our primary outcome was stoma retraction. Other postoperative complications, as well as need for reoperation, were evaluated as secondary outcomes.

FINDINGS

The inclusion process is reported in the Figure. One hundred eighty-two publications were identified via database search, and 2 additional references were identified through search. One hundred three articles underwent additional scrutiny after duplicates were removed. Title and abstract review resulted in exclusion of 82 records. Among the 21 original publications describing the use of rod during ostomy formation selected for full-text review, 15 were excluded for not comparing the rod and no-rod groups and one was excluded for not reporting the main or secondary outcomes according to our predefined protocol. Five publications were included in our qualitative analysis; we were unable to perform meta-analysis of pooled findings due to the limited number of studies included and heterogeneity in findings.

Table 2 summarizes the main features of the 5 studies that met inclusion criteria[4,6,11-13]; 4 were prospective randomized controlled trials (RCTs)[4,6,11,12] and one was a prospective cohort study.[13] The pooled sample of 1058 participants included 529 who underwent placement of a rod (bridge) and 529 with no rod. Four studies reflect data collected from a single facility, and one study was multicentered.[6] Indications for ostomy creation varied in 4 studies.[6,11-13] In one study, the population was limited to patients with ulcerative colitis undergoing total proctocolectomy, ileal J-pouch, and diverting loop ileostomy.[4] Plastic rods were used as a bridge in 4 studies,[6,11-13] and a metallic rod was used in one study.[4] Three studies reported the day that the stoma rod was removed. Uchino and colleagues[4]

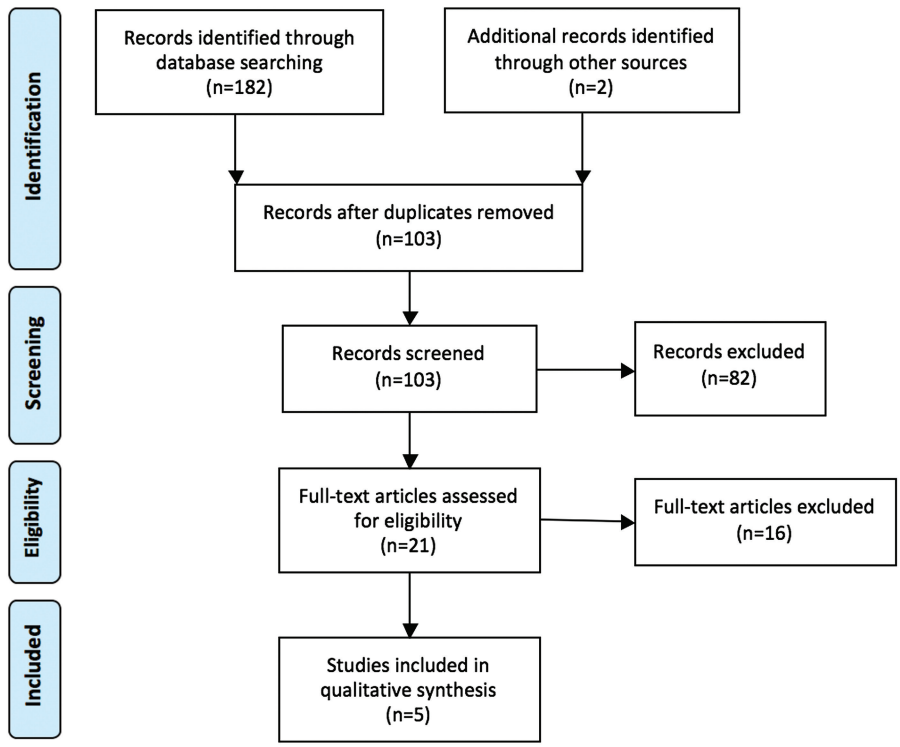

Figure. PRISMA flowchart of the inclusion process.

TABLE 2.
Characteristics of Included Studies

Study	Year of Publication	Country	Data Collection Period	Study Setting	Study Design	Number of Patients	Type of Ostomy	Indications for Ostomy	Intervention	Control	Type of Rod	Follow-up
Franklyn et al[12]	2017	India	Nov 2012-Feb 2016	Single facility	RCT	151	Loop colostomy	Diverse	Stoma rod for 10-14 d	No stoma rod	Custom-made I-shaped plastic rod	30 d
Speirs et al[11]	2006	United Kingdom	May 2001-Jun 2004	Single facility	RCT	57	Loop ileostomy	Diverse	Stoma rod for 7 d	No stoma rod	Coloplast plastic rod	3 mo
Uchino et al[4]	2017	Japan	Jul 2011-Mar 2016	Single facility	RCT	257	Loop ileostomy	Ulcerative colitis	Stoma rod for 7-8 d	No stoma rod	Custom-made metallic rod	…
Whiteley et al[13]	2016	Australia	Jan 2003-May 2012	Single facility	Prospective cohort	515	Loop ileostomy and colostomy	Diverse	Stoma rod, time not specified	No stoma rod	Coloplast and custom-made plastic rod	30 d
Zindel et al[6]	2017	Switzerland	Aug 2008-Jul 2014	Multicenter	RCT	78	Loop ileostomy	Diverse	Stoma rod, time not specified	No stoma rod	Stomocur plastic rod	…

Abbreviation: RCT, randomized controlled trial.

and Speirs and associates[11] reported leaving the rod in place for 1 week, while Franklyn and coworkers[12] reported leaving the rod in for 10 to 14 days. The follow-up period was identified in 3 of the 5 studies.[11-13]

Outcomes

Table 3 summarizes pertinent research outcomes. The incidence of stoma retraction (our main outcome) was reported in all 5 studies; it ranged from 0.0% to 8.0% in patients with rod versus 0.78% to 8.2% in patients managed without a rod.[4,6,11-13] Analysis indicated no statistically significant difference in stoma retraction between patients based on placement of a rod.

Several studies reported statistically significant differences in stomal or peristomal complications. Franklyn and colleagues[12] reported a significantly higher rate of edema in participants managed by a rod (22.7% vs 3.9%). Evidence concerning the incidence of stoma necrosis between the 2 groups differed. Franklyn and colleagues[12] and Zindel and colleagues[6] reported a higher incidence of participants managed by rods. In contrast, Whiteley and colleagues[13] reported a higher mean incidence of stoma necrosis, but the difference was not statistically significant, and Speirs and associates[11] reported equal incidence in each group.

Uchino and colleagues[4] reported higher rates of peristomal skin necrosis and abscess in participants managed with rods, but the difference did not differ significantly. In contrast, they reported significantly higher rates of peristomal irritant dermatitis. Three studies compared stoma bleeding, mucocutaneous separation, and stoma prolapse and reported no differences between participants managed with or without rods.[11-13] Stoma bleeding was reported in 3 participants managed by rods.

Three research groups indicated that the number of participants who required reoperation was equivalent in both groups.[11-13] Franklyn and colleagues[12] reported that 9 participants required additional surgical management for ostomy-related complications; 2 directly were attributed to the presence of a stoma bridge (perforation of the posterior wall with insertion).[12]

DISCUSSION

Stoma retraction is a frequent complication of loop stoma formation; incidence rates vary from 0% to 40%.[3,14,15] Retraction may occur during the early postoperative period (first 30 days following surgery) or later.[4] Agreement regarding the definition of stoma retraction varies, but most authors define it as a lowering of the mucosa of at least 5 mm from the skin surface for 50% or more of the stoma circumference.[4,11,13,16] Placement of a rod has been advocated as preventive intervention, but pooled findings from the studies included in the review suggest the use of rods or bridges does not prevent stoma retraction.

While use of ostomy rods did not reduce the likelihood of stoma retraction during the early postoperative period, the use of rods was associated with higher rates of other complications or adverse outcomes. For example, Speirs and associates[11] reported small intestine perforation attributed to the placement of a rod in addition to higher rates of stomal edema, peristomal irritant dermatitis, and abscess in participants managed with rods. Though not evaluated in this systematic review, the use of rods has been found to create complexity with the application pouching system with associated risks of leakage and peristomal moisture-associated skin irritation.[6,11,13,17] Adding complexity to the stoma pouching also may increase anxiety among patients learning to manage a new ostomy.

TABLE 3.
Stoma Complications Reported by Included Studies

Study	Patients		Stoma Retraction		Edema		Stoma Necrosis		Skin Necrosis		Peristomial Dermatitis		Peristomial Abscess		Bleeding		Mucocutaneous Separation		Stoma Prolapse		Underwent Additional Surgery	
	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C	I	C
Franklyn et al[12]	75	76	6 (8%)	5 (6.6%)	17 (22.7%)	3 (3.9%)	8 (10.7%)	1 (1.3%)	1 (1.3%)	0 (0%)	…	…	3 (4.0%)	1 (1.3%)	3 (4.0%)	0 (0%)	3 (4.0%)	1 (1.3%)	…	…	5 (6.7%)	4 (5.3%)
Speirs et al[11]	28	29	2 (6.9%)	2 (7.1%)	…	…	0 (0%)	0 (0%)	…	…	…	…	…	…	0 (0%)	0 (0%)	…	…	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Uchino et al[4]	122	135	2 (1.6%)	2 (1.5%)	…	…	…	…	…	…	84 (55%)	40 (26%)	…	…	…	…	…	…	…	…	…	…
Whiteley et al[13]	260	255	0 (0%)	4 (0.78%)	…	…	5 (2.2%)	2 (1.0%)	4 (1.8%)	2 (1.0%)	37 (16%)	17 (8%)	2 (0.9%)	1 (0.5%)	…	…	20 (9.0%)	10 (4.8%)	…	…	2 (0.8%)	2 (0.8%)
Zindel et al[6]	44	34	2 (3.3%)	5 (8.2%)	…	…	13 (21.3%)	1 (1.6%)	…	…	…	…	…	…	…	…	…	…	…	…	…	…

Abbreviations: C, control (no rod); I, intervention (rod).

Based on this evidence, we question the use of rods for prevention of stoma retraction in patients undergoing loop ostomy creation. Zindel and colleagues[6] used the Stoma Specific Morbidity Score to evaluate the number and severity of stomal and peristomal complications including edema, bleeding necrosis, peristomal skin irritation, suture dehiscence/abscess formation, stenosis, retraction, fistula, prolapse, parastomal hernia, and incomplete diversion. Items were scored on a scale of 1-2 or 1-4; higher scores indicated a greater number and severity of complications. The higher possible score was 42 points. No differences were found between patients managed with rods and those managed without rods. Zindel and colleagues[6] used multivariate analysis to identify risk factors for stoma-related complications; this analysis indicates that higher body mass index is an independent risk factor for stoma-related complications and, more specifically, stoma retraction. Nevertheless, the potential role of stoma rods in obese patients is not known.[4,11]

Considered collectively, the evidence we identified related to the use of protective rods to prevent stoma retraction is sparse. The small number of studies and the cumulative number of participants were not sufficient to enable meaningful meta-analysis of pooled findings. Analysis of these studies also identified a relatively low incidence of stoma retraction (our primary outcome). For example, Whiteley and colleagues[13] reported 4 stoma retractions in 515 participants. Thus, we cannot exclude the possibility of type II statistical error. Only 2 of the 5 studies reported the use of a power analysis to identify needed sample size.[4,6] We also observed heterogeneity among the included studies in terms of the surgical techniques used to create an ostomy and differences in techniques for identifying complications. Finally, the follow-up period in all studies was rather short with a maximum of 3 months.[11] Given these limitations, we recommend an adequately powered prospective RCT to provide more definitive evidence. Using current evidence, we recommend avoiding the use of rods whenever possible, given the lack of evidence supporting their efficacy in preventing stoma retraction in conjunction with evidence suggesting they may increase rates of other stoma-related complications from stoma retraction and may be related to further complications.

CONCLUSION

The use of rods in order to prevent stoma retraction remains controversial. We systematically reviewed the literature and extracted 5 studies comparing the use of rods for loop ostomies to studies that did not use rods. We found that stoma rods do not reduce the risk of retraction and may lead to an increased likelihood of complications. While the limited available evidence did not allow us to reach strong conclusions, we discourage the use of rods to prevent stoma retraction.

KEY POINTS

- Stoma retraction is a frequent complication of stoma formation.
- Evidence suggests that the placement of a rod does not significantly reduce the likelihood of stoma retraction.
- Evidence also suggests that the use of rods may increase the likelihood of other complications.

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DOI: 10.1097/WON.0000000000000738