

# Thal-Hatafuku Oesophagoplasty: An Effective Option in the Palliation of Non-chagasic Megaesophagus

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## ABSTRACT

*The palliation of patients with megaesophagus secondary to achalasia of the cardia presents significant challenges to the surgeon. Experience with palliation of megaesophagus secondary to Chagas' disease suggests that options other than cardiomyotomy or oesophagectomy can result in satisfactory outcomes. A small series of patients with non-chagasic megaesophagus who were treated with a gastroesophagoplasty procedure is discussed.*

# La Esofagoplastia Thal-Hatafuku: una Opción Efectiva en la Paliación del Megaesófago no Chagásico

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## RESUMEN

*El alivio de pacientes con megaesófago secundario a la acalasia del cardias, presenta desafíos significativos al cirujano. La experiencia con la paliación del megaesófago secundario a la enfermedad de Chagas, sugiere que otras opciones distintas de la cardiomiotomía o la esofagotomía pueden producir resultados satisfactorios. Se discute una serie pequeña de pacientes con megaesófago no chagásico, que fueron tratados con un procedimiento de gastroesofagoplastia.*

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## INTRODUCTION

The technique of creating a widely patent gastroesophageal junction with an intraluminal valve for the palliation of advanced achalasia was first proposed by Hatafuku, Maki and Thal in the early 1970s (1, 2). This procedure, the Thal-Hatafuku oesophagoplasty (THEG) was modified by Brazilian surgeons and has been extensively utilized in the palliation of megaesophagus secondary to Chagas' disease (3). The use of the THEG concept to treat advanced non-chagasic megaesophagus (NCM) did not become widely accepted, perhaps because of the relative rarity of megaesophagus as a presentation of achalasia in the developed world, and the prevailing belief that oesophagectomy represented the definitive treatment for megaesophagus following failed cardiomyotomy (4). At the University Hospital of the West Indies, (UHWI), Kingston, Jamaica, THEG has been

utilized to treat NCM in five patients with excellent clinical results. It is proposed that, based on the Brazilian experience with chagasic megaesophagus, and our preliminary experience with NCM, THEG should be given serious consideration as an alternative to cardiomyotomy or oesophagectomy in the palliation of NCM.

## METHODS

Beginning in September 2002, five consecutive patients presenting to the cardiothoracic surgical service of the UHWI with advanced NCM secondary to idiopathic achalasia were considered for THEG. Patients characteristics are summarized in Table 1. There were two males and three females, with an age range of 36 to 53 years (mean: 48.4 years). Three of the patients had undergone at least one prior procedure to palliate their condition, namely modified Heller's cardiomyotomy *via* laparotomy, and one of these patients had also undergone multiple endoscopic dilatation procedures utilizing general anaesthesia and Maloney dilators after his original Heller's procedure. The mean ( $\pm$  standard deviation) time from the last procedure (excluding dilatation) to the recurrence of symptoms in these patients was  $7.67 \pm 2.49$  years. The mean time from the original onset of symptoms of achalasia to presentation for THEG in

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all patients was  $15.2 \pm 2.14$  years. The time taken to develop the morphological features of megaesophagus could not be determined. Megaesophagus was diagnosed if the oesophageal diameter on contrast radiography exceeded five centimeters (two patients), or if the oesophagus had adopted a sigmoid shape on contrast studies (three patients). All patients were markedly symptomatic for dysphagia, regurgitation, excessive salivation, halitosis, weight loss and general malaise prior to undergoing surgery. Initially, THEG was performed as a salvage procedure in those patients for whom cardiomyotomy had failed to provide durable relief (patients 1, 2 and 3) but later was offered as the primary palliative modality when megaesophagus was deemed present (patients 4 and 5). In all patients, cardiomyotomy or oesophagectomy were also presented as therapeutic options in addition to THEG; no patient desired these alternative procedures over THEG. The decision to offer THEG as a therapeutic option was not randomized.

All procedures were conducted or supervised by either of two of the authors (PSR or RWI). The modified THEG was performed *via* upper midline laparotomy according to the method described by Ferraz *et al* (3). The gastroesophageal junction was opened longitudinally for approximately six centimetres on the oesophageal side, and two centimeters caudally onto the anterior gastric cardia. Stay sutures were placed on each side of the opening at the level of the junction and the oesophagogastrotomy made into a diamond-shaped opening, with superior and inferior margins. A mucosal rosette was then created by first suturing the anterior gastric surface to the inferior margin of the oesophagogastrotomy, and then invaginating this suture line into the lumen of the stomach by folding the gastric corpus over to the superior margin and suturing it there with interrupted polydioxanone sulphate sutures, with a 40-French Maloney dilator in place to ensure an adequate gastroesophageal junction lumen. In this manner, a generous intra-luminal valve was created which acts to prevent gastroesophageal reflux, but is patulous and allows the oesophagus to drain by gravity (Figs. 1– 4). In the first four patients, a Witzel jejunostomy was sited for early postoperative alimentation; the fifth patient, who underwent THEG as a primary procedure, did not have a jejunostomy sited.

Postoperatively, all patients were kept nil orally for four days, with a nasogastric tube which was removed after the commencement of bowel sounds, usually by the second postoperative day. On the fifth postoperative day, all patients were subjected to a contrast swallow study. Thereafter, if no leaks were detected, patients were started on diet. All patients were given instructions to eat smaller, more frequent meals, to elevate the head of their beds and to refrain from eating or drinking for at least two hours prior to retiring to bed. In addition, all patients were treated with proton-pump inhibitors and metoclopramide for the first three postoperative months, and then advised to take H<sub>2</sub>-receptor blockers thereafter if reflux symptoms occurred.

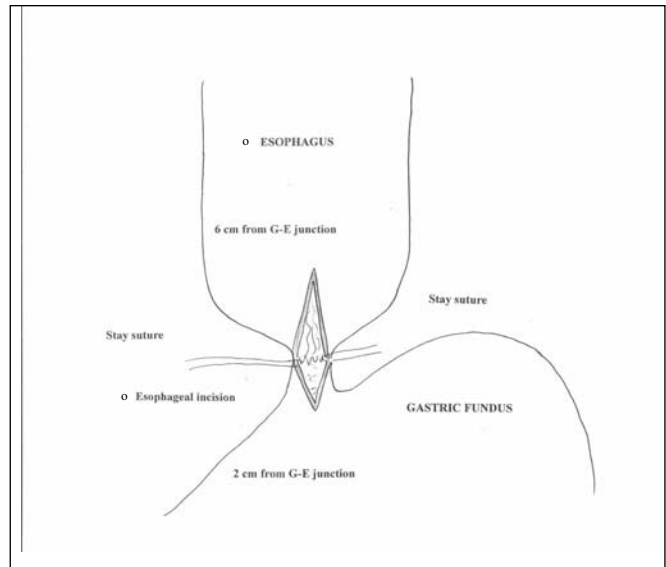


Fig. 1: Location of initial gastroesophagotomy

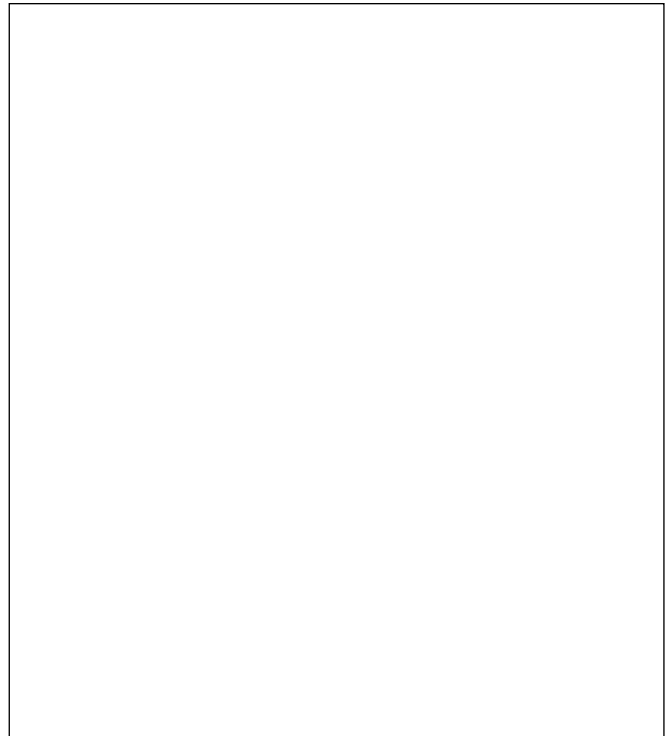


Fig. 2: Method of placement of first row of sutures (lateral view)

The first four patients were followed in the surgical outpatient clinic at six weeks, three months, six months and one year post procedure; follow-up for the last patient has been six months and is continuing. At six months and one year, patients were assigned a VÔsick Classification grade based on symptoms reported during clinic visits (Tables 2 and 3).

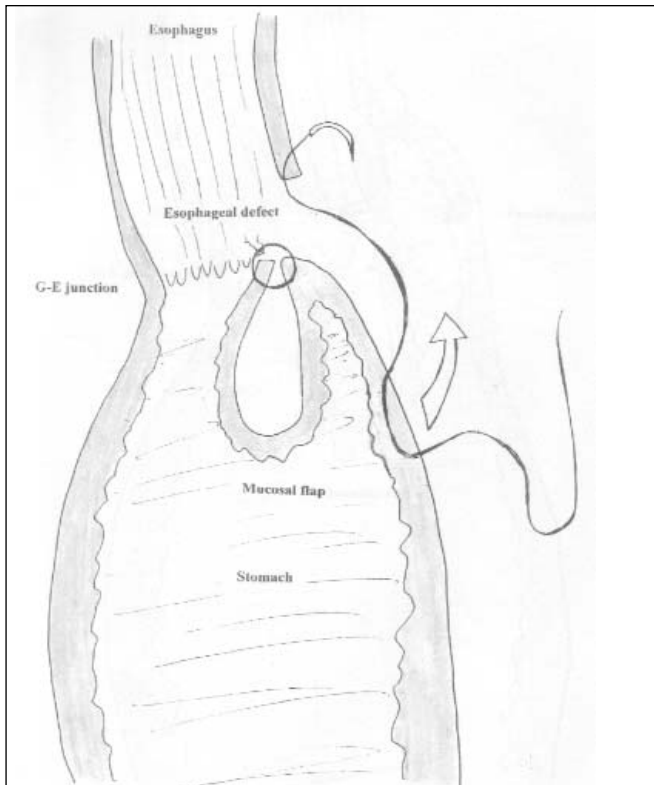


Fig. 3: After siting first row of sutures (lateral view)

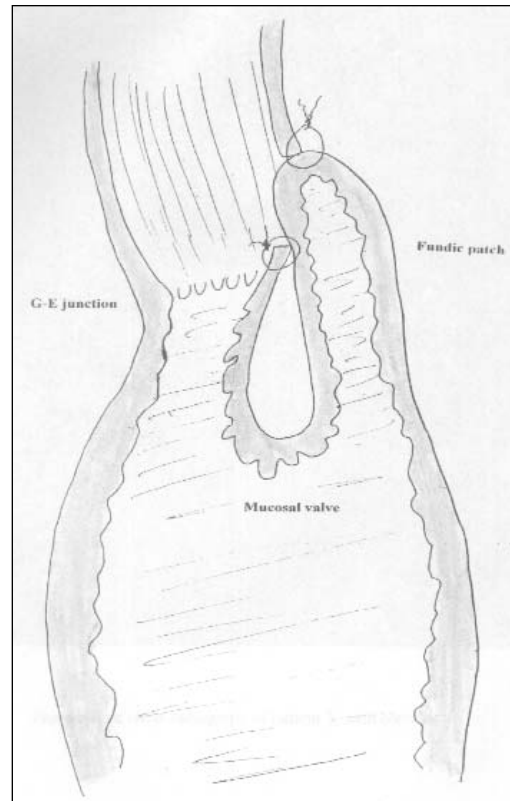


Fig. 4: After siting second row of sutures (lateral view)

Table 1: Patient demographics and surgical details

Patient Number and Gender	Age (years)	Years since original diagnosis	Type of previous operations	Number of previous operations	THEG procedure duration	THEG Hospitalization stay (days) (hours)
1. F	52	18	Heller's cardiomyotomy	2	3	10
2. M	51	12	1. Heller's 2. Dilatation	1 2	2	14
3. F	50	15	Heller's	1	1.5	11
4. M	36	17	-	0	1.3	14
5. F	53	14	-	0	1	7

Table 2: Visick classification of upper gastrointestinal symptoms

Grade	Characteristics
I	Asymptomatic
II	Mild symptoms. Quality of life unaffected. No medication needed
III	Moderate symptoms. Quality of life unaffected. Medication required.
IV	Recurrent, incapacitating symptoms equal or worse to pre-operative situation.

Table 3: Postoperative visick scores

Patient	Visick score 6 weeks	Visick score 3 months	Visick score 6 months	Visick score 1 year
1	3	2	2	2
2	3	2	2	1
3	2	2	2	2
4	2	2	2	1
5	2	2	1	1

**RESULTS**

There were no peri-operative or late deaths in these patients. The mean length of the procedures was  $1.76 \pm 0.7$  hours (range 1 to 3 hours). One patient developed a minor ab-

dominal wound infection that responded favourably to dressings and did not lengthen hospital stay. so complications occurred in relation to the use of a jejunotomy in the first four

patients. There were no other peri-operative complications.

No leaks were seen on contrast swallow evaluation at postoperative day five. In two patients (patients 3 and 5) oesophageal emptying at the time of the postoperative oesophagogram was delayed beyond 10 minutes; in the rest, emptying was complete within five minutes or less. All patients graduated to oral intake without incident and were discharged from hospital by the fourteenth postoperative day if a jejunostomy had been sited and by the seventh postoperative day for the patient who did not have a jejunostomy (mean hospital stay  $11.2 \pm 2.64$  days).

At follow-up, all patients reported improvement in symptoms, with no patient reporting significant reflux symptoms. In one patient who had demonstrated delayed oesophageal emptying on postoperative study, four instances of regurgitation were reported in the first three months after her procedure and none thereafter. In all but two patients, metoclopramide and proton-pump inhibitors could be discontinued by the third postoperative month. By the sixth postoperative month, these medications could be discontinued in all patients. No patient reported the requirement for more than occasional H<sub>2</sub>-blocker doses to treat heartburn after this period. All patients had gained at least three kilograms by the third postoperative month (mean  $4.24 \pm 1.45$  kilograms).

The mean Visick score at six months was  $1.8 \pm 0.4$ , and at one year was  $1.4 \pm 0.49$ . All patients expressed satisfaction with the results of the procedure.

## DISCUSSION

The original Thal patch procedure was proposed for the treatment of oesophageal perforation, and was later modified in the 1970s for use as a palliative procedure in patients with megaesophagus secondary to achalasia (1, 2). Ferraz and colleagues next reported on the use of the THEG in chagasic megaesophagus in Brazil in the early 1980s (5). They concluded then that equivalent and satisfactory palliation could be obtained in these patients with either THEG or oesophageal resection. In general, there is agreement that Heller's procedure applied to megaesophagus may yield unsatisfactory medium and long-term results (3, 4, 6). Subsequent reports in the world literature began to concentrate on oesophageal resection as the definitive therapy for NCM especially in light of the recognition that patients with achalasia were more likely than the general population to develop oesophageal cancer (4, 5, 7). The pathogenesis of cancer in the megaesophagus remains unclear, however there is general agreement that stasis with chronic inflammation and resultant basal layer hyperplasia may represent the premalignant phase of the disease (8). Studies of the incidence of oesophageal cancer in chagasic megaesophagus have suggested that a period of at least 20 years of stasis is a prerequisite for the development of cancer (9–11). The suggestion has been made that if stasis in the megaesophagus is relieved over the long-term, the risk of developing cancer may be reduced (11). Since the most obvious way of

achieving this goal is oesophagectomy, many have continued to advocate radical oesophageal resection as the primary palliative modality for NCM or chagasic megaesophagus. A major review of surgical therapy for benign oesophageal diseases in the late 1990s did not refer to THEG as an option in the treatment of megaesophagus, despite referring to other work from Brazil which advocated oesophagectomy in these patients (4). Only two years later, Ferraz and colleagues reported excellent late results of THEG as applied to chagasic megaesophagus in 44 of 50 patients with a mean follow-up of 63 months (range 6 to 150 months), with no patient known to have developed oesophageal carcinoma, although several patients had been lost to follow-up and their ultimate fate remains unknown (3).

The procedure as described by Ferraz and colleagues is technically simple and can be conducted expeditiously, which is important in a patient in whom a more radical procedure, such as oesophagectomy, could involve more risk and cost. This may not be a significant consideration overall, as the operative risk for oesophagectomy in specialist centres in North America is quite low (12), but could be important when considering the management of megaesophagus in a developing country, where a faster and less expensive procedure that offers equivalent palliation might offer a true advantage to the patient and the healthcare system. Thal-Hatafuku oesophagogastroplasty has the advantage of not exposing the patient to the added morbidity associated with the harvesting and use of a gastric tube, colonic interposition or jejunal graft. In both THEG and these other approaches, the native oesophagus left *in situ* or the particular conduit employed functions as a de-eneruated tube which drains by gravity. The question of the need for long-term surveillance for the development of cancer in the retained oesophagus needs to be addressed. It is recommended but not universally accepted that routine postoperative endoscopic examinations are necessary (4, 9).

In the University Hospital of the West Indies experience, the patients with NCM palliated by THEG recover quickly from the initial procedure and then report an almost complete reversal of their symptoms. Initial postoperative contrast studies have also been striking in demonstrating the immediate effect of the procedure on oesophageal diameter, which dramatically decreased by day five in most of these patients (Figs 5, 6). These findings confirm results reported in the treatment of chagasic megaesophagus (3). A likely explanation is the lack of retained foodstuffs, secretions, and importantly, gases, in the postoperative oesophagus that is now able to drain freely into the stomach. It may be because oesophageal "re-modelling" occurs that late follow-up has not discovered a patient in whom cancer was found (3). Due to economic constraints, patients in our group were not subjected to contrast oesophagography or routine oesophagoscopy after the immediate postoperative period, although it was recognized that this was desirable.

Whereas the aetiology of Chagas' Disease is known,

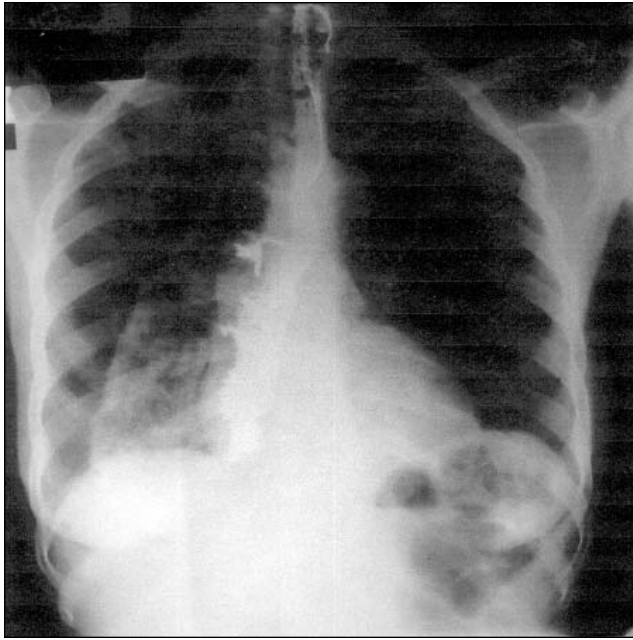


Fig. 5: Preoperative chest radiograph of patient 3, with contrast.



Fig. 6: Postoperative chest radiograph of patient 3, with contrast.

the cause of oesophageal achalasia remains idiopathic. Evidence exists which suggests that an infective agent such as varicella zoster virus or an autoimmune process may be implicated in the disease process, although this remains unproven (13, 14). Nevertheless, in both diseases, the ultimate effect on oesophageal function and structure are the same,

and the development of megaesophagus occurs along similar lines (15). It stands to reason therefore that a surgical procedure that is effective for the palliation of chagasic megaesophagus may be expected to be effective for NCM. The results reported by Brazilian surgeons (3,5) others (16), and our experience seem to support this hypothesis. A limitation of this report is the small number of patients and short follow-up period, although the numbers are similar to earlier series reporting on the results of therapy for advanced achalasia (16, 17). It is our contention that based on these and earlier findings, the Thal-Hatafuku oesophagogastroplasty procedure may be considered to be a reasonable alternative to oesophagectomy for the palliation of megaesophagus, regardless of aetiology. Further studies with long-term outcome analyses are required for support of this hypothesis.

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