

Intestinal failure in gastrointestinal fistula patients

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Abstract

Intestinal failure due to gastrointestinal fistulae can be an extremely debilitating condition that significantly impairs quality of life. It can lead to serious life-threatening problems and may be fatal if left untreated. Patients may have a variety of underlying bowel diseases, or may have iatrogenic complications. Medical and psychological co-morbidities and complications present a further challenge in the successful management of these cases. In the acute stage, management of sepsis, fluid balance and acute surgical emergencies takes priority. Longer term maintenance of fluid and nutrient homeostasis, rehabilitation, psychosocial support and possible restorative intestinal surgery should all be addressed. A multidisciplinary approach is required to manage these patients appropriately. Services are usually concentrated in dedicated regional intestinal failure units comprising surgeons, gastroenterologists, radiologists, biochemists, nutritional support teams, stoma nurses as well as specialist wards equipped to manage these patients appropriately.

Keywords Fistula; intestinal failure; nutrition; short bowel syndrome

Definitions

Intestinal failure (IF) is defined as ‘the reduction of gut function below the minimum necessary for the absorption of macronutrients and/or water and electrolytes, to the point where supplementation is required to maintain health and/or growth’.¹ It can be sub-classified into three types based upon duration of gut failure:

- type I: less than 28 days
- type II: greater than 28 days
- type III: generally irreversible.

Gastrointestinal fistulae (GIF): A fistula is defined as an abnormal communication between two epithelial lined surfaces. GIF is an abnormal track – at least one end of which is an epithelial surface within the gastrointestinal tract.

Total parenteral nutrition (TPN): Is a method by which all the nutritional needs of a patient are provided directly into a vein, bypassing the enteric system.

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Home parenteral nutrition (HPN): is a method of delivering fluids and/or nutrients to a patient through a vein in the setting of a patient’s home. It is used where there is a chronic inability to adequately absorb enteral nutrition, in order to facilitate independence from the hospital setting.²

Classification of GIF

There are several ways to classify fistulae, which may be based on anatomical, physiological or aetiological characteristics.

There are many different anatomical types of GIF including those shown in [Table 1](#).

Enterocutaneous fistulae (ECF) are the most common type to cause intestinal failure and most of this chapter will discuss the management of ECF. Rarer GIF, such as those communicating with the biliary system, will not be specifically discussed but the basic principles of management apply.

- Type 1 fistulae – resulting from an underlying disease affecting the bowel wall.
- Type 2 fistulae – resulting from injury to a normal bowel wall.

Alternatively, GIF can be defined as simple or complex:

- Simple fistulae drain via a short, simple track.
- Complex fistulae drain via long or multiple tracks and can include abscess cavities.

The clinical management of GIF will vary depending on the physiological effects of the fistula. This depends on the volume (and to a certain extent the contents) of the fistula effluent, leading to a classification based on physiological effects:

- high output fistula – output >500 ml per 24 hours
- low output fistula – output <500 ml per 24 hours.

Epidemiology

The exact incidence and prevalence of patients with GIF and IF in UK hospitals is difficult to track and is probably under-reported. Many of these are in-patients who may receive TPN for a short time (<28 days) in order to recover from surgery or severe illness. It is estimated that there are between 1500 and 2000 inpatient cases per year of type II IF in England.³

Since 1995 the British Artificial Nutrition Survey (BANS) has recorded patients receiving HPN for type II or III IF. It is estimated that the prevalence of HPN cases in 2010 was 3.66 per million of the population with a period prevalence of 10 cases per million.

There is no national or international record of the incidence and epidemiology of GIF. Many are unreported as low output postoperative GIF may close relatively quickly with conservative management, and even longer term low output GIF may require little ongoing medical attention. Fistulating conditions such as Crohn’s disease or radiotherapy predispose to GIF, particularly in the postoperative period.

Causes of intestinal failure

There are many causes of IF (listed in [Table 2](#)). Type I IF is of short duration and usually resolves after treating the underlying surgical or medical event. Type II and III IF are the more severe types of IF which will be considered in this article.

Anatomical classification of gastrointestinal fistulae

Fistula type	Abbreviation	From	To	Notes
Enterocutaneous	ECF	Small bowel	Skin	Often associated with IF <ul style="list-style-type: none"> • Crohn's • Trauma • Radiation • Surgery Variable output
Gastrocutaneous	GCF	Stomach	Skin	Distal enteral feeding possible
Colocutaneous	CCF	Colon	Skin	Usually low output
Enterointeric	EEF	Small bowel	Small bowel	'Bypass' effect
Enterovesical	EVF	Small bowel	Bladder	UTIs common
Enterovaginal	EVF	Small bowel	Vagina	Vaginal discharge and UTIs common
Colovesical	CVF	Colon	Bladder	UTIs common
Colovaginal	CVF	Colon	Vagina	Often diverticular UTIs common Often diverticular

UTI, urinary tract infection.

Table 1

Causes of gastrointestinal fistula (GIF)

GIF can be congenital or acquired. This article will consider the latter and causes are listed in [Table 3](#).

Clinical features

GIF may present in a variety of ways, depending upon the underlying cause and anatomical location of the fistula. ECF can present with drainage of intestinal contents either through the skin via a wound, drain site or an unexpected orifice. [Figure 1](#) shows an ECF which developed in the midline wound after previous laparotomy. Enterovesical or colovesical fistulae can present with recurrent urinary tract infections or pneumato- or faecaluria. Gastrocolic fistulae may present with faeculent vomiting or faeculent halitosis. Enterovaginal or colovaginal fistulae can present with drainage of bowel contents per vaginally or recurrent urinary tract infections.

The severity of symptoms and the magnitude of physiological derangement depend upon the anatomical site of the fistula. In general, fistulae that arise higher in the small bowel cause more fluid, electrolyte and nutritional disturbance. GIF draining into the urinary tract or vagina are more likely to cause septic complications, as do those GIF that fail to drain adequately or are associated with abscesses.

Initial assessment and management

Traditionally, GIF management has been taught by the acronym SNAP:

- S – SEPSIS – must be eradicated by drainage of abscesses/collections and appropriate antimicrobial therapy.
- N – NUTRITION – the need for nutritional support must be assessed and where necessary fluid, electrolyte or calorie supplementation given.

- A – ANATOMY – the location of the fistula must be established together with the length, condition and anatomy of the GI tract defined.
- P – PROCEDURE – definitive surgery to close the GIF, which fails to close spontaneously, should only be undertaken as a planned procedure when the above elements have been addressed.

Initial assessment of the patient should address sepsis control and fluid balance. It is important to recognize that these are the key causes of morbidity and mortality in the early stages, and that rushing to address underlying anatomical abnormalities is usually counterproductive.

Sepsis

Unresolved sepsis causes organ dysfunction and is a major cause of death in these patients. Sepsis may arise from the original abdominal condition, the chest, urinary tract, or bloodstream due to surgery or indwelling devices.

Specimens for microbiological testing should include wound swabs, urine cultures, blood cultures (if pyrexial) and specimens from any drains, collections, discharges or indwelling devices where possible. Close liaison with a microbiologist is essential as many of these patients will have already had several and often prolonged courses of antibiotics and therefore atypical flora. Patients are also at risk of fungal colonization/infection due to the need for extended hospitalization and indwelling medical devices.

Intra-abdominal sepsis should be sought with CT scanning in the first instance and, wherever possible, radiological drainage should be attempted to deal with any collections. Emergency surgery during the initial management stage should be reserved for the rare instances of major haemorrhage, removal of acutely ischaemic bowel or drainage of unresolved sepsis, which cannot be drained radiologically. In the emergency situation, divided

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