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Living With An Ileostomy After Colon Cancer Surgery: Managing Complications And Adapting To Life Changes

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Abstract
An ileostomy is a life-saving surgical procedure that involves creating a stoma from the small intestine to divert fecal waste outside the body. This procedure is often necessary for patients with colon cancer, inflammatory bowel diseases, or colon perforations. While an ileostomy can significantly improve a patient's quality of life, it also presents unique challenges and complications. This article provides an overview of ileostomies, including the different types, indications, and management of complications. We also discuss the emotional and psychological aspects of living with an ileostomy, including adapting to changes in bowel habits, diet, and body image. By understanding the complexities of ileostomy care, healthcare providers can better support patients in their journey towards recovery and rehabilitation. Effective management of ileostomy-related complications and adaptations can significantly improve patient outcomes and quality of life.
Keywords: *Ileostomy, colon cancer, stoma care, complication management, quality of life.*

1. INTRODUCTION: OVERVIEW OF AN ILEOSTOMY

An ostomy is a surgically formed opening in the intestines or urinary system that uses a stoma, which is an artificially made hole, to move waste like urine, mucus, or faeces to the outside of the body. A stoma is usually pink to red, round, moist, and has no nerves. It sticks out above the skin. Ostomy operations are done when a part of the urinary or intestinal system gets sick and needs to be taken out. The stoma's output, which might be mucus, faeces, or pee, is called effluent[1,2,3].The part of the intestine used to construct an ostomy determines its name. A colostomy is a surgical procedure where a portion of the colon is brought through the abdominal wall to create an opening, or stoma, allowing stool to pass out of the body through this new route instead of through the rectum and anus.An ileostomy is created by bringing the ileum, which is part of the small intestine, through the abdominal wall to form a stoma[1,3,4].Urine can be diverted to the outside of the body through the stoma which is called as an ileal conduit or urostomy, which is made using a portion of the intestine. The stoma is created by sewing the ureters through the section of the intestine, bringing them with the abdominal wall, and suturing them. Patients with conditions including colon or bladder cancer, inflammatory bowel illnesses (such Crohn's or colitis), or colon perforations are candidates for these operations. An ostomy may be necessary in cases of radiation problems, necrotic gut, diverticulitis, or trauma. The purpose of the procedure will determine whether the ostomy is temporary or permanent. Jejunostomy, double-barrel ostomy, and loop ostomy are other names for ostomies.[1, 3, 5]

Temporary stomas can be formed either as part of a planned, multi-stage surgery or during emergency situations—such as trauma or perforation of hollow organs—to divert stool away from a section of the bowel, reducing the risk of complications at the site of an anastomosis.[5,6,7]Permanent ostomies are created following the removal of the anorectum, commonly observed in cancer patients or individuals with inflammatory bowel diseases. They are also indicated when an anastomosis is impractical due to complications from radiation or trauma.[8,9,10,11]Patients with conditions including colon or bladder cancer, inflammatory bowel illnesses (such Crohn's or colitis), or colon perforations are candidates for these operationsEmergencies such as diverticulitis, bowel rupture, trauma, necrotic bowel, and complications from radiation may require the implementation of an ostomy. The purpose of the procedure will determine whether the ostomy is temporary or permanent. Jejunostomy, double-barrel ostomy, and loop ostomy are other names for ostomies.In certain cases, such as Crohn's disease and ulcerative colitis, an ileostomy is advised as a corrective remedy. It can help prevent a high-risk anastomotic leak or protect and improve one following a low pelvic anastomosis. With the development of medical technology, fewer people are having anus-preserving surgery for low-lying rectal

cancer, and more patients are having ileostomies. An ileostomy is regarded as a life-saving surgical method that optimizes the likelihood of either saving a patient's life or enhancing his or her quality of life, whether it is performed as an elective procedure or in an emergency.12,13,14

2. LOCATION OF AN ILEOSTOMY OR COLOSTOMY

The affected portion of the intestine determines where a colostomy or ileostomy should be placed. The location (Figure 1) of the various colostomy types in the colon determines their names.[1, 6, 15, 16,17,18,19, 20,21,22]

- The sigmoid colon, which connects to the rectum, is the site of a sigmoid colostomy. The sigmoid colostomy is the most frequently performed type of colostomy.
- The segment of colon located on the left flank of the abdomen is referred to as the descending colon, which includes a descending colostomy.
- The section of the colon that runs across the upper part of the abdomen is known as the transverse colon, and it is where a transverse colostomy is typically formed.
- The ascending colon, the first part of the large intestine, includes an ascending colostomy. The structure ascends along the right abdominal region, originating from the cecum. Physicians favour ileostomies over ascending colostomies.

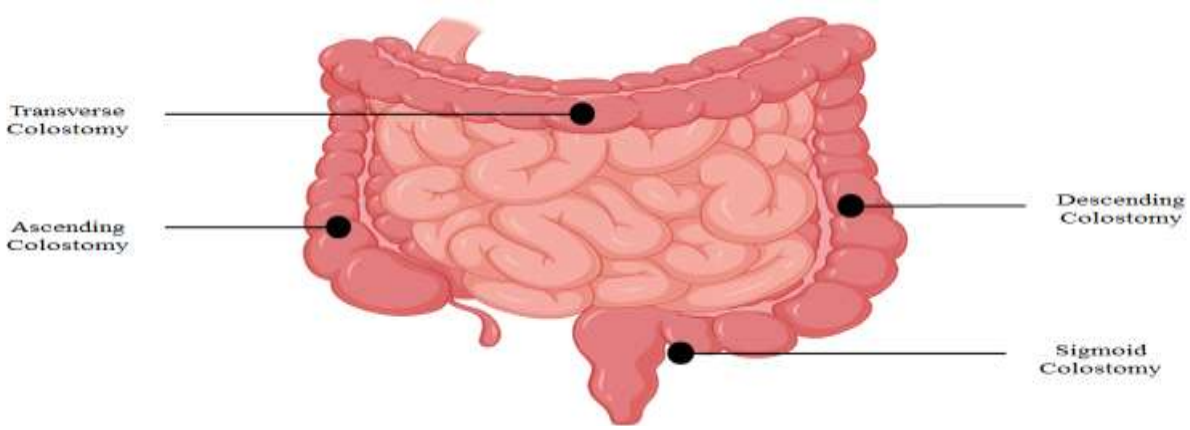

Figure 1: Location of an ileostomy

The location of the colostomy or ileostomy affects the form and consistency of the stool or fecal output. The colon normally absorbs water, so if a portion or the entire colon is damaged or bypassed, the stool's water absorption may be reduced. The stool from an ileostomy is primarily liquid due to its bypassing of the colonthat typically filters out most of the water. The feces will be produced and solid as usual if the patient has a descending or sigmoid colostomy[1, 23].

3: ILEOSTOMY AND COLOSTOMY TYPES

3.1. End colostomy or ileostomy An end colostomy or ileostomy involves attaching one end of the colon or ileum to an opening in the abdominal wall known as the end stoma. End colostomies are most commonly performed in the sigmoid colon.An end ileostomy is typically created from the terminal portion of the ileum. The entire colon may be surgically removed.[1,21,22,24,25, 26]

An ileostomy (or end colostomy) may be performed in conjugation with a rectal stump, as shown in figure 2. This procedure is sometimes referred to as the Hartmann method. The procedure entails affixing one extremity of the colon or ileum to the terminal stoma of the abdominal wall. The rectum and anus remain stationary, while the severed end is sutured or stapled. Faeces may still produce mucus that leaves the body through the anus even while it cannot pass through the rectal stump. This kind of ileostomy or colostomy may be transient. The leftover intestine can be joined to the rectum by the physician once the intestine has recovered.

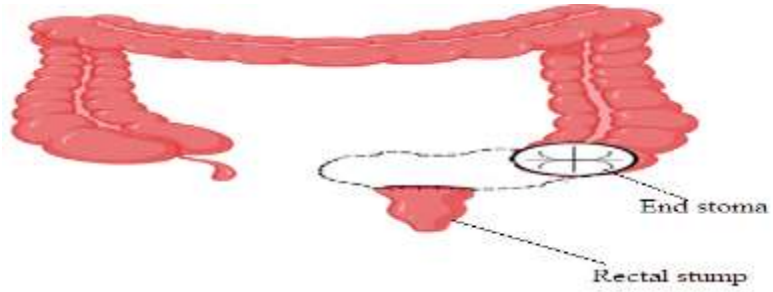

Figure 2: End stoma with rectal stump

An end colostomy accompanied by a mucous fistula is also known as a double-barrel colostomy. It is usually carried out by removing a piece of the descending or transverse colon while leaving the rectum, anus, and sigmoid colon intact, as shown in figure 3. Two stomas are used to establish this kind of colostomy. Each severed end of the colon is connected to a different abdominal wall initial (known as, the end stoma) when a portion of the colon is removed. The initial segment of the colon towards the right portion of the body is used to construct one stoma. As stool travels through it, this stoma is known as a functional stoma (end stoma). The final portion of the colon is used to construct a second stoma, sometimes known as a mucous fistula. Mucus is expelled from the body through the mucous fistula.

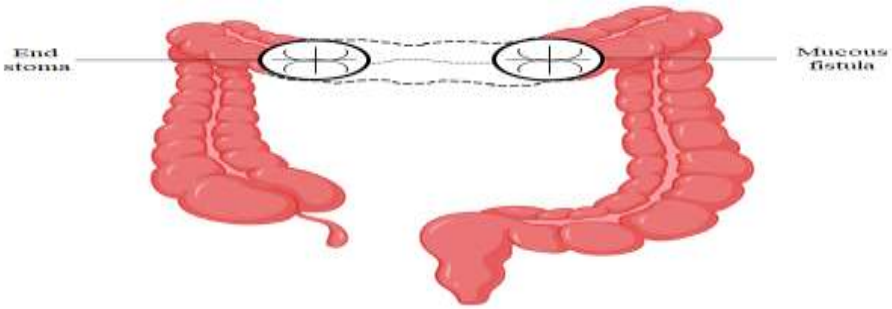

Figure 3: End stoma with mucous fistula

3. 2. Loop colostomy or ileostomy:

Colostomies and loop ileostomies are typically just temporary, as shown in figure 4. This enables the faeces to exit the body before to encountering the affected or compromised region of the intestine. The intestine can be reconnected following its healing process. A surgical incision is made in the abdomen to bring a loop of the colon or ileum to the surface, allowing for the

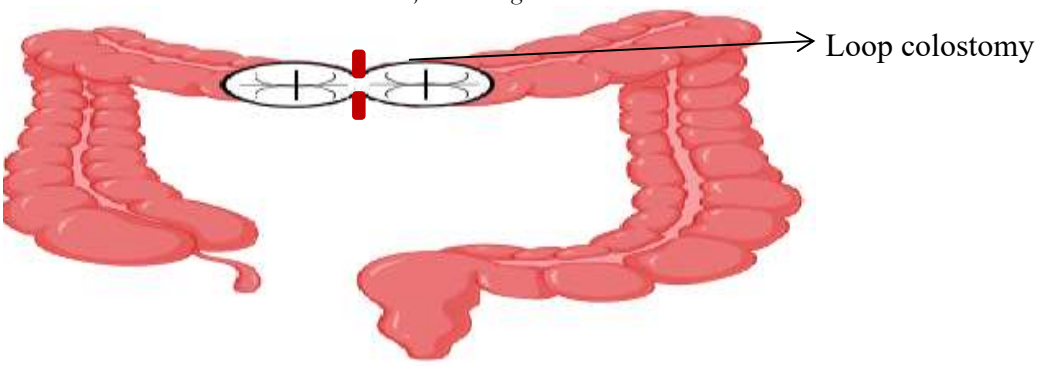

Figure 4: Loop colostomy or ileostomy

formation of a loop colostomy or ileostomy. A plastic rod is temporarily placed under the loop to stabilize and support it during the healing phase. Occasionally, a plastic rod is substituted with skin flaps. The physician incises the colon or ileum without complete transection to form an opening. The two boarders of the opening on the abdoen create a stoma. The stoma allows mucus and stool to exit the body. Additionally, some mucus and stool may exit from the anus.[27,28,29,30,31]

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4. CHANGING AN OSTOMY POUCHING SYSTEM

Figure 5: Steps for changing an ostomy pouching system

• The pouching system must be replaced every four to seven days, contingent upon the patient and the type of pouch utilized.
• Always seek the counsel of a wound care specialist or equivalent in the event of skin degeneration, pouch leakage, or other problems linked to the pouching system.
• Healthcare providers should encourage patients and their families to participate in their ostomy treatment.
• Advise the patient to evacuate the pouch when it is filled to a capacity of one-quarter to one-half with gas, pee, or faeces.
The selection of an ostomy product is determined by the patient's requirements and preferences.
Adhere to all post-operative assessments for new ostomies in accordance with agency policy.
• Pharmacological and nutritional modifications may be requisite for newly established ileostomies or colostomies.

An ostomy belt is utilised to secure the ostomy pouch. Physical exertion, greasy or moist skin, severe temperatures, and perspiration might influence the pouching process. Promptly address mild skin irritations. Raw, moist, or inflamed skin complicates the establishment of a secure, leakproof seal with a flange.

Procedures	**Additional Information**
1. Keep your hands clean.	Hand hygiene entails cleansing the hands with soap and water or employing an alcohol-based hand sanitiser. This inhibits the spread of pathogens.
2. Assemble goods.	The materials include a flange, an ostomy pouch with a clip, scissors, a stoma measuring guide, a waterproof pad, a pencil, skin prep solution, adhesive remover, stomahesive paste or powder, a damp cloth, non-sterile gloves, and extra cloths.
3. Verify the patient's identity before performing the procedure again. Encourage the patient to participate as much as possible, or support and help them throughout the procedure.	In accordance with agency policy, proper identification is required. Patients can better adapt to having an ostomy if they are encouraged to participate.
4. Establish privacy. Under the pouch, place a waterproof pad.	The pad stops effluent from flowing over the patient's bed linens.
5. Put on some gloves. Measure and dump the contents of the ostomy bag after removing it. Put the outdated pouching system in the trash bag.	Gloves are crucial for preventing infections, shielding the wearer from irritants, and preserving personal hygiene when changing a stoma. It's a straightforward yet efficient method to guarantee the health of the stoma patient and the caregiver.
6. Pull the flange gently in the direction of the stoma to remove it. Use the other hand to support the skin. You could use an adhesive remover. Do not remove a rod that is in place.	Skin tears can be avoided with gentle removal. To lessen skin and hair peeling, apply an adhesive remover. When a stoma is being formed, a rod may be utilized. Only a doctor or wound care nurse may remove it. The pouch can be removed by sliding a rod, if one is present.
7. Wipe the stoma carefully with warm water. Avoid using soap.	aemorrhaging may occur due to vigorous cleaning. Utilise a dry towel prior to detaching the stoma adhesive paste from the skin. Sanitise the peristomal area and stoma epidermis.
8. Examine the peristomal and stoma skin.	A stoma should be wet, elevated above the skin, and pink to red in color. Examine the stoma. There should be no sores, rashes, or skin disintegration on the skin around the stoma. Notify the wound care nurse if you have any issues with peristomal skin.
9. After measuring the stoma diameter using the measuring guide (tracing template), cut out the stoma opening. Trace the diameter from the measuring guide onto the flange, then cut along the outer edge of the marked line.	The stoma's diameter should be 2 mm smaller than the opening. Keep the measuring guide with the patient's supplies for later use.
10. Prepare the skin and use supplementary items as required or as instructed by the agency.	Stomahesive paste, stomahesive powder, or goods for making a skin sealant to stick the pouching system to the skin and stop leaks are examples of accessory products. If the skin is wet, the flange will not stick to it.
11. Detach the inner backing and position the flange over the stoma. Maintain the position of the border tape. Exert pressure. Maintain the flange's position for one minute to	The hand's warmth can aid in the appliance's skin-adherence and stop leaks.

facilitate warming and allow for adhesion to the patient's body. Subsequently, detach the backing from the outer perimeter and apply gentle pressure to establish a seal. Gently oscillate the rod without elevating it if it is secured in position.	
12. Apply an ostomy pouch. Affix the clip to the base of the bag.	This prevents the patient or bed from becoming soiled by the effluent.
13. For two minutes, position the palm of your hand over the ostomy pouch to facilitate the adhesion of the equipment to the skin.	Heat activates the flange.
14. Position the patient comfortably and organise the supplies. Remove refuse from the patient's room.	Eliminating trash contributes to a reduction in odor.
15. Wash your hands.	This reduces the spread of germs.

5. COMPLICATIONS ASSOCIATED WITH STOMAS

Complications associated with stomas are prevalent and are classified into two categories: early and late. The incidence of stoma complications varies significantly, ranging from 10% to 70%, as reported in the literature. Subsequent consequences encompass stoma stenosis, stoma prolapse, and parastomal hernia. Common early concerns include stoma necrosis, excessive output giving rise to fluid and electrolyte disturbances, as well as leakage and dermatological issues. [5,10, 32,33,34,35,36,37,38]

5.1. Skin issues:

Due to the bypassing of the colon's absorptive function, individuals with ileostomies have a looseoutput characterised by a strongly alkaline composition and active enzymes, which can be very harmful and irritating at the skin surface[39].The severity of peristomal skin issues can range from moderate rashes to serious ulcerations. Pruritus and excoriations may be observed in individuals with bacterial or fungal infections, irritant contact dermatitis, or skin lesions[40].

The most prevalent skin issues following ostomy surgery are peristomal skin complications (PSCs). They raise the expense of care and have a significant effect on a patient's quality of life. The most prevalent PSCs in individuals with an ostomy (or stoma) were erythema, papules, skin erosions, ulcers, and vesicles. The incidence of PSCs was reported to range from 36.3% to 73.4%. Within 120 days following surgery, readmission rates and length of stay (LOS) were elevated by skin problems. Improving the patient's quality of life is largely dependent on how these issues are managed. Essential measures to advance value-based healthcare encompass a multidisciplinary approach, enhanced patient education, and the empowerment of patients[41].

To make sure the ostomy bag is fitted correctly, a visual inspection is crucial in the emergency room. Early stoma nurse engagement is crucial to ensuring proper care and follow-up if the skin is moist, erosive, and inflammatory.Prior to donning a fresh stoma bag, the skin must be thoroughly cleansed and dried. In cases of suspected bacterial or fungal illnesses, antibacterial or antifungal lotions (also powders) should be employed[40]. In cases of skin with excessive moistire, agents to protect skin may be employed to facilitate the application of a new stoma bag and assist in fluid absorption from the compromised skin. Skin protectants are offered in the forms of powders, gels, lotions, and sprays. Their hydrocolloid creates a gel layer over lacerated skin, absorbing moisture and forming a dry covering that facilitates the adhesion of stoma appliances[42].

5.2. High output stomas:

A high-output ostomy produces more output than normal on a daily basis. This condition is more frequently seen in ileostomies than in colostomies and affects about 16% of newly created stomas, as ileostomies bypass the large intestine's ability to absorb fluids[43,44].An ileostomy's output can reach above 2000 ml in the early

postoperative phase, but it typically decreases over several weeks to an average daily volume of 200–700 ml [5,45,46].High-output ileostomies occur because to extensive small intestine resection or small bowel involvement in individuals with radiation enteritis, Crohn's disease, or infectious enteritis.Patients face the risk of dehydration, sudden kidney injury, and imbalances in electrolytes, such as hyponatraemia, hypokalaemia, and hypomagnesaemia, which can lead to secondary issues[10,46,47, 48,49,50]. Because oral fluid intake is restricted and insufficient to meet needs, patients with infectious enteritis, chemotherapy-related nausea, and diarrhea are particularly vulnerable to dehydration in the early postoperative period.Dehydration was the main cause of hospital readmissions, according to several studies evaluating the effect of dehydration on patients undergoing ileostomies. [47,51,52,53,54]

5.3. Stoma necrosis:

The most frequent cause of necrosis is ischemia, which is frequently brought on by mesentery strain, primary blood vessel ligation, or severe mesenteric dissection[55].Up to 16% of patients experience necrosis, which is more common in obese people and those having emergency stoma formation. Ischemia symptoms appear 24 hours after surgery. Clinically, Patients might report discomfort or soreness at the stoma site and around the stoma stump may have turned discolored. Despite being an uncommon consequence, stoma necrosis is an emergency that necessitates immediate contact with surgical specialists.[5, 10,34,45].

5.4. Parastomal hernia:

Incisional hernias connected to an abdominal wall stoma are known as parastomal hernias. They account for the majority of stoma-related issues that necessitate surgery[55,56,57]. The incidence rates range from 3 to 50%, depending on the type of stoma[5,37,40,45,58]. Obesity, malnutrition, chronic obstructive pulmonary disease, ascites, tobacco use, advanced age, and anabolic steroid consumption are risk factors for parastomal hernias.[59,60]

In most cases, parastomal hernias don't cause any symptoms. Patients start to experience symptoms as they get bigger, including discomfort, trouble keeping the appliance skin seal adequate and the accompanying skin irritation, and more dangerously, strangulation, obstruction, or even perforation[37,45,56,57,59]. Although life-threatening complications are uncommon, signs such as intense pain or tissue necrosis, reduced stoma output, and shock should prompt the emergency physician to urgently consult surgical services for immediate evaluation[60].

5.5. Prolapse of the stoma:

A proximal portion of the colon intussuscepts and protrudes through the stomal orifice, causing a prolapse[57,61,62].Up to 10% of colostomies and 3% of ileostomies result in a stoma prolapse. With a 30% incidence rate, transverse loop colostomies are particularly vulnerable to prolapse.Obesity, disorders linked to elevated abdominal pressure, or subpar surgical technique is risk factors for a stomal prolapse development.The primary symptoms, which can be conservatively treated in an outpatient clinic, are skin irritation, bleeding, ulcerations, and trouble fitting appliances.Although they are uncommon, emergencies like ischemia and strangulation call for immediate surgical assessment[10,37,45,55,61,63].

5.6. Obstruction and stenosis of the stom:

Stenosis can appear at any point during the postoperative phase and is documented in 2–15% of stomas.Risk factors contributing to the development of strictures and stenosis include tissue necrosis, ischemia, stoma retraction, and the formation of fistulas. These characteristics are commonly seen in individuals with Crohn's disease[10,37, 64,65,66,67,68].The most common clinical sign is loud gas. While stenosis rarely constitutes an emergency, inadequate chewing can lead to a blockage, especially due to undigested food particles. Signs of an obstruction may include nausea, vomiting, abdominal bloating, pain, and cramping, along with the passage of a thin, clear liquid that may have a foul smell or be odorless. A doctor can diagnose a stomal obstruction and assess for a localized blockage by performing a digital examination of the stoma. A CT scan with oral contrast can also be useful in identifying the location of the obstruction[5,69,70].

5.7. Complications related to the stomach:

Up to 30% of patients experience gastrointestinal issues in the early postoperative phase, making them extremely prevalent. Anastomotic leaking, bowel blockage, and paralyticileus are examples of gastrointestinal problems[32,34,71,72,73,74,75]. Patients may arrive in the emergency department exhibiting signs of sepsis, emesis, or

pyrexia. A comprehensive evaluation, encompassing imaging and laboratory tests, is necessary in the emergency department to detect blockage, intestinal ischaemia, or peritonitis. Intravenous hydration and electrolyte replenishment can restore lost fluids, while the implantation of a nasogastric tube can facilitate bowel relaxation[73,75,76,77]. Antibiotic treatment should begin immediately for patients experiencing ischemia or peritonitis, followed by prompt consultation with the primary medical team[78,79].

5.8. Infections:

Another frequent consequence in the early postoperative phase is infection, which happens in nearly 30% of patients.It is important to distinguish between bacterial colonization of the neobladder and a symptomatic infection of the upper urinary tract.Asymptomatic bacteriuria and bacterial colonization of the neobladder have been observed in 78% of patients[71,72,73,77,80,81,82,83]. Without symptoms such as fever, chills, or abdominal and flank pain, asymptomatic bacteriuria should generally not be treated, as doing so may lead to harmful side effects and contribute to antibiotic resistance. Nonetheless, significant infections that may lead to sepsis, pyelonephritis, wound dehiscence, and abscess formation might be induced by bacterial proliferation or urine leakage from the uretero-ileal anastomosis.A complete infectious check-up, including blood work, blood and urine cultures, and abdominal and chest imaging, should be performed by the emergency physician in response to any indication or symptom of infection[5,71,73,74, 84].

5.9. Problems related to metabolism:

The ileum's role in absorbing minerals, vitamins, and bile salts means that urine diversion may lead to significant metabolic complications, such as electrolyte and metabolic disturbances, bone abnormalities, nutritional deficiencies, and urolithiasis[5,73,84,85].Patients are susceptible to vitamin B12 insufficiency because the terminal ileum is where vitamin B12 absorption takes place most frequently. It usually takes between three and five years for the liver's stores of vitamin B12 to deplete enough to produce noticeable symptoms[83,86,87].Patients who are depleted may arrive at the emergency room with neurological deficiencies, including peripheral neuropathy, ocular atrophy, spinal cord degeneration, or dementia, as well as hematological abnormalities. Vitamin B12 levels and other blood tests can be used to confirm the issue. Once a vitamin B12 deficiency is diagnosed, lifelong intramuscular injections are typically required to maintain adequate levels.Other long-term metabolic effects are linked to the utilization of intestinal portions for urine diversion procedures. 70% of patients with intestinal urinary diversions develop hyperchloremic metabolic acidosis as a result of the ileum's absorption of ammonium and chloride and excretion of bicarbonate upon exposure to urine.Clinically, patients may arrive at the emergency room with complaints of weakness, lethargy, exhaustion, or weight loss[88,89,90,91,92]. In the emergency room, treatment consists of replacing electrolytes, replacing fluids, and correcting the acidosis using sodium bicarbonate (also sodium citrate). Calcium is mobilized from the bones to neutralize excess protons in reaction to the metabolic acidosis. Ileal excision increases the incidence of fractures by 21% via reducing bone mineral density and impairing calcium absorption[76,90,93,94]. Patients with ostomies or ileal pouches may be more susceptible to bone loss, according to mounting data. Dual energy X-ray absorptiometry (DEXA) screening and surveillance, in conjunction with calcium/vitamin D supplements, may be helpful for those patients, pending prospective trials[95].

Individuals with urinary diversion have a higher risk of forming kidney stones as a result of metabolic changes, persistent infections, urine stagnation, and the presence of foreign materials like sutures or staples. Infections, pain, hematuria, blockage, or trouble emptying the pouch are some of the symptoms that these people may exhibit. In the emergency room, an electrolyte correction, analgesia, and hydration should be initiated before a diagnostic evaluation. Consultation with the primary care team is necessary to provide conclusive treatment[71,88,90,91].

5.10. Mechanical issues:

Among the mechanical consequences include strictures and ureteroenteric stenosis. Up to 30% of individuals experience ureterointestinal strictures, which are commonly observed at the anastomosis site.They are thought to be brought on by ischemia and manifest anywhere from a few months after the treatment to years later.Clinically, patients may have pyelonephritis-causing blockage, hydronephrosis, flank discomfort, and infection. A complete check-up should be given to the patient, which should include imaging, blood tests, and a referral to the primary team for additional care[36,71,86,98].

6. COMMON GASTROINTESTINAL RESPONSES TO SPECIFIC FOODS[44,99,100]

Types of Food	Common gastrointestinal responses
Broccoli, Brussels sprouts, cabbage, fizzy drinks, cauliflower, peas, beans, asparagus, and beer.	Gas
Fruit and vegetable skins, celery, apple peels, cabbage, coconut, maize, mushrooms, dried fruit, pineapple, nuts, popcorn, and seeds	inadequate digestion
Rice, spaghetti, peanut butter (creamy), bananas, cheese, tapioca, applesauce, and skinless potatoes	Stool thickness
Spicy foods, grape juice, high-sugar foods, fried foods, and prune juice	Stool that is thinner
Peas, dry beans, eggs, salmon, garlic, onions, alcohol, asparagus, and broccoli	A stronger smell
Yogurt, parsley, cranberry juice, and buttermilk	less smell

CONCLUSION

Although surgical stoma formation is frequently performed, problems can arise. Even years after surgery, people with stoma-related problems often visit the emergency room. Consequently, emergency physicians must be proficient in the many types of stomas and the associated complications.. Knowledge of stoma-related emergencies facilitates timely evaluation and efficient treatment. Skin irritation, prolapse, and blockage are frequent side effects. Additionally, emergency physicians must be able to identify symptoms of hemorrhage, perforation, and necrosis of the stoma. Healthcare professionals can provide prompt, appropriate care, lower morbidity, and improve patient outcomes by being aware of stoma-related emergencies. Providing top-notch emergency care requires staying current on stoma care.

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