Management of the Gastrointestinal System in Critical Care

Nutrition

It is essential that critically ill patients receive nutrition. There is no disease process that has been shown to be benefited by a lack of nutrition. However, there are many circumstances whereby the gut may not be available to deliver nutrition, either on a temporary or a more long-term basis. No patient should be allowed to go without some sort of nutritional support being delivered for more than a few days. Nutritional support should be considered within 24 hours of admission in all patients.

Assessing nutritional requirements

The delivery of adequate and appropriate nutritional support to critically ill patients has been, and continues to be, the subject of a great deal of research. The results of studies looking at the use of different feed formulations, routes of administration, calorie requirements, nutritional supplements etc. have largely been disappointingly unhelpful. Generally speaking patients should be fed in a standardised and consistent manner, avoiding over-feeding and ensure an adequate intake of water, vitamins and minerals. There are methods available to measure the energy expenditure of patients so that calorie intake can be adjusted to match. However, these techniques are prone to error and studies have shown no benefit to such a strategy. The vast majority of patients will do just as well with a "standard" calorie intake, unless very small or very large. You should avoid the temptation to underfeed or not feed obese patients. Critical illness tends to result in loss of protein, i.e. muscle mass, in the face of starvation leaving fat stores untouched.
Typically, patients should receive in the order of 2000 Kilocalories per day.

Enteral feeding

Enteral nutrition should be considered for all patients within 24 hours of admission. Enteral feeding may be delivered through a nasogastric tube (the most common method), a nasojejunal tube, a gastrostomy (placed either surgically or percutaneously – PEG tube) or through a surgically-placed feeding jejunostomy tube. When a nasogastric (NG) tube is used, most commonly a large-bore standard NG tube (Ryles tube) will be used. However, once enteral feeding has been successfully established, this should be changed to a fine-bore NG tube.

Please refer to the Critical Care Services Guidelines for Nutrition Support on the Clinical Portal for further information.

Enteral feeds used in Critical Care

Please refer to Enteral Feeds used in Critical Care on the Clinical Portal.

Parenteral nutrition

There is no indication to commence parenteral nutrition out of normal working hours – it is never an urgent or emergency therapy. Thus, while "standard bags" are available, there is little or no rationale for their use.
UHW. Parenteral nutrition (PN) must be Consultant authorised, and can be requested via referral to a member of the Nutrition Support Team (x 6393) before midday (Mon-Fri).
Glutamine and additional electrolytes will be added to the PN wherever possible.
UHL. Liaise with the Nutrition Support Team.

Enteral versus Parenteral feeding
A basic tenet of nutritional support states that "if the gut works, use it". Enteral nutrition is generally better tolerated and has fewer complications that parenteral feeding. It is also considerably cheaper! However, when the gut is not available, it will be necessary to use parenteral nutrition. Parenteral nutrition should not be used unless it can be established that the gut cannot be used, e.g. short bowel syndrome. Failing that, every effort should be made to establish enteral feeding before resorting to parenteral nutrition, even if this delays feeding for a few days. Thus, for example, efforts to overcome gastroparesis should precede the use of parenteral nutrition, either pharmacologically (either metoclopramide or erythromycin) or by placement of a post-pyloric nasojejunal tube.

Bowels: All patients should be commenced on the appropriate bowel protocol. Please refer to the Bowel Management guidance on the Clinical Portal.

Blood Glucose Control

Many critically ill patients will develop hyperglycaemia as part of the stress response, even in the absence of pre-existing diabetes mellitus. Traditionally, insulin was commonly administered to hyperglycaemic patients at a random pre-determined blood glucose level, usually around 10 mmol/l. The publication in 2001 by van den Berghe "Intensive Insulin Therapy In Critically Ill Patients" in the New England Journal of Medicine, sparked major interest in blood glucose control with a much greater emphasis being placed on maintaining strict normoglycaemia using much bigger doses of insulin than in times gone by. This sparked much controversy and generated several other studies with varying results. A subsequent large-scale multicentre international trial, entitled "NICE-SUGAR" published its results in the New England Journal of Medicine in March 2009. This study concluded that intensive glucose control was associated with an increased mortality rate compared to "conventional" glucose control. The Directorate policy with regard to blood glucose control is to not to commence insulin unless the patient's blood glucose is greater than 8.0mmol/l. Having decided to initiate insulin therapy, the target glucose range will be 4.0 to 8.0 mmol/l, with titration of insulin to achieve this target.

Upper GI tract haemorrhage

It is common practice for patients to be admitted to the ICU for diagnosis and management of upper GI tract haemorrhage. Critical care acts as a place of safety

outside of normal working hours for the safe conduct of upper GI tract endoscopy. A request for admission for the purpose of caring for such a patient may therefore be made by the on-call endoscopist. Upper GI tract haemorrhage may have many different causes, but typically we see patients bleeding from peptic ulceration, gastric erosions or oesophageal/gastric varices. Patients with upper GT tract haemorrhage may require volume resuscitation with transfusion of blood and blood products. Other therapies may also be required, such as clotting factor transfusions. If in doubt as to what will help, you should discuss the patient with the duty consultant intensivist and you may need to also discuss the patient with the haematologists. Some patients may undergo procedures during endoscopy to stem bleeding, but others may require either surgery or interventional radiology so it is difficult to generalise regarding management. However, patients with peptic ulceration may also require administration of omeprazole (a proton pump inhibitor) in high dose by infusion (80 mg initially, followed by 8 mg/hour for 72 hours). Patients with erosions may receive omeprazole 40 mg. bd. Proton pump inhibitors are not indicated in variceal bleeding. Further information can be found in the Good Prescribing Guide.
Variceal haemorrhage may require the placement of a Sengstaken-Blakemore tube (or variant thereof) and administration of terlipressin, a synthetic analogue of vasopressin. Again, further information is available in the Good Prescribing Guide.

Stress Ulceration

In the early days of critical care, upper GI tract haemorrhage was recognised as a relatively common complication of being critically ill. This is usually referred to as stress ulceration. Further information on stress ulceration can be found here. Prevention is of course better than cure. Many clinical trials have investigated this problem. Current opinion suggests that pharmacological prevention continues to play a key role in this. In Cardiff we use ranitidine for this purpose as there is insufficient evidence to suggest that a proton pump inhibitor is superior and may be associated with an increased incidence of Clostridium difficile infection.
Ranitidine is given as a slow IV injection of 50 mg (diluted to 20 ml with 0.9% saline and given over 10 minutes) tds until enteral feeding is established when it is administered enterally 150 mg bd.

Management of Upper Intestinal Bleeds

Most bleeds are from peptic ulcers, and stop spontaneously, but 20% re-bleed . Patients at high risk of rebleeding and death, should be identified by clinical and endoscopic findings.

High-risk patients

- Haematemesis with melaena (twice the mortality of either alone).
- Fresh melaena
- Continued bleeding or a rebleed in hospital
- Age > 60, or concomitant cardiopulmonary disease
- Elderly patients on NSAIDS
- Pulse > 100 / min, BP < 100 mmHg systolic, cold clammy extremities
- Active arterial bleeding on endoscopy (90% risk of rebleed).
- Visible vessel in the ulcer base on endoscopy (70% risk of rebleed).

- Adherent clot on endoscopy (30% risk of rebleed).
- Varices on endoscopy.

Low-risk patients

- Age <60
- Coffee-ground vomit without melaena
- Alcohol induced
- Haemodynamically stable
- Endoscopic stigmata absent.

Management

1. Resuscitation

a) Obtain good peripheral IV access (14g or 16G cannula). Central line in shocked or high risk patients i.e. elderly or with concomitant heart or respiratory disease or if unable to establish peripheral access. Do not delay resuscitation in order to insert central line if peripheral access possible.
b) IV fluid is crystalloid - if hypotensive or bleed is significant give blood +/- FFP.
c) Check clotting, FBC, U&Es and cross-match 4 units. Initial Hb is a poor indicator of degree of bleed as haemodilution takes hours to develop.

2. Treatment

a) Keep NBM, and avoid a NG tube as this may exacerbate gastric or oesophageal lesions.
b) Arrange urgent GI endoscopy (ideally within 6-24 hours). Contact Endoscopy Suite (UHW x 6344, UHL x 5000)
c) Those requiring out of hours endoscopy:
    i) Suspected varices (jaundice, liver signs, and previous varices).
    ii) Those not responding to initial resuscitation.
    iii) A rebleed.
d) The surgeons should be informed of patients who require out of hours endoscopy.

Surgery to be considered if:

- Patient > 60 years, one rebleed, transfusion requirement >4 units in 24 hours for volume replacement.
- Patient < 60 years, two rebleeds, transfusion requirement >8 units in 24 hours for volume replacement.

Management of acute variceal bleeds

- Consider varices in all acute bleeds. All patients with suspected bleeding varices should be endoscoped urgently (same day) to confirm diagnosis and attempt injection.
- Two large-bore intravenous cannulae (14g/16g), +/- a central line.
- Transfuse blood and fresh frozen plasma if there are clotting abnormalities. Crystalloids should be given cautiously whilst awaiting blood. Do not over replace fluids; maintain blood pressure at about 120 mmHg systolic.
- Check clotting, FBC, U&Es and cross-match 6 units of blood.

- Arrange endoscopy with sclerotherapy. If bleeding is very profuse then obtain the help of an anaesthetist to sedate and protect the airway.
- If bleeding continues in spite of sclerotherapy and/or the patient is exsanguinating, pass a Sengstaken tube (see guidelines on the use of the Sengstaken tube).

Further treatment

- Transfer to Critical Care for intensive nursing care.
- Recheck clotting and correct any abnormalities with Blood/FFP/platelets and 10 mg of IV vitamin K, daily.
- Give omeprazole 20 mg bd (to prevent bleeding from sclerotherapy ulcers).
- Monitor and treat encephalopathy (lactulose +/- enemas).
- Arrange for further endoscopy and sclerotherapy to be performed.
- If bleeding continues in spite of 2-3 attempts at sclerotherapy and a total of 72 hours of balloon tamponade consider a TIPSS procedure (Discuss with Radiology Dept)

Insertion of a Sengstaken tube

- These should be positioned by someone experienced in their use.
- Ensure the tube is firm and cold (tubes must be kept in the freezer to keep them rigid).
- Inflate both balloons with air using a 50 ml syringe to ensure there are no leaks (gastric with 300-400 mls and oesophageal with 30-40 mls). Completely deflate the balloons with a sucker and then spigot or clamp).
- Lubricate the tube with lubricating gel.
- Anaesthetise the oropharynx with 10% Xylocaine spray and if the patient is agitated sedate with Diazemuls (2.5mg iv). If bleeding is very brisk, an anaesthetist should protect the airway from aspiration with a cuffed endotracheal tube and also help sedate the patient.
- With the patient in the left lateral position, place a mouth guard in the patients mouth to protect the tube and your fingers!
- Pass the tube over the back of the tongue guiding it with your fingers, ask the patient to swallow. If the tube buckles, insert a guidewire or endoscopic biopsy forceps down the gastric port (obtained from the endoscopy unit) to stiffen it, great care should be taken when attempting this (the tube can be placed nasally).
- Only when the tube has been passed to a level of 50cm + should attempts be made to inflate the gastric balloon, this is done using 300-400mls of air. A pressure of approx. 90mmHg should be achieved. If pain occurs whilst inflating the balloon, stop, and reposition the tube.
- The tube should be pulled back firmly and traction applied to the tube with two wooden spatulas being taped to it with the mouth guard in place or by hanging a 500 mls bag of saline from the end of the tube.
- A penetrated X-ray should be obtained to check the position of the gastric balloon which should look like an ‘avocado pear’ at the GOJ.

Maintaining the Sengstaken tube

- The gastric port is placed on free drainage and the oesophageal port on continual low suction.
- If oesophageal bleeding continues after 15 minutes of inflation of the gastric balloon (i.e. blood continues to come from the oesophageal port) inflate the oesophageal balloon to 30 mmHg using a 3-way tap and sphygmomanometer.

- If gastric aspiration continues with significant volume; check the balloon has not moved. Consider the possibility of gastric varices.
- Since some balloons may leak slowly, check the pressure in the oesophageal balloon every hour using the 3-way tap and sphygmomanometer, maintaining the pressure at 30 mmHg.
- To avoid pressure necrosis the oesophageal balloon should be deflated every 3 hours for 5 minutes. The oesophageal balloon should be deflated after 6-24 hours and the gastric balloon after 24 hours. The tube should be left in situ for another 6 hours in case of rebleeding, this occurs in 50% unless sclerotherapy is performed simultaneously. If rebleeding occurs re-inflate both balloons until haemostasis is achieved and re-attempt sclerotherapy.

This protocol has been prepared by the Gastroenterologists as general guidelines for the management of acute upper GI bleeds.