

Minimally Invasive Esophagectomy in People Living with HIV

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Abstract

Background: People living with HIV infection have a longer survival rate after the introduction of Highly active antiretroviral therapy (HAART). Hence major resections in these patients can be performed safely.

Materials and methods: 5 retro positive patients underwent minimally invasive esophagostomy (MIE) in our institution between 2010 and 2015. Patient demographics, HIV status (CD4 count and viral load), Post-operative mortality, technical feasibility and outcomes were analyzed.

Results: Out of the 5 thoraco-lap esophagectomies, none required conversion. One patient died in the postoperative period due to overwhelming chest infection and sepsis (mortality - 20%). Two patients (40%) required prolonged ventilatory support in the postoperative setting. We had anastomotic leak in one patient (20%), which settled spontaneously. The expired patient carried maximum viral load (1,57,454) and lowest CD4 count (120).

Conclusion: Minimally invasive esophagectomy is a safe and viable option in retro positive patients, wherein the morbidity of laparotomy and thoracotomy are avoided. We report, what we believe is the first pilot case series of 5 minimally invasive esophagectomies in HIV positive patients and we believe that this study will be the shoulders for the next generation of investigators to stand on.

Keywords: Thoracoscopy; Laparoscopy; Esophagectomy; Retropositive; HIV; AIDS; Minimally invasive esophagectomy

Introduction

Five HIV/AIDS positive individual underwent minimal invasive esophagectomy (MIE) in our institution between 2010-2015. 3 patients had stricture of the esophagus and undergone multiple dilatations, 2 patients had squamous cell carcinoma of the esophagus and were operated upon after anterior radiation. The four patients who survived remain free of symptoms, and were completely normal at two years follow up, requiring no dilatation or adjustment of life style. In this case series of HIV / AIDS patients undergoing esophagectomy, we like to report technical feasibility and viability.

Materials and Methods

5 patients underwent minimal invasive esophagectomy (MIE) (Figure 1) in our unit between 2010-2015. 3 of the patients had corrosive stricture and had undergone multiple dilatations (30, 40 and 37 times each). All 3 patients had upper mid esophageal stricture, and had no gastric stricture. All 3 were on highly active antiretroviral therapy (HAART) with reasonable CD4 count. They also had very low viral loads (<100 copies/ml) (Table 1). The remaining 2 patients were diagnosed to have a cancer esophagus, 1 in the mid third and 1 in the lower third, both biopsy proved to be squamous cell carcinoma. Both underwent 25 days of pre operative anterior radio therapy. All 5 patients were optimized pre operatively with incentive spirometry, nutritional counseling, and pre operative antibiotics.

Techniques

The initial dissection was performed thoracoscopically, with the patient in the prone position. Entry was through the right chest with optical port being just below the tip of the scapula (6th space) two working ports were inserted one space below. The esophageal malignancy was assessed and the esophagus was mobilized above and below the tumor, using an umbilical tape that was passed around the

esophagus. There was considerable technical difficulty in the 3 patients who had a stricture of the esophagus, possibly because of esophagitis secondary to repeated dilatations. The right bronchus was seen and preserved in all cases. The azygos vein was tied off and disconnected in all the patients. Dissection was continued proximally up to thoracic inlet and distally up to the diaphragm. Thoracoscopy was completed with an intercostal drainage tube.

Then the patient was turned over to the supine position. Laparoscopy was performed and the stomach freed from the omentum, preserving the gastro epiploic arch close to the greater curve. This dissection was taken proximally upto to the hiatus, and distally upto the pylorus. We did not add a pyloromyotomy or a pyloroplasty in any of our patients. The left gastric artery were taken by flipping by the greater curve upwards, and the gastrohepatic omentum was then freed, suspending

S No	Age	Gender	Etiology
1	33	Male	Corrosive stricture
2	42	Male	Corrosive stricture
3	54	Male	Squamous cell carcinoma
4	38	Male	Corrosive stricture
5	45	Male	Squamous cell carcinoma

Table 1: Patient demographics.

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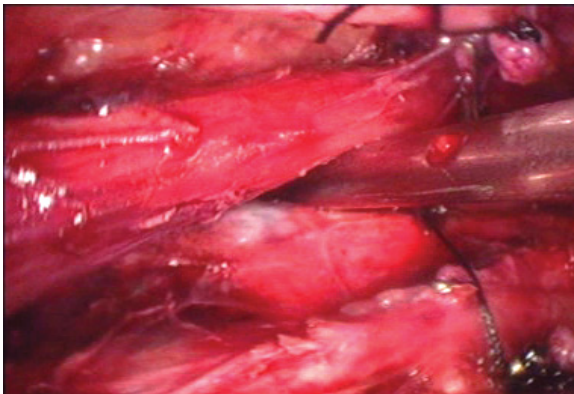


Figure 1: Minimally invasive esophagectomy.

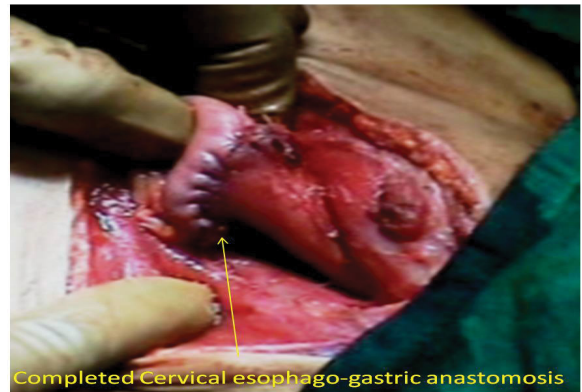


Figure 2: Completed cervical esophago-gastric anastomosis.

the stomach on the right gastric and the right gastro epiploic vascular pedicles.

A 45 mm, 3.5 vertical height stapler was fired at the level of the 5th blood vessel along the lesser curve. Then, hugging the lesser curve, a sleeve was constructed of the greater curve by progressively firing Endo GI staplers upto the fundus of the stomach. After the gastric tube was created, the lower end of the specimen was sutured to the gastric tube using two sutures of 2-0 polypropylene.

Then the cervical incision (Figure 2) is made, along the anterior border of the sternomastoid. Further dissection is performed until the upper end of the esophagus is dissected out. The recurrent laryngeal nerve is preserved and the cervical esophagus is freed until the thoracic inlet. A gentle traction on this delivers the entire esophagus and gastric tube into the neck.

Then the specimen is removed, and the gastric tube is pulled up to lay a long side of the lower end of the cervical esophagus. A single layer esophago gastric anastomosis, using 3-0 polydioxinone (PDS) is performed in the neck. Ports are closed with a single abdominal drain and cervical drain.

Results

Conversion, operating time and hospital stay: None of the 5 patients required conversion, although we counseled all patients for the same. The mean operative time was 4 hours and 20 minutes. The mean hospital stay was 10 days, longest was 14 days for the patient who required prolonged ventilation.

Post operative mortality: We had one post operative mortality in a 45 year old male with a cancer esophagus. There was no evidence of leak, but pulmonary infiltrates rapidly appeared by 48 hrs, and spread to full blown ARDS. He expired on the 6th post operative day.

Anastomotic leak: There was one anastomotic leak, in a patient who had 40 dilatations before the esophagectomy. There was no systemic sepsis, and the salivary leak in the neck settled down spontaneously by two weeks. At follow up he required two more dilatations, but at 12 months, he is able to eat and drink normally.

Prolonged ventilation: Two patients (40%) required prolonged ventilation (more than 48 hrs). One was the patient who expired and the other was the patient with small leak that spontaneously settled.

CD4 counts: Except the patient who expired, the other patients had reasonable CD4 counts. The mortality patient had a CD4 count of 120.

Patient	Viral Load	CD4 Count	Prolonged Ventilaton	Mortality
1	Undetectable	550	-	-
2	Undetectable	484	+	-
3	Undetectable	746	-	-
4	<100	392	-	-
5	1,57,454	120	+	+

Table 2: Variation viral loads.

Viral loads: The viral loads varied, with the highest viral load being in the patient who expired (Table 2).

Others: Albumin and other parameters were normal as seen at pre-anesthetic workup.

Discussion

HIV patients tend to be immunocompromised, and often suffer from co morbidities like low albumin, tuberculosis, candidiasis, etc. [1]. The esophagectomy, minimal invasive or otherwise, is a devastatingly large procedure on any patient [2]. A few studies have attempted correlation of these two issues.

Stebbing et al. in Archives of internal medicine 2010 studied primary esophageal malignancy in patients on HAART [3]. Their conclusions based on 19 patients was that the outcome of HIV related esophageal malignancy was similar to the general population with the disease and therefore, that the same risk moderation strategies were applicable. However, this was in a Caucasian population of HIV patients, in whom the general health parameters and Karnofsky indices are almost always better than the Asian patients with HIV [4].

Zoysa et al. in the Southern African Journal of HIV medicine published the first article of a trans hiatal esophagectomy in a HIV positive patient with a CD4 count of 60 cells/UL [5]. Patient did well after a trans hiatal esophagectomy.

Sidler et al. in the Journal of Laparoendoscopic & Advanced Surgical Techniques reported a laparoscopic resection of esophageal stricture with trans gastric anastomosis in a 2 year old child with clinical AIDS and an esophageal structure [6]. This patient too tolerated the procedure well and was alright.

Two more patients with refractory esophageal strictures secondary to candidiasis, who after several attempts at stricture dilatations needed open trans hiatal esophagectomy was reported by Loveland et al. in the *Journal of Pediatric Surgery* [7].

Minimal invasive esophagectomies have been proved by several studies including a landmark one by Dolan et al. in *Surgical Endoscopy* 2013 as a safe alternative to open esophagectomy [8].

A patient with HIV, coinfection with tuberculosis had an esophageal perforation and underwent an end cervical esophagostomy and resection of the perforated esophagus, with a deferred reconstruction in view of poor prognosis. This was reported by Adkins et al. in the *Annals of Thoracic Surgery* [9].

To our knowledge, our series of MIE in HIV positive patients is the first to be reported worldwide in English literature. Although the mortality of 20% is certainly more than in our non-HIV patients, it might be related to a higher viral load, lower CD4 count, overall hypoproteinemic status found in South Indian patients with HIV [10,11]. It is quite possible, that by optimizing these parameters, we might be able to get the same mortality and morbidity results in this group of patients as in those without the virus.

Indeed, in comparison to our non-HIV corrosive stricture patients, the need for numerous dilatations and progression to requiring surgery seems to be higher in this group of patients. Further studies are required before we understand whether this is due to the disease itself, the antiretroviral therapy, co-infection with tuberculosis or other as yet undefined factors.

A minimal invasive esophagectomy, although technically demanding, is feasible, and has now been in practice for over 2 decades [8]. Several studies have shown that avoiding laparotomy and thoracotomy and mobilizing esophagus by taking down the fibers and blood vessels under direct vision, can give multiple benefits to patients in the post operative period, as in several minimal invasive procedures like adrenalectomy, and fundoplication [12,13].

Given the fact that these patients are immune suppressed, and will deal with post operative complications poorly, it seems sensible to do the MIE for these patients rather than a blind trans hiatal esophagectomy where post operative bleeding might compromise the patients frail internal millo.

Conclusion

Five patients with HIV with refractory esophageal obstruction due to esophageal stricture or esophageal cancer underwent minimal invasive esophagectomy, and 4 are alive and well, the longest follow

up being 6 years after surgery. Overall MIE is a safe alternative to open esophagectomy even in the immunocompromised patients. To our knowledge this is the first published case series in World literature. Further numbers are required before conclusions can be drawn about long-term feasibility. We believe that this pilot case series will pave the way for further major resections in a large group of immunocompromised patients.

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