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REFERENCES

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FOCUS ON ENTERAL FEEDING

Enteral feeding (EF) refers to the delivery of a nutritionally complete feed containing protein, carbohydrate, fat, water, minerals and vitamins, directly into the stomach, duodenum or jejunum. This article gives an overview of EF, looking at routes for feeding and administration of feeds.

Much research has shown that malnutrition is common in UK adults - both in community and in hospital settings increasing morbidity and mortality.^{1,2,3} It is well known that patients who are undernourished are at a greater risk of impaired immunity and wound healing, along with an increased risk of infections.¹ These individuals cope less well with surgical and medical interventions and as a result, their hospital stay is increased by as much as five days, compared to those well-nourished.^{2,3} This in turn results in greater costs for the NHS. Therefore, it is vital that all hospitals provide their patients with adequate nutrition.

EF plays a fundamental role in the clinical management of patients who cannot meet their nutritional requirements via oral diet and are, therefore, at risk of being undernourished.⁴ There are various reasons why EF may be indicated, these include; lack of appetite and inability to tolerate oral nutritional supplements, poor swallow, anorexia, neurological conditions, disorders of the gut, surgery which has removed part of the gastrointestinal tract, hypermetabolic conditions such as burns and severe infections, which greatly increase a patients' nutritional requirements,⁵ and those critically unwell.

Before a decision is made to commence EF, it should be discussed with the patient, their family and the multidisciplinary team (MDT), where a dietitian should always be included. Patients must consent to EF before it

is commenced. For patients who are lacking capacity, their welfare power of attorney can make the decision on their behalf. If the incapacitated individual has not appointed a power of attorney, then the doctor involved in patient care is responsible for making any decision to start, stop, or withhold medical treatment, including EF once it is in the patient's best interest. If an illness is regarded as being in a terminal phase and the medical plan is to provide only compassionate and palliative care, ethical considerations indicate that EF should only be given to alleviate symptoms.⁶ Therefore, it should not be used to prolong survival. In cases where there is an element of doubt; a 'trial period' should be agreed on.

ROUTES FOR FEEDING

Nasogastric (NG) feeding

Most EF is given via NG tubes which feed into the stomach. Feeding into the stomach should always be used unless there is indication to bypass the stomach. NG feeding permits hypertonic feeds, higher feed rates and bolus feeding. NG tubes can be placed on the wards by nursing or medical staff. The position of an NG tube should be confirmed every time before feeding or administering medications in order to reduce aspiration risk.⁷ This can be done by testing the pH of aspirate which should be <5.5 . If an aspirate cannot be obtained of a pH >5.5 , an x-ray should be undertaken to confirm positioning before feeding is commenced.⁷

Nasojejunal (NJ) feeding

NJ feeding is appropriate for patients with recurrent vomiting and/or tube feeding-related aspiration, gastric reflux, gastroparesis, gastric outlet obstruction, or total, or partial gastrectomy.⁸ It could also be used in unconscious patients who need to be nursed flat as it reduces aspiration risk, but not completely.⁹

Percutaneous gastrostomy (PEG) feeding

PEG feeding involves directly inserting a gastrostomy tube through the abdominal wall. The most common procedures are either endoscopic or radiological, using sedation and local anaesthetic. PEG feeding should be considered for patients who are likely to require enteral nutrition for longer than four to six weeks and who have a functional gastrointestinal tract.⁶ Benefits of PEG feeding include the fact that it is discrete and can go unnoticed, it is better tolerated than NG feeding, it has a lower risk of aspiration in those with swallowing difficulties and patients generally receive more of their feed from this method, therefore aiding nutritional status.⁶

Before a PEG procedure takes place, a pre-PEG assessment should be completed by the hospital nutrition team. This assessment considers if the patient is able to withstand the invasive nature of PEG-placement, use of anaesthesia, possible procedure complications and if the patient will tolerate the PEG post-insertion. For example, some patients, such as those with neurological conditions, may find the PEG distressing and can pull at it, or even pull it out.

If required, a PEG tube can have a jejunal extension added to it to feed directly into the jejunum for the same reasons as an NJ tube would be indicated.

PEG placement has associated risks and complications, including formation of gastrocolic fistula, especially in IBD patients who are in the active stage of their disease.¹⁰ Gastric outlet obstruction, wound infections, peritonitis and leaking at the peristomal site, skin ulceration and tube degradation are also contraindications which can occur.¹¹ There is also the risk of buried bumper syndrome (when the internal bumper of the PEG tube gets buried into the gastric or abdominal wall).¹²

If indicated, PEG tubes can be removed. This is a relatively easy procedure which can be carried out endoscopically, or by cutting off fixation devices and pushing the remaining device into the stomach which could be passed.¹⁰

PARENTERAL NUTRITION (PN)

Sometimes, EF is not appropriate and PN is indicated. PN bypasses normal digestion in the stomach and bowel. It is administered into the blood through an intravenous catheter. PN contains protein, carbohydrates fats, vitamins and minerals. PN can be given solely or supplementary to oral intake to meet nutritional requirements. Some diseases and conditions where PN is indicated include, but are not limited to, short bowel syndrome, high output fistulas, intestinal failure, bowel obstruction and severe acute pancreatitis.¹³ Some patients may require this therapy for a short time and there are other patients who have received PN at home for a lifetime.

HOME ENTERAL FEEDING (HEF)

The number of people receiving HEF is on the rise, especially in the UK which has shown a 42% rise in the number of people receiving HEF in a 10-year period.¹⁸ This may be due to a combination of reasons, including the fact that people are living for longer and a shift in care provisions from acute to community settings.¹⁰ Much research has shown that HEF can improve clinical outcomes and decrease healthcare costs via weight gain, improved nutritional status, reduced infections and a lower number of hospital admissions.^{19,20,21} However, we must not forget that the thought of HEF can be frightening for the patient, their family and any carers involved and much consideration should be made before deciding on HEF.

Prior to discharge, planning arrangements should be discussed between the acute dietitian and the HEF dietitian, nutrition nurse, carers, district nurses and family. Adequate training on the feeding pump should be given to anyone who may be involved in the delivery of HEF to ensure safe practice. The patient should always be included in any planning and they should be made aware of what HEF will involve on a

daily basis. Any concerns or questions that the patient or carers have ought be considered and answered by the MDT.

ADMINISTERING MEDICATIONS

Another benefit of EF is the ability to administer medications via the tube. Drugs should always be changed to liquid form before administering, as tablets are known to get stuck in the tube and cause blockage. Various considerations must be made before giving medications via an EF tube. This includes the fact that not all drugs are suitable to be given via enteral tubes. In order for the drug to have bioavailability, it must be delivered to the correct location of the gastrointestinal tract. For example, if a drug designed for absorption in the stomach is placed directly into the jejunum, this may compromise its overall effect.

As dietitians, we must also consider that enteral feeds may interact with some drugs and negatively impact on their absorption. For example, an enteral feed should be stopped for two hours before phenytoin is administered and for two hours afterwards.¹⁴ This may require the feed timing to be altered around the medication administration, e.g. overnight feeding may be more appropriate, or starting the feed later in the day after the drug has been given.

TYPES OF FEEDS

Much consideration should be made by the dietitian and MDT when deciding on what type of feed to administer. This includes considering the patient's nutritional requirements, diarrhoea, disorders of the gastrointestinal tract, motility issues and diseases such as kidney disease.

Polymeric

Polymeric feeds (what we call standard feeds) contain nitrogen as their protein source. These feeds vary in carbohydrates, protein, fat, vitamins, minerals and fibre. They are suitable for those with a normal functioning bowel. The complex carbohydrate source is partially hydrolysed starch and they contain long-chain triglycerides (LCTs). The energy provided in these feeds can range from 0.5kcal/ml to 2kcal/ml, which are more suitable for those with high energy requirements.

Elemental

Elemental feeds contain individual amino acids, or pre-digested protein and are low in fat, especially LCTs. Carbohydrate is the main energy source. As these feeds are low in LCTs, but have a higher concentration of medium chain triglycerides (MCTs), they are thought to require minimal effort from the digestive system and reduced stimulation from the pancreas. MCTs have the added benefit that they can be absorbed in the absence of lipase.¹⁵ These feeds are, therefore, beneficial to those who present with malabsorptive or maldigestive issues such as pancreatic disease or short bowel syndrome.¹⁵ However, it should be remembered that these feeds are more expensive than polymeric feeds and should only be used when indicated.

Disease specific

These feeds are generally used in patients who are acutely unwell, including those with organ failure, acute renal failure, respiratory failure, or multiple burns. Research has shown that enteral feeds supplemented with EPA and DHA were advantageous in preserving lean body mass (LBM) compared to standard feeds in those with head, neck and oesophageal cancer.^{16,17} Enteral feeds which have modified amounts of fluid, protein and electrolytes may be used in those with renal failure.¹⁰

MONITORING

As dietitians, part of our role is to monitor patients who are receiving enteral feed. Each patient will be individual as to how closely they require monitoring depending on their tolerance of the feed, changes in medications, ability to meet their nutritional requirements, weight and changes in their clinical condition. However, patients should be closely monitored until they are tolerating their enteral feed with nil issues, weight is steady and they are meeting their nutritional requirements as planned.

When a dietitian is reviewing an EF patient, they will investigate how much nutrition the patient is receiving from their feed and what percentage of their requirements they are meeting. They will also determine fluid balance, any losses (e.g. diarrhoea, stoma output, vomiting), biochemistry markers including

hydration status and refeeding markers, if the nutritional requirements or clinical picture has changed since feeding was commenced in addition to early discovery of any side-effects. Body weight should also be checked, at least weekly.

STOPPING ENTERAL FEEDING

It may be decided that EF should be stopped as it is no longer indicated. This may be for various reasons, including that appetite/oral intake has improved and the patient can now meet their nutritional requirements via diet alone. Other reasons include improved swallow, gastrointestinal function has reoccurred, or the patient's overall clinical condition is much better.

If patients are transferring from enteral feed to oral diet +/- oral nutritional supplements, this process should be closely monitored by the dietitian and MDT to reduce nutritional risk. Other circumstances where EF may be stopped include that it is showing no benefit to the patient, or the patient's clinical condition may have deteriorated and they require palliative care. In this case, the continuation of EF would not be in the patient's best interest. Alternatively,

the patient or their family may request EF to be stopped. Regardless of the reason for stopping EF, it should always be discussed with the consultant looking after the patient and the wider MDT should be involved too.

CONCLUSIONS

Overall, EF and HEF can provide many benefits to the individual, including improved clinical outcomes, preservation of LBM, increased recovery and reduced hospital stay. However, EF should only be commenced when it is in the patient's best interests and much consideration should take place around the patient's and family's opinion, possible contraindications, ethical considerations, what we are looking to achieve from feeding, the length of feeding time, most suitable feeding route and most appropriate type of feed to use.

Close monitoring from the dietitian is necessary, particularly when feeding is first commenced. Patients who require HEF should be made aware of what is involved with feeding on a daily basis and the MDT should ensure all members of the family and carers receive adequate pump training prior to discharge to allow the continuation of safe care at home.



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