Intestinal Fistulae

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An intestinal fistula can be defined as an abnormal communication between two epithelized surfaces, one or both forming part of the gut. Fistulas are primarily classified into:

Internal - connecting two hollow viscera or potential spaces
External - connecting hollow viscera to body surface.

External fistulae can furthermore be subdivided into:

Low output - less than 500ml of drainage
High output - more than 500ml of drainage.

Although various studies have yielded different results it is generally agreed that mortality lies around 10-20%.

Aetiology

1. CONGENITAL - these are rare and usually follow failure of normal embryological maturation. Eg tracheo-oesophageal fistula accompanying oesophageal atresia.
2. TRAUMATIC - may follow diverse types of trauma including gunshot wounds, foreign bodies or even closed injury. Eg. retroperitoneal duodenal rupture.
3. INFLAMMATORY - predominantly internal. May follow both septic as well as aseptic inflammation. Eg. post-T.B.
4. NEOPLASTIC - the great majority follow malignant neoplasms and arise as a result of invasion or obstruction with proximal perforation and abscess formation.
5. DEGENERATIVE - usually develop on a background of senility. Eg. aorto-duodenal fistula.
6. POST-IRRADIATION - follow deep X-Ray therapy often in relation to gynaecological malignancies.
7. POST-OPERATIVE - responsible for 95% of cases. Predisposing factors include tension on suture lines; ischaemia; sepsis; obstruction or involvement with malignant growths. They may also occur due to inadvertant bowel injury in connection with endoscopies.

Table 1.

Sites of Intestinal Fistulas

Oesophagus	*Congenital*	— Tracheo-oesophageal fistula
	Acquired	— Carcinoma of oesophagus
		— Pressure necrosis from NG tube
		— Swollowed foreign bodies
		— Post-pneumonectomy
Stomach	*Spontaneous*	— Intra-gastric (neoplasms, ulcers)
		— Extra-gastric (colonic or pancreatic lesions)
	Post operative	— Trauma
Duodenum	*External*	— post Billroth II
		— duodenal ulcer
	Internal	— Duodenocolic (due to Ca colon, duodenal diverticuli, Crohn's)
		— Duodenorenal (due to right nephrolithiasis or carcinoma)
		— Duodenobiliary (following cholecystitis)
		— Duodenovascular (after prostetic aortic grafts)
Biliary	*Spontaneous*	— biliary calculus erosion
		— duodenal ulcer
		— biliary malignancy
	Post-operative	— primary surgery
		— reconstructive surgery
Bowel	*Deliberate*	— colostomies and ileostomies
	Spontaneous	— Crohn's disease
		— Tuberculosis
		— Diverticular disease
		— Malignancy
	Post-operative	— breakdown of intestinal anastomosis
		— repair of traumatised bowel
		— abscess formation
Pancreas	*Spontaneous*	— pseudopancreatic cyst
		— Abscess
	Post-operative	— biopsy

Diagnosis

Few problems are usually encountered in the diagnosis of external fistulae as the skin breach discharging bile, enteric contents or gas is usually clearly visible. In the occasional problematic case, oral markers such as carmine dye will definitely prove helpful. As in every clinical condition a thorough history and examination are essential paying particular attention to any predisposing abdominal pathology and/or previous operation. Internal fistulae often prove somewhat more difficult to diagnose as they tend to present with non-specific symptoms such as abdominal pain, diarrhoea etc. but the one universal complaint is weight loss. Investigations are essential adjuncts in diagnosis. Radiological studies in particular whether plain or using contrast are very useful to show:

- — origin of fistula
- — complexity and size of fistula track
- — condition of G.I.T. from where fistula commences
- — disruption of bowel
- — prescence of distal obstruction.

Fistulography using contrast media may also be utilised. Ultrasound, CT scan, bacteriological examination or biopsy procedures may also prove useful. Laparoscopy or laparotomy may ultimately be resorted to in order to obtain the full diagnosis.

Management

The currently adopted rationale of therapy is summerised in Table 2. **Resuscitation** should *not* be carried out using blood unless the fistula is connected to a blood vessel (e.g. aorto-duodenal) or the patient is severely anaemic. Neither is the use of plasma popular. The best way seems to be the administration of 500 - 1000 ml of Dextran 70 followed by Normal Saline.

Once resuscitation is complete full attention must be given to **Fluid and Electrolyte management.** A strict fluid balance chart as well as daily plasma electrolyte concentrations are required. An initial daily regimen for the adult patient would be:

5% Dextrose 200 ml
N-Saline 500 ml
Potassium Chloride 80 mmol

Subsequent administrations must then be tailored to the particular person in the light of the electrolyte levels.

Nutrition of the patient with intestinal fistula is initially parenteral. A central venous catheter usually into the subclavian vein is set up. The basic idea is to provide calories, nitrogen compounds as well as vitamins and trace elements. Various proprietary products are available. Nitrogen is provided by means of amino-acid preparations. Initially 0.5g nitrogen/kg body wt./day may be started and subsequently long term management involves the calculation of the daily urea excretion in the urine.

$$\text{Grms. nitrogen/day} = \text{24hr urea excretion} \times \frac{100}{80} \times \frac{28}{60}$$

Daily calorie needs border around 40-50 kcal/kg/day. A large part is supplied as fats upto a maximum of 2-3g/kg/day of 10% Intralipid. Any additional calories can be supplied by means of 10% Dextrose. Daily blood glucose estimations must be undertaken and any signs of hyperglycaemia treated with short-acting Insulin. Initially the total volume should be low (about 2L) and gradually increased. Vitamin supplements should also be provided with additional doses of folate as this is particularly low in this condition. Trace minerals must also be added particularly Zinc (12mg/l of fluid lost) and Chromate (20μg).

Once parenteral nutrition is safely established, the patient's gastrointestinal function is reviewed with a view to using it for the provision of nutrients. This is normally in the form of low residue elemental diets of which several types are commercially available. However this may result in a number of problems including gastric stasis, diarrhoea, and hyperosmolar dehydration all of which must be looked for and corrected immediately. Should these prove troublesome the patient can be maintained solely on parenteral nutrition.

As soon as the nutritional needs have been satisfied, it is essential to ensure correct **protection of the skin** (in external fistulae), as well as collection of all fluid discharge. This is carried out efficiently by the use of an adhesive STOMA BAG. Besides protection

Table 2.

Phase 1 (immediate)	— Restore blood volume — Correct fluid and electrolyte imbalances — Control fistula and protect skin — Drain abscesses with/out antibiotic therapy
Phase 2 (till day 2)	— Continue fluid & electrolyte therapy — begin parenteral nutrition
Phase 3 (day 3-5)	— Start enteral feeding — Demonstrate anatomy of fistula
Phase 4 (day 5 -)	— Continue nutritional treatment until fistula closes or patient fit for surgery — Operate to eliminate sepsis if necessary.

and collection of drainage, it improves patient comfort, facilitates early mobilisation and reduces the risk of cross-infection.

Surgery. One of the most debatable query as regards intestinal fistula management is when to stop conservative measures and *operate*. Although, until recently, thirty days following the control of sepsis has been more or less the baseline it is now felt that this is too short a time. This is especially the case in external fistulae showing signs of improvement such as reduction of discharge, weight gain and return of defaecation. In fact in a study of 27 cases of intestinal fistulae, Parsa et al reported a 100% spontaneous closure in uncomplicated external fistulae. Failure to close occurred in internal and external fistulae with exposed or everted bowel mucosa, very large opening or distal obstruction. The criteria for operative closure of external fistulae are that of failure to close on conservative therapy when investigations have revealed a reason for it. With internal fistulae, spontaneous closure is extremely unlikely although surgery is rarely urgent. Torrential diarrhoea with electrolyte and nutritional problems is one of the major indications for emergency surgery once the patient has been rendered fit for the operation.

Surgical treatment can be palliative or curative. Palliation includes drainage of abscesses, establishment of feeding enterostomies and proximal diversion. Curative operations aim at removing diseased bowel and associated fistulae usually followed by restorative anastomosis. In external fistulas in which failure to close is the result of an area of mucocutaneous fusion, a local dissection to separate the mucosa and infold it into two layers will suffice.

Complications

In external fistulae failure to close is the major complication. Several reasons may be responsible including distal obstruction, discontinuity of bowel ends, chronic abscess or malnutrition. Other complications include metabolic and nutritional distruption, sepsis, pulmonary problems, deep vein thrombosis, gastrointestinal bleeding as well as psychological problems.

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Acknowledgement: *I would like to thank Mr. A. Zammit MD FA Chir for his help in the preparation of this manuscript.*