Cost effective oesophageal intubation

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Carcinoma of the oesophagus presents a multitude of challenges of patient care in Africa. The majority of patients present with very advanced manifestations of the disease. The treatment options are usually few and limited to palliation. Placement of an endoprosthetic tube is one method which is commonly undertaken and very often provides satisfactory palliation, with restoration of swallowing.

Introduction

Standard endoprostheses are expensive and cost between 40-80 US Dollars. When related to the National Health Budget of 4-5 US Dollars per person per year, the cost is prohibitive and unaffordable for most developing countries where the disease is on the rise[4].

Since 1987 a locally manufactured tube of the traction prototype has been used in Mulago Hospital. It is called the Mulago Tube. It is made from a plastic hosepipe, and a nasogatric tube and is introduced using the standard operative technique for a traction tube.

The manufacture of the tube and its clinical performance was studied by comparing the complications seen when it was used to the complications of standard tubes recorded in the literature.

Manufacture of oesophageal tube.

Polychlorovinyl colourless hosepipes of internal diameter sizes ¾ or ½ inch were used. . Pieces 25cm long were cut from a roll of hosepipe. The distal end was bevelled using a surgical blade or scissors so that the cut edges could be wrapped around a nasogastric tube whose function was that of a pilot guide. Strong sutures were used to stitch the nasogastric tube in place. The tube was immersed in hot water and then the proximal end was flanged by applying an inverted bottle end and firmly pressing its shoulders against the mouth of the tube. Subsequently it was allowed to cool to room temperature. The rough edges on the tube were smoothed by applying a naked candle flame followed by moulding while still hot. The manufacture could be undertaken in theatre.

Patients amd methods

Patients presenting with advanced carcinoma were studied. The diagnosis was made from Barium swallow, oesphagoscopy and tissue biopsy. Patients with complete obstruction on Barium swallow were included. The tumours of the mid and lower third of the oesophagus were the only ones intubated.

Standard preparations of the patient were undertaken pre-operatively. An upper midline laparotomy incision was used. The standard techniques for traction tube placement were used,

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with an ante-grade or retrograde approach for traction. In the latter cases railroading was done. Following placement, the tube was anchored with one or two stitches through the tube and the abdominal oesophagus.

Results

Thirty-four patients were intubated during a twenty-four month study period (1988-1990). Eighteen were males. The mean age was 59 years with a range of 45-74 years. Twenty-eight of the tumours were squamous carcinomata

Table 1 details the complications encoutered during surgery. Tables 2 and 3 show the complications which occur which occur after surgery.

TABLE 1. Complications during intubation

Complications	Cases	%
Perforation	1	6
False passage	1	6
Retrograde intubation	8	44
Gastric spillage	8	44
100		

TABLE 2. Complications in the immediate post-operative period

Complications	Cases	%
Oro-pharyngeal pain	12	32
Neck pain	8	21
Pain swallowing	5	13
Chest discomfort	13	34
TOTAL	38	100

Failed antegrade intubation and gastric spillage were the commonest intraoperative complications, while perforation was the most serious.

Chest discomfort and oro-pharyngeal pain were the most common early complications. Abdominal pain and Gastric reflux were the commonest complications.

TABLE 3. Complications secondary to tube placement

Complications	Cases	%
Hypostatic pneumonia	3	10
Gastric reflux	7	24
Lung infection	1	3
Back pain	0	0
Abdomen pain	10	34
Halitosis	2	7
Tube migration	5	17
Empyaema thoracis	1	3
TOTAL	29	100

TABLE 4: Deaths and timing

Time of Deaths	Cases	%
Intra-operatively	0	0
Two weeks post-operative	5	100
Four weeks post-operative	0	0
TOTAL	5	100

Five deaths were recorded during the first 30 days. These all occurred during the first two weeks. Aspiration causing respiratory complications was the cause in all the cases.

Discussion:

When compared to complications reported for standard oesophageal endoprosthetic tubes, there were no significant differences in the type, incidence and frequency seen. in our series[1,2,3]. We had anticipated an increase in the frequency of traumatic injury to the oro-pharyngo and oesophagus due to the inevitable design imperfections of the tube. This was confirmed by the study. The trauma was, however, of a minor nature and of no serious consequence to the patients. The distal end of the tube presented a manufacturing problem. The nasogastric tube had to be wrapped with near perfect apposition of the tube edges over it, ensuring that they did not overlap, and that they were well rounded off and smooth. This minimised sharp ends and prominences that would cause injuries during traction. Meticulous moulding was rewarding as it maximised the safety of the tube.

The only case of fatal oesophageal perforation occurred intra-operatively. Bagnolesi[1] in his series had none. As a perforation occurred once in thirty-four patients the risk was considered acceptable. The patient had a fungating tumour located at the cardia. Tumours at this location are difficult to intubate and are associated with an increased risk of perforation[1,2,3].

The immediate post-operative complications were caused, among other things, by the trauma that occurred during traction and were attributed to the distal end of the tube. These lesions were self-limiting suggesting that they were of minor nature. Analgesics and antibiotics adequately controlled the symptoms.

The presence of a permanent communication between the oesophagus and stomach is common to traction tubes. The resulting complications were expected to be similar to those reported by others. This was confirmed in this study. As the complications seen are caused by reflux of gastric contents, appropriate nursing care minimises them.

The 30 day mortality was high. Five of the thirty-four patients died. The deaths occurred within the first two weeks post-operatively suggesting that they were not directly related to the tube design but rather to gastric reflux complications following tube implantation. The deaths were preventable. This emphasises the need for appropriate nursing care as a key component of patient management. When implemented it reduced the mortality significantly. The overall surgical risk, and complications were similar to those in the literature[2,3]. The slight increase of the risk of perforation found in the study did not compromise its overall performance since in other aspects it compared favourably with standard tubes.

In a region where the per capita health budget is about five US Dollars per person, this tube balances favourably the cost vis-à-vis effectiveness of intubation. The advantages of the prosthesis are the wide availability and low cost. It costs about one US dollar compared to 40-80 US Dollars for the imported varieties. The tube can be made and assembled in the operating theatre and requires simple skills to accomplish.

In conclusion, because this tube can be made from available local materials and has shown favourable results when compared to other tubes, it provides a cost-effective way of treating carcinoma of the oesophagus.

References

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