The patient with gastrointestinal disease

Ian Nesbitt

Abstract

Gastrointestinal dysfunction is a common presenting or co-existing condition in patients undergoing surgery. Fluid management, analgesia and nutrition are important in these patients, and increasing recognition of the high burden of illness from emergency surgery is driving structural changes in the management of laparotomy patients.

Specific disease states are also discussed (liver disease, pancreatitis, abdominal trauma).

Keywords Gastrointestinal disease; intra-abdominal hypertension; liver disease; nutrition; pancreatitis

Introduction

Gastrointestinal disease is common, presenting as the primary complaint or co-existing problem. This article looks at considerations in the perioperative care of these patients.

The functions of the gastrointestinal system are nutrition and excretion of waste. Gastrointestinal dysfunction can affect many other organs and is implicated in the development of multiorgan failure.

Patient assessment

A systematic (ABCDE) approach (Table 1) will help identify and prioritize life-threatening problems followed by a thorough examination of the gastrointestinal system. It may also help identify non-surgical causes of abdominal symptoms (e.g. diabetic emergencies, pneumonia).

Investigations

Investigation of gastrointestinal dysfunction will be directed by the history, examination and differential diagnosis. In general, many patients will warrant full blood count, clotting, liver function, urea and electrolyte tests, with additional biochemical or radiological tests depending on anticipated findings. In particular, imaging should not replace or unduly delay appropriate decision-making, especially in emergency surgery (Table 2).

Fluid management

Fluid management should include clinical assessment of volume status. The aims are replacement of deficits and ongoing losses, maintenance and regular reassessment including electrolyte replacement and management of acid–base disturbances.

Many patients require maintenance fluid, particularly if fasting is prolonged. This can be calculated (ml/hour) using body weight (i.e. 4 ml/kg for the first 10 kg plus 2 ml/kg for the next 10 kg and an additional 1 ml/kg thereafter). Thus a 40-kg patient would require 40 + 20 + 10 = 70 ml/hour.

Dehydration is common in patients with gastrointestinal disease, since large volumes of fluid can be lost through the gastrointestinal tract but there is copious evidence that fluid overload adversely affects outcomes after gastrointestinal surgery. Individualizing fluid management is important, and, in the UK, is a nationally recommended intervention (NICE guidelines on fluid management intraoperatively).

The gastrointestinal tract secretes large volumes of electrolyte-containing fluid. Tables 3 and 4 show the volumes secreted and acid–base balance disturbances that occur in various conditions.[1]

Nutrition

Malnutrition is associated with increased morbidity and mortality in the perioperative period. Preoperative nutritional assessment provides an opportunity to identify at-risk patients. The Nutritional Risk Score (NRS) is a validated tool for assessing and identifying patients at nutritional risk. Patients with an NRS of 3 or more are prone to develop postoperative complications and should benefit from nutritional support.[2] The nutritional profile of these patients is a good prognostic indicator and efforts should be made to maintain an optimal nutritional status.

Prolonged periods of fasting prior to surgery are unnecessary with minimal effects on aspiration risk.[3] Preoperative oral carbohydrate administration (pre-load) is established in general surgery as part of enhanced recovery programmes. This is as safe as administering clear fluids 2 hours preoperatively and reduces insulin resistance in the postoperative period.[4]

No studies have demonstrated benefits from delaying nutrition postoperatively. Early postoperative enteral nutrition has been shown to reduce complications and shorten length of hospital stay. Total parenteral nutrition (TPN) should only be given when enteral nutrition is impractical. In the critically ill, late institution of TPN may be beneficial compared with early TPN.[5]

Immunonutrition adds substances such as amino acids (arginine and glutamine), ω-3 fatty acids and RNA nucleotides. The reported beneficial effects include reductions in the rate of postoperative infectious complications and the length of hospital stay, although not all studies have demonstrated these benefits.[6]

Specific disease

Trauma

Abdominal trauma is common. The spleen and liver are the most commonly injured solid organs. CT is highly sensitive (>90%) for solid organ injury, but less so for hollow organ, diaphragmatic, or mesenteric injury. It is increasingly used in less stable patients. Focused assessment with sonography for trauma (FAST) is a quick non-invasive bedside investigation most useful for confirming the need for laparotomy in unstable patients. Laparoscopy can be used as a diagnostic tool in stable patients to avoid negative laparotomy where other investigations are

Ian Nesbitt *FRCA DICM FFICM is a Consultant in Anaesthesia & Critical Care at the Freeman Hospital, Newcastle Upon Tyne, UK. Conflicts of interest: none declared.*

Systemic approach to patients with abdominal disease

Examination	Rationale	Examples
Airway breathing	Ensure airway is patent, protected and breathing is adequate	Aspiration risk with ileus Respiratory embarrassment from distended abdomen Presence of co-existing or confounding disease, e.g pneumonia with right upper quadrant pain, diabetes
Circulation	Examine for adequacy of perfusion including urine output	Dehydration secondary to inadequate intake and/or increased losses in obstruction or diarrhoea Hypovolaemia secondary to upper gastrointestinal bleeding
Disability	Basic assessment of level of consciousness (also has implications on airway) Check blood glucose	Hepatic encephalopathy or risk of hypoglycaemia in liver disease Abdominal trauma may be have associated head injury Severe hypoxia or hypoperfusion can impair consciousness
Gastrointestinal	Mouth to anus assessment Nutritional status Examination of abdomen	Presence of co-existing disease, e.g spider naevi or caput medusa in liver disease, palpable aortic aneurysm, previous surgical scars

Table 1

inconclusive (e.g. positive FAST but negative CT). Management of patients with intra-abdominal injuries varies from conservative to life-saving laparotomy. The decision is based on the condition of the patient and mechanism of injury. Unstable patients should generally have early surgery while stable patients can be managed conservatively. One review described a 1% increase in mortality for every 3-minute delay in laparotomy for abdominal trauma while negative laparotomy generally has minimal related morbidity.[7] Equivocal cases are therefore better managed with early surgery. Dynamic decision-making and rapid, early, appropriate intervention for trauma are key elements in improving outcomes.

Liver disease

Patients with liver disease are at high risk of postoperative complications. Acute hepatic failure is associated with high mortality. In chronic liver disease, perioperative risk depends upon the severity of disease, the clinical setting and surgical procedure. Careful preoperative preparation and monitoring to detect complications early in the postoperative course are essential to improve outcomes. Child–Pugh and the Model for End-stage Liver Disease (MELD) scores (Tables 5 and 6) are used to classify the severity of liver disease and predict mortality. Patients with Child class C or a MELD score over 15, severe

Investigations in gastrointestinal disease

Test	Rationale	Comments
Full blood count	Anaemia Leucocytosis	Guides transfusion Aids diagnosis of systemic inflammatory response syndrome or sepsis
Urea and electrolytes	Electrolyte loss via gastrointestinal tract Acute kidney injury	Hypokalaemia from vomiting Pre-renal failure from hypovolaemia/ dehydration
Amylase	Aids diagnosis of pancreatitis	May be normal in 20% of patients. Lipase is more than 90% sensitive
Coagulation screen	Severe liver disease, disseminated intravascular coagulation in severe sepsis	Prothrombin time prolonged in liver dysfunction
Liver function tests	Liver disease, cholestasis	Transaminases raised in hepatocellular damage Alkaline phosphatase raised in cholestasis
Microbiology	Blood cultures, stool samples Virology in liver disease	Ideally cultures should be taken before initiation of antibiotics but do not delay antibiotics if sampling delayed
Imaging/radiology	Erect chest X-ray Computed tomography scan	Although often essential, should not replace or unduly delay appropriate decision-making, especially in emergency surgery

Table 2