

Challenges in the Management of Benign Oesophageal Strictures in Zambia

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Background: Benign Oesophageal structures are common in Zambia and pose great challenge in their management. Infants and children are more affected than adults. Conservative and surgical treatments have been deployed in this institute and each of these methods have their advantages and disadvantages.

Methods: Operative technique consisted of 32 adult patients (15.6%) using isoperistaltic transverse colonic segment the length of which can be extended from ascending to descending colon depending on the distance between lower thyroid cartilage and the stomach. The transverse colon was passed subcutaneously. The first stage was feeding colostomy, which was followed by definitive operation.

Results: Two hundred and five Zambia with benign oesophageal stricture caused by ingestion of corrosive substances were seen in a period of 20 years from 1985 to 2005 inclusive. The majority (84.4%) were Zambia infants aged below 3 years. The remaining 32 patients (15.6%) were adults aged from the ages of 15 to 64 years giving a mean age of 41 years. Corrosives were taken accidentally in 84.9% while in the remaining 31 (15.1%) drank corrosives in suicidal attempt. All the babies were treated conservatively using bouginage and gastrostomy. Five infants who came in irreversible shock died. The 32 (15.6%) had gastrostomy for feeding the patients with failed attempted bouginage and got anterior sternal transverse colon oesophageal replacement. Morbidity was high but mortality was nil. We found this operation suitable for third world countries since there was no need for parental feeds. The operation restored ability to take food orally in 80% as compared to 26% of patients with bouginage.

Conclusion: Confident vascularity depending on middle colic and left colic is guaranteed by low incidence of stenosis. The functional results are excellent as compared to minor complications which can be corrected early.

Introduction

Benign Oesophageal structures are common in Zambia and pose great challenge in their management. Infants and children are more affected than adults. Conservative and surgical treatments have been deployed in this institute and each of these methods has its advantages and disadvantages. This paper is based on our 20-year (1985 to 2005) experience in the management of benign oesophageal stricture.

Patients and Methods

Patients who came to hospital following ingestion of corrosive substances were admitted. Their treatment depended upon the seriousness of the case. Routinely every patient was put on intravenous drip of normal saline. The patient was kept nil by mouth for 72 hours, prophylactic antibiotics, given, and Hydrocortisone given three times a day. Strong analgesics were administered in order to keep the patients comfortable. On the 3rd day patients who had ingested corrosives were classified according to the degree of dysphagia as follows:

- **Type I:** Ability to swallow solids.
- **Type II:** Ability to swallow fluids only.
- **Type III:** Inability to swallow both fluids and solids.

Patients were treated as follows:

Type I: Patients were treated with prophylactic antibiotics Hydrocortisone, and analgesics, barium swallow was done after two weeks.

Type II: Were put on prophylactic antibiotics, Hydrocortisone, intravenous 5% glucose and strong analgesics. Food was given in fluid form and if no improvement, feeding gastrostomy was done under general anaesthesia after two weeks – this was followed by barium swallow which was done after a further two weeks.

Type III: Prophylactic antibiotics, analgesia, hydrocortisone were given. Then barium swallow was done after 2 weeks which was followed by gastrostomy.

Conservative Treatment

Patients who had dysphagia of solids but could drink water were treated by Bouginage and Feeding Gastrostomy which was made under general anaesthesia. Then the patient was given No. 1 silk to swallow. The end of the silk was hooked from the gastrostomy. Diagram I: Dilators were tied to the silk and regular dilatation was done under general anaesthesia on several occasions until the patient would begin taking fluids and later on solids. The gastrostomy was closed after successful clinical evaluation. Unsatisfactory functional evaluation of the Oesophageal dilatation was an indication for surgery.

Surgical Management for benign oesophageal strictures

Failed oesophageal dilatation was the only indication for replacing oesophagus with transverse colon. Under general anaesthesia two incisions were made:

- (i) A curved hockey-stick incision along the anterior border of the left Sternomastoid muscle extending up to the space of Burns. Proximal oesophagus was easily identified by passing a nasal gastric tube which was easily palpable. The left side of oesophagus was gently mobilized without compromising its blood supply.
- (ii) Midline incision skirting the umbilicus was done. A required length of colon from the stomach to the left side of oesophagus in the neck was estimated. The transverse colon was mobilized based on preservation of good blood supply to the colon confirmed by ensuring that the colonic vascular arcade was pulsating. This could visually be seen and palpitated between the fingers. The middle colic and the left colic arteries were identified and confirmed by transillumination of the mesocolon.

The whole operation was based on getting blood supply from middle colic and left colic arteries. Good supply to the transverse colon was confirmed by temporary closure of the middle artery, then followed by right colic, and lastly by closing right ileocolic using Bulldock arterial clumps for fifteen to

twenty minutes, leaving left colic arteries supplying the whole transverse colon. The blood supply to the whole transverse colon was visibly seen and palpably felt to be adequate. Despite of this, the middle colic artery was left intact in addition to the left colic artery. The ascending colon and the transverse colon were both long enough to reach the thyroid notch without any tension.

The right colic and ileocolic arteries were ligated with No. 2 silk and cut thus allowing the whole ascending and transverse colon to be used as oesophageal replacement. All 33 patients had transferred colic segment based on middle and left colonic arteries. Retention of middle colic artery did not restrict the mobility of colonic transfer; and therefore it was not considered necessary to ligate it.

Subcutaneous tunnel was made lateral to the sternum from the abdomen up to the neck. The tunnel had to allow the whole hand move inside freely. The transverse colon, carrying middle colic and left colic arteries, was easily tunnelled subcutaneously using nylon No. 1 tied at its proximal end. After confirming by visualization and palpation of pulsation of marginal arcade of transverse colon side to side 10cm long anastomosis in two layers was carried out between the colon and the cervical oesophagus.

Patients were reviewed and reassessed postoperatively at 3 months and after 6 months. The functional results were according to the following criteria:

- (a) Excellent (asymptomatic)
- (b) Good patients with chewing problems
- (c) Fair able to take fluid feeds only
- (d) Poor – persistence of dysphasia to both solid and liquids.

Results

A total of 205 patients were seen in 20 years. They all had history of having ingested corrosive substance. There were 173 patients (84.4%) who were below the ages of 3 years.

The rest (15.6%) were adults with ages ranging from 15 to 64 years. Males accounted for 115 (56.1%) of cases. There were 90 (43.9%) were female giving a male to female ratio of 1.3 to 1. The ingestion of corrosives in children was accidental, while in adults it was either accidental or intentional (Table 1). Corrosives ingested included detergent soap, hair cream, JIK, Battery acid water, rat poison, paraffin, petrol and diesel. Four (4) patients (1.95%) who had salivary fistula closed spontaneously after three (3) to six months in all patients. One (1) patient (0.5%) had left recurrent laryngeal palsy following operation in the neck recovered in six (6) months.

Stenosis in the neck was one of our major problems. 51 patients (24.9%) required more than two operations. The 10cm side to side anastomosis was later converted end to end anastomosis between the colon and oesophagus and the dysphasia due to stenosis stopped.

Surgical procedure had no mortality the results were good compared to conservative treatment where there was mortality five (5) patient (2.4%) morbidity was high in both mode of treatment due to long stay in hospital.

Table 1. Causes of Ingestion of Corrosive Substances.

		%	M	%	F	%
Accident	174	84.9	103	50.2	71	34.6
Suicide	31	15.1	19	9.3	12	5.9
TOTAL	205	100%	122	59.5	83	40.5

Table 2. Complication Following Ingestion of Corrosives

A. Immediate Complication	Number of cases
Dysphagia	205
Pneumothorax	10
Intestinal obstruction	6
Bronchia Fistula	5
Salivary fistula	4
Burst abdomen	2
Left recurrent laryngeal nerve palsy	1
Death	5
B. Late complication	
Oesophagocolic stenosis	51
Dilatation of colon	3
Cologastric stenosis	-
Ventral hernia	1

Table 3. The functional results of all patients.

Functional Results	Bouginage		Surgery	
	No	%	No	%
Excellent	93	45.4	18	8.8
Good	35	17	10	4.9
Fair	30	14.6	4	1.9
Poor	10	4.9	-	-
Mortality	5	2.4	-	-
TOTAL	173	84.4	32	15.6

Discussion

Benign oesophageal strictures are common among Zambians. They occur following ingestion of corrosive substances. The highest incidence is among infants below the age of three (3) years when an infant would drink any substances left lying within their reach. Five (5) infants (2.4%) died in this age group. They came in shock which could not be treated. One wonders whether most of these babies in this age group who die from unexplained circumstance do so after ingestion of corrosive substances. The cause of death will continue not to be known as long as the parents of these patients decline post mortem in such a case in this part of the world. The child to child care syndrome which exists in most of the third world countries will continue to be responsible for most of unexplained infants' deaths since child guardians may be afraid to explain that the infants left in their custody drank corrosive substances.

Corrosive injuries of Oesophagus are the commonest causes of benign oesophageal strictures in both infants and adults in Zambian. The 26 Zambian (12.7%) adults took corrosive substances in order to commit suicide. While 6 adults (2.9%) drunk corrosives by accident, thinking it was cold water kept for drinking.

These strictures are very often, dense, long and multiple frequently requiring surgery. In developed institutions, skin tubes, gastric tubes small intestine, and prosthetic tubes have all been used as oesophageal substitutes^{1,2}. In our hands the use of transverse colon for

replacement of oesophagus has been found to have several advantages over other oesophageal substitutes^{3,4}. In this institution transverse colon seems to be ideal oesophageal substitute which provides complete relief from dysphasia in two stage operation with no significant mortality nor morbidity. In our hands we found distinct disadvantages when small intestines, and stomach were used^{8,10}. The stomach was found not to be ideal because in patients who had taken corrosive substance, the stomach is also frequently affected by the corrosive agents thus precluding its use for bypass^{5,6}.

Transverse colon in our hands remains the conduit of choice. Its is less bulky as compared to both ascending and descending colons. Transverse colon when used forms a good isoperistaltic conduit¹. The middle colic and left colic on which the oesophageal replacement is created have very few anatomic variations and form more consistent marginal vessels^{7,11}. When well mobilized these arteries give adequate length which will allow the transverse colon to reach the neck without compromising the blood supply to the transverse colon^{15,17}. The two arteries give adequate blood volume and pressure in such a way that we have not had any experience of necrosis in the transverse colon^{20,22}. The use of left colon as a substitute for oesophagus acted as an anti-peristaltic segment, which carried the risk of gastric acid regurgitation, and thus creating peptic colitis⁶. The worst disadvantage was that it provided short segment interposition graft which could not reach the neck¹⁹. However, both left colon

and right colon have been used by other Authors for short lower benign stricture bypass. And in patients with large defect tracheo-oesophageal fistula^{4,11}. The right column artery is short, one would therefore expect it to restrict the length of usable colon²³.

The current trend surgical treatment of corrosive oesophageal stricture does not mandate excision of oesophagus in spite the remote possibility of malignant changes^{12,14}. An attempt to remove the damaged oesophagus would be disastrous^{15,16}. This surgical procedure had several advantages, vascularity to the replacement conduit was excellent. The piece of colon selected has good length to replace the whole oesophagus¹⁷. The terminal ileum which is often rendered ischaemic due to ligation of ileocolic artery is excised and this has no long-term nutritional nor functional consequences were seen arising from the removal of terminal 10cm of ileum or ileocaecal valve²². The neck surgery has several advantages, the side to side anastomosis of colon and oesophagus overcomes the problem of disparity in sizes between the two conduits²¹. Closure of the terminal proximal end of the colon and a side to side oesophagocolonic anastomosis ensure that; the potentially ischaemic terminal end of the colon²², furthest from the vascular pedicle is not sutured to the oesophagus. Ischaemia of this segment has been reported to be the main cause of leak at this site⁶, which is often followed by stenosis on the anastomosis site^{6,16,18,20}.

In this study side to side anastomosis size of 10cm reduces the possibility of stenosis; tension free colo-oesophageal anastomosis. Two patients (1%) developed a fistula from the proximal blind end to the colon and not from the anastomosis. Both were treated by passing nasogastric tube for two weeks of feeding¹⁹.

Six patients (2.9%) showed delayed emptying in the colon conduit due to poor gastric outlet valve which was affected by ingested corrosives.

The operative functional results are excellent as compared to bouginage. Conservative treatment consisted of resuscitation keeping a patient well by mouth for not more than 2 weeks. Patients had dysphagia to solid feed ended up doing well. These eventually did well and had few bouginages based on signs and symptoms which were supported by Barium Swallow.

All infants below the age of 3 years were treated conservatively although their hospital stay

turned out to be long. The end results were good. An infant was allowed to swallow a silk No. 1 which was fished out from the gastrostomy – the silk was left in situ and the patient received weekly bouginages using the silk to pull the dilators. Fistula which resulted from this procedure was treated by temporary suspending the dilatation until the fistula had healer. Feeding had to continue through gastrostomy. The 32 adults in whom conservative treatment had failed were subjected to surgery. Gastrostomy was done in all patients who had dysphagia to fluid in a period of 2 weeks. These were later subjected to oesophagocoloplasty.

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