

# World Journal of *Clinical Cases*

*World J Clin Cases* 2021 September 6; 9(25): 7292-7613



## Contents

Thrice Monthly Volume 9 Number 25 September 6, 2021

## EDITORIAL

- 7292 Radiation oncology practice during COVID-19 pandemic in developing countries

*Abuhijla F, Abuhijlih R, Mohamad I*

## OPINION REVIEW

- 7297 Complete mesocolic excision and central vascular ligation in colorectal cancer in the era of minimally invasive surgery

*Franceschilli M, Di Carlo S, Vinci D, Sensi B, Siragusa L, Bellato V, Caronna R, Rossi P, Cavallaro G, Guida A, Sibio S*

- 7306 Fecal diversion in complex anal fistulas: Is there a way to avoid it?

*Garg P, Yagnik VD, Dawka S*

## MINIREVIEWS

- 7311 Regulatory roles of extracellular vesicles in immune responses against *Mycobacterium tuberculosis* infection

*Yan Z, Wang H, Mu L, Hu ZD, Zheng WQ*

- 7319 Aortic stenosis and Heyde's syndrome: A comprehensive review

*Lourdusamy D, Mupparaju VK, Sharif NF, Ibebuogu UN*

## ORIGINAL ARTICLE

## Retrospective Study

- 7330 Key determinants of misdiagnosis of tracheobronchial tuberculosis among senile patients in contemporary clinical practice: A retrospective analysis

*Tang F, Lin LJ, Guo SL, Ye W, Zha XK, Cheng Y, Wu YF, Wang YM, Lyu XM, Fan XY, Lyu LP*

- 7340 Long-term outcome of pancreatic function following oncological surgery in children: Institutional experience and review of the literature

*Bolasco G, Capriati T, Grimaldi C, Monti L, De Pasquale MD, Patera IP, Spada M, Maggiore G, Diamanti A*

- 7350 Efficacy of arbidol in COVID-19 patients: A retrospective study

*Wei S, Xu S, Pan YH*

- 7358 Characteristic analysis of clinical coronary heart disease and coronary artery disease concerning young and middle-aged male patients

*Peng KG, Yu HL*

- 7365 Quantitative analysis of early diabetic retinopathy based on optical coherence tomography angiography biological image

*Shi Y, Lin PY, Ruan YM, Lin CF, Hua SS, Li B*

- 7372** Mucin 1 and interleukin-11 protein expression and inflammatory reactions in the intestinal mucosa of necrotizing enterocolitis children after surgery

*Pan HX, Zhang CS, Lin CH, Chen MM, Zhang XZ, Yu N*

### Observational Study

- 7381** Research on the prognosis of different types of microvessels in bladder transitional cell carcinoma

*Wang HB, Qin Y, Yang JY*

- 7391** Is burnout a mediating factor between sharps injury and work-related factors or musculoskeletal pain?

*Chen YH, Tsai CF, Yeh CJ, Jong GP*

- 7405** Role of international normalized ratio in nonpulmonary sepsis screening: An observational study

*Zhang J, Du HM, Cheng MX, He FM, Niu BL*

### Randomized Controlled Trial

- 7417** Clinical effectiveness of adding probiotics to a low FODMAP diet: Randomized double-blind placebo-controlled study

*Turan B, Bengi G, Cehreli R, Akpınar H, Soytürk M*

### SYSTEMATIC REVIEWS

- 7433** Association between COVID-19 and anxiety during social isolation: A systematic review

*Santos ERRD, Silva de Paula JL, Tardieux FM, Costa-e-Silva VN, Lal A, Leite AFB*

### CASE REPORT

- 7445** Avascular necrosis of the first metatarsal head in a young female adult: A case report and review of literature

*Siu RWH, Liu JHP, Man GCW, Ong MTY, Yung PSH*

- 7453** Successful treatment of solitary bladder plasmacytoma: A case report

*Cao JD, Lin PH, Cai DF, Liang JH*

- 7459** Pseudomyxoma peritonei originating from intestinal duplication: A case report and review of the literature

*Han XD, Zhou N, Lu YY, Xu HB, Guo J, Liang L*

- 7468** Agranulocytosis following injection of inactivated Japanese encephalitis vaccine (Vero cell): A case report

*Wang L, Zhang X, Liu YT*

- 7472** Importance of clinical suspicion and multidisciplinary management for early diagnosis of a cardiac laminopathy patient: A case report

*Santobuono VE, Guaricci AI, Carulli E, Bozza N, Pepe M, Ranauro A, Ranieri C, Carella MC, Loizzi F, Resta N, Favale S, Forleo C*

- 7478** First case of forearm crisscross injury in children: A case report

*Jiang YK, Wang YB, Peng CG, Qu J, Wu DK*

- 7484** Octreotide-induced acute life-threatening gallstones after vicarious contrast medium excretion: A case report  
*Han ZH, He ZM, Chen WH, Wang CY, Wang Q*
- 7490** Acute deep venous thrombosis induced by May-Thurner syndrome after spondylolisthesis surgery: A case report and review of literature  
*Yue L, Fu HY, Sun HL*
- 7498** Successful treatment of refractory lung adenocarcinoma harboring a germline *BRCA2* mutation with olaparib: A case report  
*Zhang L, Wang J, Cui LZ, Wang K, Yuan MM, Chen RR, Zhang LJ*
- 7504** Effective treatment of polyneuropathy, organomegaly, endocrinopathy, M-protein, and skin changes syndrome with congestive heart failure: A case report  
*Fu LY, Zhang HB*
- 7512** Awake craniotomy for auditory brainstem implant in patients with neurofibromatosis type 2: Four case reports  
*Wang DX, Wang S, Jian MY, Han RQ*
- 7520** Coexistence of tuberculosis and squamous cell carcinoma in the right main bronchus: A case report  
*Jiang H, Li YQ*
- 7527** Is simultaneous presence of IgG4-positive plasma cells and giant-cell hepatitis a coincidence in autoimmune hepatitis? A case report  
*Tan YW, Wang JM, Chen L*
- 7535** Surgical treatment of delayed cervical infection and incomplete quadriplegia with fish-bone ingestion: A case report  
*Li SY, Miao Y, Cheng L, Wang YF, Li ZQ, Liu YB, Zou TM, Shen J*
- 7542** Neonatal biliary atresia combined with preduodenal portal vein: A case report  
*Xiang XL, Cai P, Zhao JG, Zhao HW, Jiang YL, Zhu ML, Wang Q, Zhang RY, Zhu ZW, Chen JL, Gu ZC, Zhu J*
- 7551** Hemorrhagic transformation after acute ischemic stroke caused by polycythemia vera: Report of two case  
*Cao YY, Cao J, Bi ZJ, Xu SB, Liu CC*
- 7558** Treatment of lower part of glenoid fractures through a novel axillary approach: A case report  
*Jia X, Zhou FL, Zhu YH, Jin DJ, Liu WX, Yang ZC, Liu RP*
- 7564** Trigger finger at the wrist caused by an intramuscular lipoma within the carpal tunnel: A case report  
*Huang C, Jin HJ, Song DB, Zhu Z, Tian H, Li ZH, Qu WR, Li R*
- 7572** Thrombolysis and embolectomy in treatment of acute stroke as a bridge to open-heart resection of giant cardiac myxoma: A case report  
*Chang WS, Li N, Liu H, Yin JJ, Zhang HQ*
- 7579** Breast adenoid cystic carcinoma arising in microglandular adenosis: A case report and review of literature  
*An JK, Woo JJ, Kim EK, Kwak HY*

- 7588**    Diagnosis and management of ophthalmic zoster sine herpette accompanied by cervical spine disc protrusion: A case report  
*Yun G, Kim E, Baik J, Do W, Jung YH, You CM*
- 7593**    Hemorrhagic pericardial effusion following treatment with infliximab: A case report and literature review  
*Li H, Xing H, Hu C, Sun BY, Wang S, Li WY, Qu B*
- 7600**    Wernicke's encephalopathy in a rectal cancer patient with atypical radiological features: A case report  
*Nie T, He JL*
- 7605**    Total hip revision with custom-made spacer and prosthesis: A case report  
*Liu YB, Pan H, Chen L, Ye HN, Wu CC, Wu P, Chen L*

**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Lan Sun, MD, PhD, Chief Physician, Professor, Department of Oncology, The People's Hospital of Bishan District, Chongqing 402760, China. sunlan6203@163.com

**AIMS AND SCOPE**

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

**INDEXING/ABSTRACTING**

The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC's CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: Yan-Xia Xing; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lai Wang.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

**EDITORIAL BOARD MEMBERS**

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

September 6, 2021

**COPYRIGHT**

© 2021 Baishideng Publishing Group Inc

**INSTRUCTIONS TO AUTHORS**

<https://www.wjgnet.com/bpg/gerinfo/204>

**GUIDELINES FOR ETHICS DOCUMENTS**

<https://www.wjgnet.com/bpg/GerInfo/287>

**GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH**

<https://www.wjgnet.com/bpg/gerinfo/240>

**PUBLICATION ETHICS**

<https://www.wjgnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjgnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjgnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjgnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>

## Fecal diversion in complex anal fistulas: Is there a way to avoid it?

Pankaj Garg, Vipul D Yagnik, Sushil Dawka

**ORCID number:** Pankaj Garg 0000-0002-0800-3578; Vipul D Yagnik 0000-0003-4008-6040; Sushil Dawka 0000-0002-9372-3683.

**Author contributions:** Garg P conceived and designed the study; Garg P and Yagnik VD collected and revised the data; Dawka S reviewed and edited the manuscript; All authors critically analyzed the data, finally approved and submitted the manuscript.

**Conflict-of-interest statement:**

None of the authors have any conflicts of interest.

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

**Manuscript source:** Invited manuscript

**Specialty type:** Medicine, research and experimental

**Pankaj Garg**, Colorectal Surgery, Garg Fistula Research Institute, Panchkula 134113, Haryana, India

**Pankaj Garg**, Colorectal Surgery, Indus International Hospital, Mohali 140201, Punjab, India

**Vipul D Yagnik**, Surgical Gastroenterology, Nishtha Surgical Hospital and Research Center, Patan 384265, Gujarat, India

**Sushil Dawka**, Surgery, SSR Medical College, Belle Rive 744101, Mauritius

**Corresponding author:** Pankaj Garg, MBBS, MS, Associate Professor, Surgeon, Colorectal Surgery, Garg Fistula Research Institute, House No. 1042, Sector-15 Near Amartex Chowk, Panchkula 134113, Haryana, India. [drgargpankaj@yahoo.com](mailto:drgargpankaj@yahoo.com)

### Abstract

Temporary fecal diversion by a diverting colostomy or ileostomy is occasionally performed for serious complex fistulas. The main indications are highly complex and extensive cryptoglandular anal fistula, anal fistula associated with severe anorectal Crohn's disease, recurrent rectovaginal fistula, radiation-induced fistula and anal fistula with associated necrotizing fasciitis. The purpose of stoma formation is to divert the fecal stream away from the anorectum and the perianal region so as to control the infective process and prevent trauma to the operated repaired tissues. Once the fistula has healed, the diverting stoma is closed. However, two questions are relevant. First, is it certain that the same disease would not relapse (or the fistula would not recur) once the colostomy is closed? Second, is there a non-surgical method which can obviate the need for a diverting colostomy? An attempt is made to answer both these questions in this review.

**Key Words:** Anal fistula; Fecal diversion; Diverting stoma; Colostomy; Crohn's disease; Rectovaginal fistula

©The Author(s) 2021. Published by Baishideng Publishing Group Inc. All rights reserved.

**Core Tip:** Fecal diversion is performed for severe and uncontrolled anal fistula disease. Though usually done as a last resort, it significantly increases morbidity and cost. We speculated on whether fecal diversion is actually the last resort, is it effective and can it be avoided? A novel non-surgical protocol [LOOP: L: Liquid diet with no fiber; O: Oral rehydration salt; O: Oral vitamins and protein powder/supplements; P: Phosphate

**Country/Territory of origin:** India**Peer-review report's scientific quality classification**

Grade A (Excellent): 0

Grade B (Very good): 0

Grade C (Good): C

Grade D (Fair): 0

Grade E (Poor): E

**Received:** May 11, 2021**Peer-review started:** May 11, 2021**First decision:** June 23, 2021**Revised:** June 23, 2021**Accepted:** July 16, 2021**Article in press:** July 16, 2021**Published online:** September 6, 2021**P-Reviewer:** Kuroki H,  
Triantafyllidis J**S-Editor:** Wang LL**L-Editor:** Filipodia**P-Editor:** Zhang YL

(sodium phosphate) enema] prevents contact of fecal matter with the anorectum and has been successfully utilized to treat several acute anorectal conditions. LOOP can potentially avoid the need to divert the fecal stream in many fistula cases where it would be deemed necessary. This would markedly decrease the morbidity and cost incurred due to fecal diversion.

**Citation:** Garg P, Yagnik VD, Dawka S. Fecal diversion in complex anal fistulas: Is there a way to avoid it? *World J Clin Cases* 2021; 9(25): 7306-7310

**URL:** <https://www.wjgnet.com/2307-8960/full/v9/i25/7306.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v9.i25.7306>

## INTRODUCTION

Anal fistulas can be simple or complex. As the name suggests, complex fistulas are complicated and pose a significant management challenge. A good proportion of fistulas in any series can be complex; at referral tertiary centers this may be as much as 50% of all reported fistulas[1]. At times, the fistula can be so complex that all routine treatment options fail to provide relief[2]. In such cases, temporary fecal diversion (diverting colostomy or ileostomy) is considered as the “last resort” management option[2]. However, this option is associated with significant morbidity which comprises physical discomfort as well as psychological distress. Diverting colostomy is quite depressing for the patient especially when performed for a non-malignant condition especially as the time of stoma closure is uncertain. Not uncommonly, patients have to live with the colostomy for the rest of their life. Last but not the least, the additional surgical procedures increase the cost of treatment significantly. Therefore, the indications and benefits of diverting stomas in perianal fistulas needs to be reviewed and an alternative less morbid (preferably non-surgical) method needs to be considered.

## WHY IS A DIVERTING STOMA NEEDED IN PERIANAL FISTULAS?

A diverting stoma is needed in perianal fistulas for two reasons: (1) Uncontrolled sepsis with risk of septicemia: At times, the fistula may be associated with conditions which lead to marked sepsis like severe anorectal Crohn's disease[3,4], anal fistula with associated necrotizing fasciitis or Fournier's gangrene[5,6], anal fistula with large perirectal abscess, *etc.*[2]. It is believed that fecal diversion would prevent the bacterial load (fecal matter) from reaching the site of sepsis and would thus help in better and easier control of the fulminant infection; and (2) Highly refractory fistula: Another indication of diverting stoma is to increase the chances of fistula healing. At times, there are high perianal fistulas (supralevator or perirectal fistulas)[2], rectovaginal fistulas[7,8], radiation-induced fistulas[7,9] and Crohn's fistulas[3] which recur repeatedly and refuse to heal even after repeated surgeries. Fecal diversion can help in these patients by preventing fecal matter, hence possible infection, from reaching the fistula site (surgery site in operated patients). Secondly, the risk of physical trauma by the stool mass to the surgical site is also curtailed due to which the healing of the surgical wound is expected to be better.

These are the two main categories for which temporary fecal diversion is performed in patients of perianal fistulas.

## HOW EFFECTIVE IS FECAL DIVERSION?

The important point to discuss is the efficacy of the diverting stoma in achieving the primary purpose for which the diversion is done. Unfortunately, the literature highlights that fecal diversion does not serve the purpose in a significant proportion of cases[10]. In many cases, either the disease does not improve at all[8] or it does improve with diversion but recurs once the diverting colostomy is closed, thereby necessitating permanent diversion[3,10-12].

In a study of 86 patients suffering from anal fistula due to Crohn's disease, 62% required temporary fecal diversion and out of these, 49% ultimately ended with permanent diversion[13]. In patients with refractory anorectal Crohn's disease for whom temporary fecal diversion was done, only 63.8% patients reported improvement in clinical symptoms within 3-6 mo[14,15]. The restoration of bowel continuity could only be attempted in 34.5% of these patients and was successfully achieved in only 16.6% patients[14,15]. Of patients in whom bowel continuity could be restored successfully, re-diversion was needed in 26.5% patients due to relapse of severe symptoms[14]. Improvement in the rectal and the perianal disease was the single most important and consistent factor responsible for restoration of bowel continuity[14,16]. On the other hand, there are studies which demonstrated that the quality of life seemed similar or potentially superior in diverted patients suffering from Crohn's perianal fistulas compared with patients in whom the diversion was not done[17]. A diverting stoma, therefore, has the potential to improve quality of life in patients, especially with severe perianal Crohn's disease[17]. Though medical treatment remains the mainstay of perianal Crohn's fistulizing disease, aggressive surgical management should be considered only for severe or recurrent disease[18]. Therefore, in patients with perianal Crohn's disease, both medical and surgical treatments should be used judiciously and the disease be managed by a multidisciplinary team[18].

Thus, the popular belief that fecal diversion would lead to rapid resolution of symptoms, rapid improvement in the disease process, and full recovery from the disease may not be true in all cases, and there is evidence in the literature which does not support this[14]. In one of the largest series of anal fistula patients who underwent surgery, half of the patients had high complex fistulas, and amongst these high fistulas, about 30% were supralelevator fistulas[1]. The long-term success rate of 93.5% could be achieved in this series without needing to do fecal diversion in any patient [1]. This implies that temporary fecal diversion should be done more sparingly and after much deliberation in patients of complex perianal fistulas. Moreover, whenever it is considered, the minimal impact of fecal diversion on long-term disease prognosis as well as the possibility of inability to restore the bowel continuity should be discussed with the patient in detail. This would be even more relevant for the patients who are resistant to the prospect of permanent fecal diversion from the very beginning.

## IS THERE A NON-SURGICAL WAY WHICH CAN OBTAIN THE NEED FOR FECAL DIVERSION?

As discussed above, the indications of fecal diversion need to be pruned but it would be worthwhile if its need could also be curtailed by a method which is less morbid and preferably non-surgical.

One of the methods already in vogue is loose (draining) seton insertion. In patients of complex fistulas with large deep abscesses or severe sepsis, seton insertion can lead to adequate drainage and resolution of sepsis. Along with this, it can also prevent recurrence of abscess over extended periods of time. Therefore, in highly complex cryptoglandular fistulas and patients with severe fistulizing Crohn's disease, a draining seton can help prevent the need of fecal diversion in many cases[19]. However, there would be cases with severe disease in whom the passage of fecal matter through the anus and contact of fecal matter with the fistula keeps worsening the disease process. In these patients, another novel method can be helpful in many, if not all patients, to prevent fecal diversion.

The aim of temporary fecal diversion is to prevent contact of fecal matter with the anorectum and perianal tissues for a few days to weeks. If the same endpoint can be achieved by a non-surgical method, then the need of diversion might be mitigated. LOOP does precisely that; LOOP is an acronym for L - Liquid diet with no fiber, O - Oral rehydration solution (ORS), O - Oral vitamins and protein powder supplements, P - Phosphate (sodium phosphate) enema at the start of the treatment (Table 1). The basic principle behind LOOP is that the patients do not pass any bowel motions at all for few days to weeks while all their nutritional needs are taken care of.

As the diet has zero fiber, stool formation would be nil or minimal. The electrolytes (sodium, potassium, chloride, citrate) are taken care of by ORS. The proteins are given at 1 gm/kg body weight/d by oral protein powder supplement. The patient can take clear fluids (with zero fiber) like juices, coconut water, clear soups with butter, soft drinks, glucose water, tea, coffee *etc.* An oral multivitamin tablet is given daily to replenish vitamins and minerals. Along with these dietary recommendations, an enema (sodium phosphate or any other enema preferred by the patient) is given on the

Table 1 LOOP concept

LOOP concept	
L Liquid diet with no fiber	Clear fluids (with zero fiber) like juices, coconut water, clear soups with butter, soft drinks, glucose water, tea, coffee, <i>etc.</i>
O Oral rehydration solution	The electrolytes (sodium, potassium, chloride <i>etc.</i> ) are taken care by this
O Oral vitamins and protein powder supplements	The proteins are given at 1 gm/kg body weight/d by oral protein powder supplement
P Phosphate enema at the start of the treatment	Enema (whichever preferred by the patient) is given on the first day of the treatment so as to evacuate the rectum and clear the bowels. Otherwise, the residual stool in the rectum can harden and can cause problems later

first day of the treatment so as to evacuate the rectum and clear the bowels. Otherwise, the residual stool in the rectum can harden over the next few days (when the patient is on LOOP and not passing stool) and these hardened stools could cause problems and pain when the normal diet and bowel motions are resumed after a few days.

LOOP can be implemented for a few days to weeks (2-4) depending upon the patient's tolerance. If the patient can tolerate it well, then it can be extended as needed without any negative consequences as all the nutritional requirements are fully taken care of while the patient is on LOOP.

LOOP was initially developed to provide relief by a non-surgical method in anorectal conditions which get aggravated by passage of stool. These include intractable bleeding from hemorrhoids in patients on anti-coagulants that cannot be withheld[20], acute refractory anal fissure[21], acute painful thrombosed hemorrhoids *etc.*[21]. LOOP was found to be highly successful in these patients and, barring a few, it was comfortably tolerated.

The application of the LOOP protocol can be logically extended to patients requiring fecal diversion as the endpoint of both temporary fecal diversion and LOOP is the same – fecal matter should not come in contact with perianal tissues. LOOP may not be able to replace fecal diversion in all indications but can do so in conditions which require fecal diversion for a short period.

The indications of fecal diversion can be divided in three parts: (1) Acute conditions: Surgical repair of refractory rectovaginal fistula or high cryptoglandular fistulas (supralevator or pelvirectal), anal fistula with huge abscess with septicemia, anal fistula with associated necrotizing fasciitis or Fournier's gangrene; (2) Acute exacerbation of a chronic controlled condition: Abscess formation in Crohn's disease otherwise well controlled with medications; and (3) Chronic debilitating condition: Severe widespread Crohn's disease, severe radiation proctitis with anal fistula.

The first two indications require fecal diversion for a short period (days to a few weeks) and in these conditions, LOOP can replace fecal diversion in most cases. However, for the third indication (chronic debilitating conditions), it would perhaps be difficult to replace fecal diversion with LOOP. Moreover, this is the category of patients who end up having a permanent stoma.

Thus, the LOOP protocol is logical, simple, easy to execute, has no drawbacks, can be interrupted anytime, is tolerated well by most patients, and can be repeated as required. It has been shown to be effective in avoiding surgery in other acute anorectal conditions[20,21]. Against this background, it is recommended that LOOP be tried in order to avoid fecal diversion by stoma creation for the indications listed above.

## CONCLUSION

Temporary fecal diversion in the management of perianal fistulas is utilized where it is intended that fecal matter should not come in contact with the anorectum and perianal tissues for a short period of time. It is done for highly complex cryptoglandular anal fistula, severe anorectal Crohn's disease, recurrent rectovaginal fistula, radiation-induced fistulas, anal fistula with associated necrotizing fasciitis *etc.* However, the main drawbacks of fecal diversion are questionable impact of fecal diversion on disease resolution, uncertainty over the time-frame and success of restoration of bowel continuity, risk of having a permanent stoma, and significant increase in morbidity and cost. Therefore, fecal diversion should be used sparingly in clinical practice. A novel protocol, LOOP (patient kept on zero fiber diet with full oral nutritional support so as to avoid passage of bowel motions for a few days to weeks), has been shown to be successful in treating several acute anorectal conditions. LOOP can be tried as a

non-surgical method to avoid fecal diversion in many, if not all, conditions where temporary fecal diversion is done. If found effective, LOOP will prevent significant morbidity and reduce cost in the management of this dreaded disease.

## REFERENCES

- 1 Garg P, Kaur B, Goyal A, Yagnik VD, Dawka S, Menon GR. Lessons learned from an audit of 1250 anal fistula patients operated at a single center: A retrospective review. *World J Gastrointest Surg* 2021; **13**: 340-354 [PMID: 33968301 DOI: 10.4240/wjgs.v13.i4.340]
- 2 Onița M, Dumnici A, Hornung E, Papiu H, Tarța C, Aiordachioaei G, Goldiș D, Onița C. [Temporary total fecal diversion--ultimate solution for complex recurrent anal fistula]. *Chirurgia (Bucur)* 2009; **104**: 757-760 [PMID: 20187479]
- 3 Hain E, Maggiori L, Orville M, Tréton X, Bouhnik Y, Panis Y. Diverting Stoma for Refractory Anorectal Crohn's Disease: Is It Really Useful in the Anti-TNF Era? *J Crohns Colitis* 2019; **13**: 572-577 [PMID: 30452620 DOI: 10.1093/ecco-jcc/jjy195]
- 4 Lee MJ, Heywood N, Sagar PM, Brown SR, Fearnhead NS; pCD Collaborators. Surgical management of fistulating perianal Crohn's disease: a UK survey. *Colorectal Dis* 2017; **19**: 266-273 [PMID: 27423057 DOI: 10.1111/codi.13462]
- 5 Bronder CS, Cowey A, Hill J. Delayed stoma formation in Fournier's gangrene. *Colorectal Dis* 2004; **6**: 518-520 [PMID: 15521946 DOI: 10.1111/j.1463-1318.2004.00663.x]
- 6 Oguz A, Gümtüş M, Turkoglu A, Bozdağ Z, Ülger BV, Ağaayak E, Büyüç A. Fournier's Gangrene: A Summary of 10 Years of Clinical Experience. *Int Surg* 2015; **100**: 934-941 [PMID: 25859652 DOI: 10.9738/INTSURG-D-15-00036.1]
- 7 Yuan ZX, Qin QY, Zhu MM, Zhong QH, Fichera A, Wang H, Wang HM, Huang XY, Cao WT, Zhao YB, Wang L, Ma TH. Diverting colostomy is an effective and reversible option for severe hemorrhagic radiation proctopathy. *World J Gastroenterol* 2020; **26**: 850-864 [PMID: 32148382 DOI: 10.3748/wjg.v26.i8.850]
- 8 Fu J, Liang Z, Zhu Y, Cui L, Chen W. Surgical repair of rectovaginal fistulas: predictors of fistula closure. *Int Urogynecol J* 2019; **30**: 1659-1665 [PMID: 31468097 DOI: 10.1007/s00192-019-04082-w]
- 9 Huang X, Zhong Q, Wang H, Zhao J, Kuang Y, Guan Q, He Y, Qin Q, Ma T. Diverting colostomy is an effective procedure for ulcerative chronic radiation proctitis patients after pelvic malignancy radiation. *BMC Surg* 2020; **20**: 267 [PMID: 33143666 DOI: 10.1186/s12893-020-00925-2]
- 10 Geltzeiler CB, Wieghard N, Tsikitis VL. Recent developments in the surgical management of perianal fistula for Crohn's disease. *Ann Gastroenterol* 2014; **27**: 320-330 [PMID: 25331917]
- 11 Buhulaigah H, Truong A, Zaghiyan K, Fleshner P. Clinical Factors Associated With Response to Fecal Diversion in Crohn's Disease. *Am Surg* 2020; **86**: 1277-1280 [PMID: 33150794 DOI: 10.1177/0003134820964223]
- 12 Bafford AC, Latushko A, Hansraj N, Jambaulikar G, Ghazi LJ. The Use of Temporary Fecal Diversion in Colonic and Perianal Crohn's Disease Does Not Improve Outcomes. *Dig Dis Sci* 2017; **62**: 2079-2086 [PMID: 28550490 DOI: 10.1007/s10620-017-4618-7]
- 13 Galandiuk S, Kimberling J, Al-Mishlab TG, Stromberg AJ. Perianal Crohn disease: predictors of need for permanent diversion. *Ann Surg* 2005; **241**: 796-801; discussion 801 [PMID: 15849515 DOI: 10.1097/01.sla.0000161030.25860.c1]
- 14 Singh S, Ding NS, Mathis KL, Dulai PS, Farrell AM, Pemberton JH, Hart AL, Sandborn WJ, Loftus EV Jr. Systematic review with meta-analysis: faecal diversion for management of perianal Crohn's disease. *Aliment Pharmacol Ther* 2015; **42**: 783-792 [PMID: 26264359 DOI: 10.1111/apt.13356]
- 15 Burke JP. Role of Fecal Diversion in Complex Crohn's Disease. *Clin Colon Rectal Surg* 2019; **32**: 273-279 [PMID: 31275074 DOI: 10.1055/s-0039-1683916]
- 16 Gu J, Valente MA, Remzi FH, Stocchi L. Factors affecting the fate of faecal diversion in patients with perianal Crohn's disease. *Colorectal Dis* 2015; **17**: 66-72 [PMID: 25306934 DOI: 10.1111/codi.12796]
- 17 Kasperek MS, Glatzle J, Temeltcheva T, Mueller MH, Koenigsrainer A, Kreis ME. Long-term quality of life in patients with Crohn's disease and perianal fistulas: influence of fecal diversion. *Dis Colon Rectum* 2007; **50**: 2067-2074 [PMID: 17680311 DOI: 10.1007/s10350-007-9006-5]
- 18 Truong A, Zaghiyan K, Fleshner P. Anorectal Crohn's Disease. *Surg Clin North Am* 2019; **99**: 1151-1162 [PMID: 31676054 DOI: 10.1016/j.suc.2019.08.012]
- 19 Nottingham JM, Rentea RM. Anal Fistulotomy. [Updated 2021 Jan 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK555998/>
- 20 Garg P. Conservative Management (LOOP) of Bleeding Hemorrhoids Causing Severe Anemia: Avoidance of Blood Transfusion and High-Risk Emergency Surgery. *Indian J Sur* 2020; **1-2** [DOI: 10.1007/s12262-020-02414-5]
- 21 Garg P. A simple novel concept to conservatively manage refractory spasm in acute fissure-in-ano: Defecation put on-hold temporarily (DePOT). *J Family Med Prim Care* 2020; **9**: 5800-5801 [PMID: 33532440 DOI: 10.4103/jfmpe.jfmpe\_1175\_20]



Published by **Baishideng Publishing Group Inc**  
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)

**Help Desk:** <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

