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Introduction

Feeding of patients with head injury can be a challenge as a result of the various neurological effects caused by damage. Head injury can be defined as any injury to the scalp, skull or brain (Smeltzer et.al, 2008). After a head injury, the patient may have problems with swallowing and this may compromise the patient's nutritional status and as a result of this, the patient may require a feeding tube in order to meet his nutritional needs. Various feeding options have been devised to help feed patients with head injury. In Norway, one such method of feeding used in patients with head injury is a percutaneous endoscopic gastrostomy tube (PEG). A percutaneous endoscopic gastrostomy is an endoscopic procedure for inserting a feeding tube into the stomach in order to provide long-term nutritional support (Smeltzer et.al, 2008).

The writer of this essay had an opportunity to practice in the neurological ward at a Central Hospital in Norway for six weeks and had a privilege of nursing a patient with head injury who had a PEG. The author chose to write on this topic so as to have a clear insight of what a PEG is and find out its benefits as compared to a naso-gastric tube which is commonly used for feeding head injury patients in Zambia. In order to effectively discuss the topic, the write up has been divided into subheadings as follows: description of a PEG, different types of PEG, types of feeds given to patients with a PEG and the nursing care of a patient with a PEG. The write up also highlights the advantages and disadvantages of using a PEG as compared to a naso-gastric tube which is commonly used in Zambia. Is the use of a PEG possible in Zambia's hospital set up? Is it cost effective? Thereafter, a conclusion will be drawn and recommendations made.

Description of a PEG

A percutaneous endoscopic gastrostomy is a procedure for placing a feeding tube directly into the stomach through a small incision in the abdominal wall using an instrument known as an endoscope (Delegge & Kalmin, 2011). This procedure can be done in a hospital or at an outpatient surgical facility and takes about half an hour to be completed. Insertion of a PEG requires the services of two physicians. After administering a local anesthetic, one physician inserts a cannula into the stomach through an abdominal incision and threads a non-absorbable suture through the cannula; the second physician inserts an endoscope via the patient's upper gastrointestinal tract and uses the endoscopic snare to grasp the end of the suture and guide it up through the

patient's mouth. The attached PEG tube is guided down the esophagus, into the stomach and out through the abdominal incision (Smeltzer et al, 2008). The physician makes a small incision in the skin of the abdomen over the stomach and pushes a needle through the skin and into the stomach and a tube for feeding then is pushed through the needle and into the stomach. Once inserted, feeds can be given through the tube within 24 hours (Marks, 2010).

This procedure is performed as a means of providing nutrition to patients who cannot take food by mouth. The sole purpose of a PEG is to provide fluids and nutrition directly into the stomach. Patients who have difficulty swallowing, problems with their appetite or inability to take adequate nutrition through the mouth can benefit from this procedure (Marks, 2010). This includes those with neurological disorders such as stroke, brain injury and impaired swallowing. In addition, patients who have trauma, cancer, or recent surgery of the upper gastrointestinal or the respiratory tract may require this procedure to maintain their nutrition intake (Gaurav, 2011). A PEG tube is usually preferred for prolonged enteral nutrition support longer than one month (Smeltzer et al, 2008).

On the other hand, nasogastric feeding is also used for enteral tube feeding and is suitable for short-term feeding usually 2-4 weeks (Dougherty & Lister, 2008). A nasogastric (NG) tube is a tube that is passed through the nose and down through the naso- pharynx and esophagus into the stomach (Sheil, 2008). With an NG tube, the patient should be placed comfortably in an upright position. A thin, flexible tube is gently inserted into the patient's nostril, down into the throat through the esophagus and into the stomach. After, inserting the NG tube, it is important to check if it is correctly positioned in the stomach and this can be done by aspirating some gastric content from the tube using a syringe. Since the stomach is acidic, fluid drawn out from the tube is tested for acidity with a pH indicator to show whether or not the tube is in the stomach i.e. if the tube is in the stomach, gastric acid makes litmus paper change color from blue to red. Sometimes an x-ray may be necessary to make sure that the NG tube is correctly placed in the stomach. Once the tube is correctly positioned it should be taped to the patient's nose or cheek to keep it in place (Dougherty & Lister, 2008).

Types of PEG

There are different types of PEG tubes used for feeding patients. However, the most commonly used are the catheter and button. The PEG catheter has a mushroom-like tip that holds the tube in place whilst in the stomach and some thread or "suture" material is usually wrapped around the tube and stitched to the skin around the gastrostomy to keep it in place. This type of PEG tube can be left in place for about two to four weeks and thereafter be replaced by another device as it is temporal. The PEG catheter is about 6 to 8 inches long outside the body (Bishop & Shelley, 2008).

The other type of PEG tube is the button which is only half an inch past the skin level and so it is not noticeable under the skin. The two commonly used buttons are the Bard and Medical Innovations Corporation (MIC). Both buttons serve the same function and the only difference between them is the internal part of the button. The Bard button has a dome-like shape on the inside whereas the MIC button has a balloon that is inflated with water after it is placed in the stomach. Both buttons have feeding tubes that connect to the button when feeding the patient and are removed after feeding. Both buttons have a valve on the inside that prevents stomach contents from coming out through the button even when it is open. The Bard button feeding tube fits securely but does not lock in place where as the MIC button has a locking mechanism that prevents accidental removal of the feeding tube during feeding. Because the balloon can be deflated, the button is easy to remove and replace with a new one. A Bard button will generally need to be changed every 6-12 months and may last 3-4 years where as MIC buttons may be replaced every 4-6 months (Bishop & Shelley, 2008).

Types of feeds given to patients with a PEG

There are different types of feeds which are given to patients according to their medical conditions. For example, a patient with diabetes mellitus may be given special feeds with low glucose to help control the blood glucose levels as compared to a patient with a normal diet. After a PEG feeding tube is placed, a registered dietitian, nurse or physician who specializes in nutrition should assess the patient to determine his nutritional needs; this means the amount of calories, protein, and fluids that will be necessary each day, as well as the most appropriate nutritional formula. Nutritional products designed for tube feeding are formulated to provide all the nutrients the patient will need including vitamins, and minerals (Delegge & Kalmin, 2011). The patient can

be given standard feeds which are generally 1kcal/ml, with higher energy alternatives (1.2 or 1.5kcal/ml) for those patients who need more calories in a shorter period of time, or those who do not tolerate large volumes. There are also fibre-containing feeds which help when the patient has both diarrhea and constipation (Collier, 1999).

Nursing care of a patient with a PEG

Nursing care of a patient with is a PEG is a very important aspect which should not be overlooked because if infection sets in, there can be serious complications on the patient. It is therefore, imperative for the nurse to set goals and have a plan of care for the patient. Before undertaking any actions the nurse should always ensure that hands are washed before and after caring for a patient with a PEG tube so as to prevent transmission of infection to and from the patient (Department of Children's Services, 2010). The area around the tube (stoma site) may experience a discharge within the first few days after the abdominal incision and as a result of this, daily cleaning of the stoma site and tube is vital in order to reduce the possibility of soreness or infections. It is also important for the nurse to ensure that the skin around the PEG tube is washed with water and soap on a daily basis and any encrustation should be removed with saline solution (Smeltzer et al, 2008). The PEG tube site should be rinsed well with water and kept dry. The use of cream or powder on the skin around the tube should be discouraged as this can damage the tube material and may lead to irritation of the skin and give rise to infection (Department of Children's Services, 2010). A small dressing should be applied over the tube insertion site so as to protect the skin around the incision from seepage of gastric acid and spillage of feeds. The skin around the tube should be evaluated daily for signs of breakdown, irritation, excoriation and the presence of drainage or gastric leakage. It is also the responsibility of the nurse to encourage the patient and the family to participate in this evaluation and in hygiene activities (Smeltzer et al, 2008). If the skin around the PEG becomes red or inflamed and there is pus discharge, it is important to notify the doctor or a member of the gastrostomy care team. The PEG tube should be rotated daily if there are no stitches holding it in place to prevent adherence to the sides of track and also to help decrease pressure on the skin under the bumper (Anderson et al, 2011). Moreover, rotation of the Peg tube helps prevent the `Buried Bumper Syndrome´ which means that the internal disk of the PEG becomes buried in the stomach wall and stomach lining grows over it. Rotation of the

PEG tube means pushing the tube into the stomach, rotating it 360 degrees (a complete circle) and then returning it to its normal position (Department of Children's Services, 2010).

In order to ensure that the nutritional needs of the patient are met, it is imperative for the nurse to adhere to the feeding regime devised by the dietician and the gastrostomy team. Commercial tube feeding formula should be administered at room temperature and the patient should be upright (no less than thirty degrees) to minimize the risk of regurgitation and potential aspiration (tube feeding getting into the lungs). After feeding, the patient should be kept upright for thirty minutes to prevent complications such as abdominal cramping, nausea and vomiting, bloating and aspiration (Delegge & Kalmin, 2011). Tube feeding should be infused slowly. The simplest method of infusing tube feeding through the PEG tube is called bolus feeding where tube feed formula is placed within a large syringe and slowly administered to the patient through the plug cap on the end of the PEG feeding tube. The patient should be fed 4-6 times per day and a minimum of 20mls of water should be flushed in the PEG tube before and after each feed to maintain patency (Delegge & Kalmin, 2011).

The nurse should also communicate to the patient and family about the care of the PEG and anything that the patient wishes to know concerning his care so as to help the patient accept and be able to cope with the expected changes (Smeltzer, et.al, 2008).

ANALYSIS

Advantages of using a PEG tube for feeding as compared to a nasogastric tube

According to James et al, (2001) a PEG tube can be used for long-term feeding (more than 6 months) as compared to the NG tube which can be used for short-term feeding, usually one month. Most patients with head injury may take time to recover and regain their swallowing ability and in such instances a PEG tube would be ideal. Warlow et al, 2001 noted that a PEG tube gives the patient ability for increased mobility as it can be hidden under the clothing and this in-turn may help boost patient's morale. This is not the case with an NG tube which is visible on the patient's nostril and because of this; the patient becomes self-conscious due to appearance of the tube and this may make the patient have a negative attitude towards self and others.

Furthermore, Warlow et al, (2001) found out that a PEG tube cannot be easily displaced as is the case with an NG tube which can be easily pulled out by the patient and this may pose a danger to the patient as the NG tube can dislodge in the airway and consequently cause airway obstruction. A PEG tube promotes patient comfort as it is connected directly to the stomach unlike the NG tube which passes through the nose, nasal-pharynx and esophagus into the stomach. An NG tube may become uncomfortable to the patient especially after using it for an extended period of time. In a study done by Pearce and Duncan in 2002, it was noted that the nasogastric tube is uncomfortable for most patients as it is usually tolerated for a week or two. Longer than this, the patient may pull it out at every opportunity. Some patients prefer to die rather than have the NG tube re-inserted, an indication of the great discomfort the NG tube can cause. Hand restrainers can be used to keep the NG tube in place but the resultant immobility creates additional problems, such as depression, osteoporosis, contractures and pressure sores.

James et al, (2001) also found out that a PEG tube promotes comfort to the patient unlike the NG tube which causes nasal irritation which may later result into sinusitis. A PEG tube has a large bore tube which reduces the risk of tube occlusion and also has a larger reservoir capacity in stomach thus all the feeds go directly into the stomach. With a PEG tube, there is a lesser risk of aspiration as compared to an NG tube were the patient is at a higher risk of aspiration and this may later cause pulmonary aspiration which can complicate into pneumonia. Since the PEG tube is connected directly to the stomach it does not interfere with swallowing as is the case with the NG tube. In addition, formula is easier to deliver through a PEG tube as it often uses gravity (Bolus) feedings which is difficult with the NG tube and so often requires a pump for thick feedings. Risk of reflux and aspiration may be increased by having a tube pass through the gastro-esophageal sphincter all the time (Samour, 1999). PEG tubes are preferred over nasogastric tube feeding in patients who are comatose because the gastro-esophageal sphincter remains intact. Regurgitation and aspiration are less likely to occur with a PEG tube than with an NG tube (Smeltzer et al, 2008).

Disadvantages of using a PEG as compared to a nasogastric tube

Although more comfortable than an NG tube, the PEG is the significantly riskier and costlier option. There is a tendency to compensate by changing the PEG every six

months or longer. This is unhygienic, because the tube becomes quite dirty after a month, especially around its luminal surface (Dautle et al, 2002). Furthermore, Warlow et al, (2001) found out that PEG tube insertion is an expensive procedure as compared to a nasogastric tube which is cheap and widely available. A PEG tube is considered to be an expensive procedure as its insertion and removal requires services of a skilled and specialized health personnel such a surgeon or gastroenterologist, this is not the case with an NG tube which can be inserted by a nurse. In addition, there is also need to have equipment to use such as an endoscope which is an expensive piece of equipment. PEG tube insertion requires a minor surgical incision which may later on became inflamed, sore or infected and this is not the case with an NG tube as there is no surgery required to insert the tube (Abby, 2010).

According to James et al, (2001) it was noted that with a PEG tube, there was an increased risk of infection around the incision site as compared to an NG tube. With a PEG tube the patient has a high potential of having skin excoriation due to the leakages of digestive secretions at stoma site. Therefore, there is need for constant monitoring of the stoma site and proper wound care. If not cared for adequately, a patient with a PEG may have peritonitis which may necessitate surgical intervention. Moreover, if the PEG tube is pulled out accidentally by the patient or caregiver during bathing, dressing, moving or exercising, a slipped PEG within two weeks of insertion can give rise to peritonitis which is always a medical emergency and requires urgent attention. After the stoma has matured, a slipped PEG must also be attended to urgently because the stoma can close within several hours. Another major drawback is that the PEG cannot be changed easily. The change is sometimes quite difficult, requiring check endoscopy or radiography before the new PEG can be safely used. Hence, the change is usually done by a specialist in a hospital setting (Pearce & Duncan, 2002).

People who use PEG tubes may also find it more difficult to resume normal feeding compared with those who use nasogastric tubes. This may be because the convenience of PEG tubes means people who use them are less willing to carry out swallowing exercises and dietary changes compared to people who use nasogastric tubes (National Health Service, 2011). In a study done by Delegge & Kalmin (2011) it was noted that after removal of a PEG tube patients usually experienced transient stinging and burning

at the incision site. Rombeau & Rolandeli (1997) also noted that after removal of PEG tube, there was a danger of the patient having a fistula.

Is the use of a PEG possible in Zambia's hospital set up?

Zambia's hospital set up is divided into three categories namely; Level 1hospitals at District level also known as the primary level hospital, Level 2 hospitals at Provincial level also referred to as secondary hospitals and Level 3 hospitals also referred to tertiary hospitals at the Central level (Republic of Zambia, 2011). The intensity of care also differs as the hospital level changes. The referral system also comes in as soon as these levels of care are adhered to. In Zambia, the highest national referral hospital is the University Teaching Hospital (UTH) which is located in the nation's capital Lusaka. Being the only national tertiary referral hospital in Zambia, UTH offers a number of specialist services among which is endoscopy done in the department of surgery (University Teaching Hospital, 2011). Despite having an endoscope at UTH, there was no information regarding PEG tube insertion and to the author this meant that this procedure was not done in Zambia and hence the need to have it considered in future. Is it possible for the PEG procedure to be done in Zambia? Zambia being a developing nation lacks financial resources in the delivery of health care services and thus gets support from its cooperating partners and donors in order to meet the health care needs of the Zambian population. Despite, the many challenges the Zambian health care system may face, with good planning the use of PEG for long-term patient feeding can be done and this would help meet the nutritional needs of patients who have difficulties with swallowing. Currently, the Ministry of Health in Zambia is working hard to ensure that hospitals have adequate and latest equipment. This can be seen from Ministry of Health's objective in the National Health and Strategic Plan on medical equipment which states "To significantly improve on the availability and condition of essential medical equipment and accessories so as to ensure effective delivery of key health services" (Zambia National Health and Strategic Plan, 2005). Looking at this, it clearly shows that the Ministry of Health in Zambia is committed to improve the provision of healthcare services in Zambia and therefore can consider purchasing equipment such as endoscopes for all second level hospitals in each province in the country.

In order to have the PEG tube insertion procedure introduced and implemented in Zambia, it would be important to orient the surgeons and nurses on how the procedure

is done, types of feeds to give the patient and how to care for a patient with a PEG tube. In addition, nurses need to take an active role of educating caregivers, patients and their relatives. In order for the nurses to take up this role, they need to be well knowledgeable and updated with latest information. According to Jacqueline & Kathy, 2006, nurses have a role of educating the patient on the PEG; its placement and removal and the need for good follow-up in order to avoid complications.

Looking at the Zambian set up, it would be ideal to educate the patient and family on the type of feeds, care of the PEG tube, how to live with a PEG tube and its complications. The importance of maintaining high standards of personal hygiene, cleaning and changing the PEG tube when dirty should be emphasized both to the patient and family as any infection on the stoma site may lead to serious complications such as peritonitis. Whether the PEG tube insertion procedure was done while the patient was in hospital or at the outpatient department, follow-up of patients should be done and this can be attained by referring the patients to the nearest health clinic for continuity of care. Patients should also be told the need to seek prompt medical attention should there be any queries or problems regarding the PEG tube.

Is the use of a PEG cost effective in the Zambian hospital set up?

Looking at how a PEG tube insertion is done and the type of equipment that is required to perform the procedure, it is an expensive procedure. Despite PEG tube insertion being an expensive procedure, it is a procedure that the Zambian health care system should consider introducing at all second level hospitals. This is because the procedure is worthwhile and aims at promoting the nutritional status of patients who have difficulties with swallowing and require long-term feeding as is the case with head injury patients. PEG tube procedure not only improves the patient's nutritional status but also improves wellbeing as it is comfortable to the patient (James et al, 2001).

Conclusion

Percutaneous endoscopic gastrostomy is an endoscopic procedure for inserting a feeding tube into the stomach in order to provide long-term nutritional support (Smeltzer et.al, 2008). This procedure is done so that the nutritional needs of the patient are met and is usually indicated for long-term patient feeding such as those with head injury.

There were a few studies done on the use of PEG tube feeding in Southern Africa. With regard to Zambia, there was no information available regarding the use of a PEG and this is evidence enough to show that very little has been done concerning the use of PEG tubes in Zambia and hence the need to consider it.

From the author's point of view, PEG tube feeding is a good method of feeding as it is comfortable to the patient and enables the patient to meet his nutritional needs. Moreover, this method of feeding enables the patient to move freely and thus boost the patient's self-esteem and is well tolerated by the patient (Warlow et al, 2001). Therefore, this method of feeding should be considered in Zambia as it not only helps the patient maintain his nutritional status but also promotes the patients self-esteem and wellbeing.

Despite the many challenges faced by the Zambia's healthcare system, I strongly feel it is possible for the Government of the Republic of Zambia through the Ministry of Health to consider introducing the use of a PEG tube for long-term feeding in patients who have difficulties with swallowing such as patients with head injury.

Recommendations

To the Norwegian set up

- Nurses should not relent in cleaning the PEG tube while patient is still under their care as the stoma site can become infected.

The Government of the Republic of Zambia through the Ministry of Health should consider doing the following:

- Provide specialized training for nurses and doctors at all levels of care with skills on how to manage patients with a percutaneous endoscopic gastrostomy.
- Purchase necessary equipment such as endoscopes including all the medical and surgical supplies needed to perform the PEG tube insertion at all second level hospitals in Zambia
- Sensitize communities and the nation at large by disseminating information on the various feeding options available through health education given by the health workers, local drama groups, local radio stations, Television, and leaflets which should be printed in English and the common local languages.

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