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Minimally invasive oesophagectomy: The first case report of a thoracoscopic oesophagectomy done in the Caribbean

Yardesh Singh^{a,b}, Aqilah Hosein^b, Sidiyq Mohammed^{a,b,*}, Thivy Kuruvilla^b, Vijay Naraynsingh^c^a University of the West Indies, Department of Clinical Surgical Sciences, San Fernando General Hospital, Trinidad and Tobago^b San Fernando General Hospital, Trinidad and Tobago^c Medical Associates, St. Joseph, Trinidad and Tobago

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ABSTRACT

INTRODUCTION: Minimally invasive oesophagectomy is one of the options in the armamentarium of a modern surgeon when faced with treating oesophageal cancer. Trinidad and Tobago has successfully treated a patient using this method. This case report adds to the rich surgical history in the Caribbean.

CASE PRESENTATION: Our patient presented with progressive dysphagia, and after being worked up was diagnosed with oesophageal cancer. He underwent neoadjuvant chemotherapy and had a minimally invasive McKeown oesophagectomy done by a fellowship trained, advanced laparoscopic oesophageal and gastric surgeon.

CONCLUSION: The patient had an uneventful recovery and was tumor free with excellent quality of life at 4 years, showing that the Caribbean is keeping up with the rest of the surgical world.

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1. Introduction

The mainstay of curative treatment for oesophageal cancer is oesophagectomy [1]. Perioperative outcomes in minimally invasive oesophagectomy (MIO) have been shown to be superior compared to open oesophagectomy, while maintaining oncologic safety [2,3]. The developing twin island state of Trinidad and Tobago has been keeping up with the world's surgical advances, and we present the first documented case of a minimally invasive oesophagectomy performed in the West Indies. This work has been reported in line with the SCARE criteria [4].

2. Case report

A 53-year-old Caribbean male presented to the surgical unit with an eight-month history of odynophagia and progressive dysphagia. This was associated with unintentional weight loss over three months. He had no significant smoking or alcohol usage in his history.

Physical examination revealed generalised wasting, but no other notable abnormalities. His laboratory results were within normal limits. An oesophageal and gastric endoscopy and biopsy showed a

mucus secreting adenocarcinoma in the distal third of the oesophagus. On the island, there is no facility for endoscopic ultrasound, and as such, a staging contrast CT showed a stage 3 oesophageal tumour with no significant lymphadenopathy (Fig. 1). Staging laparoscopy and cytology confirmed no peritoneal disease, and a decision was made in conjunction with the oncologist to treat the patient with neoadjuvant chemotherapy and subsequent surgery.

Following neoadjuvant chemotherapy, a restaging CT scan showed a good response, and a staging laparoscopy was performed to evaluate the peritoneum. Further multi-disciplinary team discussion yielded the decision to proceed with a minimally invasive McKeown oesophagectomy. Preoperatively, the patient received endoscopic botulinum toxin injection to the pylorus. The sequence of events at surgery could be divided into three phases.

During phase one, a right thoracoscopic approach was initially used, with the patient in a prone position (Fig. 2). In order to better visualise the oesophagus, an artificial pneumothorax at 8 mmHg pressure was created, and the oesophagus was mobilised away from the mediastinum on the right (Fig. 3). The dissection was carried out along the surrounding landmarks and included the pericardial diaphragmatic node, while ensuring that both crura could have been visualised.

After careful exposure of the vagus and right recurrent laryngeal nerves, and dissection of the right upper paratracheal nodes, the azygos vein was stapled off using a Covidien vascular staple. This facilitated the complete nodal dissection of the other tracheal nodes and retracting of the oesophagus to the right. The left sided dissec-

* Corresponding author at: Department of Surgery, University of the West Indies, San Fernando General Hospital, Trinidad and Tobago.

E-mail address: sidiyq@gmail.com (S. Mohammed).

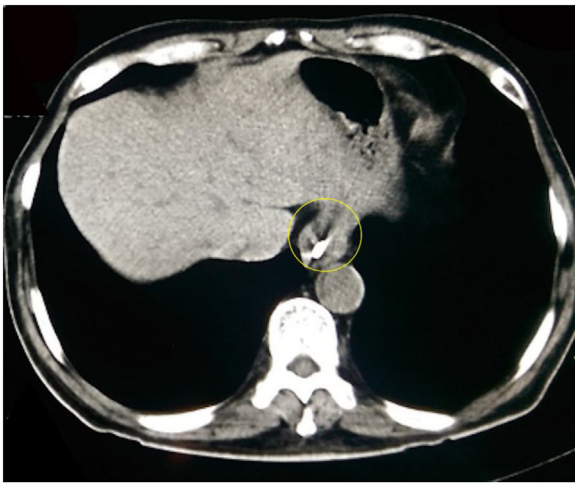


Fig. 1. Showing the axial CT scan demonstrating the narrowed oesophageal lumen encircled in yellow.

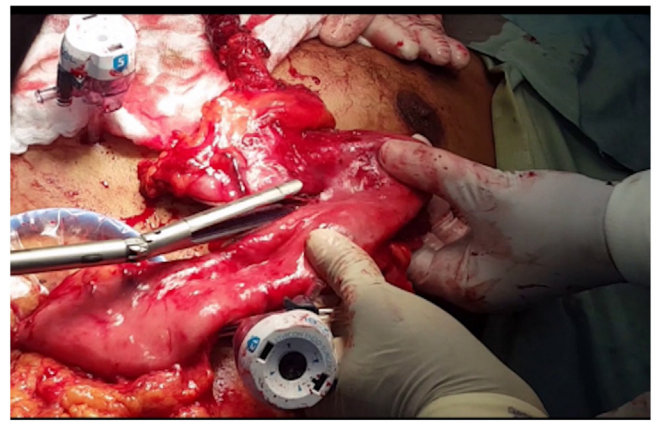


Fig. 4. Showing the formation of the gastric conduit.



Fig. 2. Showing port placements during the thoroscopic stage.

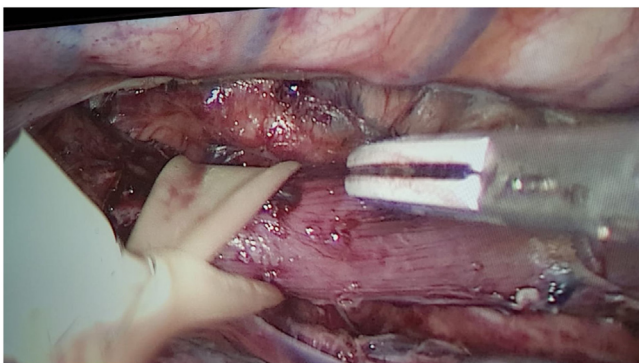


Fig. 3. Showing oesophageal dissection and mobilization.



Fig. 5. The final specimen.

tion was then completed, and the thoracic duct was ligated just above the diaphragmatic hiatus, essentially mobilising the entire oesophagus, from diaphragmatic hiatus to the thoracic inlet.

At the laparoscopic phase, the duodenum was approached, and full kocherisation was achieved. The entire greater curvature of the stomach was mobilised and the gastrocolic ligament was divided. A D1 lymphadenectomy was performed, the left gastric vessels were taken with Covidien vascular staple, with preservation of the right gastric and the right gastroepiploic vessels, and the gastric conduit was fashioned (Fig. 4). The proximal end of the stomach was stapled off and the specimen removed through an umbilical incision with a wound protector.

In the third stage, the cervical stage, the oesophagus was mobilised and transected, a nasogastric tube attached to the distal oesophagus, and the specimen removed through the umbilical incision (Fig. 5). The gastric conduit was attached to the nasogastric tube and passed into the chest and up to the neck, maintaining the specific orientation that was required. A stapled anastomosis was fashioned and oversewn uneventfully. A feeding jejunostomy was placed, and drains, inclusive of a thoracostomy tube, was left in situ. The patient spent one day in the intensive care unit and one day in the high dependency unit.

Prior to the removal of the drains and chest tube, an upper gastrointestinal swallow showed no obvious leak, and the patient was started on liquid diet and graduated to a soft diet. The patient was

discharged with close outpatient follow up. The final pathology report revealed an adenocarcinoma of the lower oesophagus, all surgical margins clear, and a total of 12 lymph nodes retrieved. None of the lymph nodes were positive for tumour. Three months post-op he was seen at a follow up visit, tolerating diet and doing well, and continued to have further visits for a four-year duration.

3. Discussion

Ever since the first totally laparoscopic oesophagectomy in 1995 by DePaula, the management of oesophageal cancer has been refined [5]. What remains clear is that surgery continues to play a pivotal role in the treatment of the disease, either alone, or in combination with neoadjuvant therapy.

There are numerous challenges that continuously face the developing medical world, most often a lack of resources; be it necessary equipment for diagnosis and staging, or advanced medications needed to treat patients. Here in the Caribbean, Trinidad and Tobago has been at the forefront of minimally invasive surgery [6,7]. As we continue to pioneer this skill, we are faced with some of the very basic challenges that hamper total best practice.

This particular case suffered from not having access to endoscopic ultrasound or PET CT during staging [8]. As a direct result, our treatment methods are based on the information we have, which is limited by accessible amenities, as well as a multidisciplinary approach to what would be best for each patient. The well documented multidisciplinary approach provides a level of compromise when the recommended tests and treatments prove difficult to obtain [9].

As minimally invasive surgery continues to expand and increase in popularity among both patients and surgeons, quality control is important. Cases that are done should be performed by a trained laparoscopic surgeon, which in turn will give the patient the best possible outcome and improve the quality of care offered. It was with this in mind that this case was led by an upper GI trained laparoscopic surgeon, in order to do just that, as a mortality rate of 5% and even under 2% in some experienced centres are increasingly being seen and expected [10].

Over the last twenty-five years, the medical literature has been filled with discussion around the treatment of oesophageal cancer. Preoperative decisions on neoadjuvant versus upfront surgery, decisions on pertinent intra-operative issues such as patient positioning, and postoperative objectives have all been evaluated and has influenced the overall decision making process in our low volume centre [11,12].

Thus, in the treatment of this patient, discussion on every step of management was vital. The preoperative decision to initiate neoadjuvant therapy was guided by the National Comprehensive Cancer Network (NCCN) guidelines, even though the staging procedure was suboptimal with the unavailability of endoscopic ultrasound [13]. Since the operating surgeon was trained in laparoscopic upper GI surgery, the benefits of the thorascopic stage being done with the patient initially prone allowed the first assistant to be the camera holder, and gravity would naturally aid retraction during the procedure [14]. The added advantage was that the need for an experienced first assistant was reduced, and the potential for iatrogenic injury and its sequelae would hence be lower [15].

The post-operative course for these patients has been improving over the last decade. High volume centres are moving away from post-op ICU admissions, and patients can go straight to the ward. However, in small, low volume centres, immediate post-operative access to individualised care and constant monitoring available in the ICU may increase the likelihood of achieving a good outcome. Post-operative complications such as gastric outlet obstruction, or even more commonly pneumonia, and respiratory failure, would

be recognised much earlier in the ICU/HDU setting, and the options for treating such would be speedily employed [16].

Some surgeons choose to do an intra-operative pyloromyotomy at surgery, which may aid in the prevention of gastric outlet obstruction. Another treatment option is endoluminal dilation if the patient does develop this complication post-operatively [17,18]. There is no clear data that suggests a definitive measure is required at the time of surgery, and with the advice and lead of more advanced centres, low volume centres may make decisions on a case by case basis.

We expect that with following the oncological principles, including at least a two-stage lymph node dissection, specific surgical planning targeted to achieve an R0 resection, and the use of minimally invasive techniques, we can provide satisfactory results with respect to early and long-term outcomes, all without jeopardizing the disease-free survival [19].

This case report not only demonstrates that the resource-limited developing Caribbean is able to keep on par with first world surgery, but also provides a significant addition to the documented surgical history of the Caribbean.

Conflicts of interest

There was no conflict of interest in this case report.

Funding

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Ethical approval

No ethical approval was required by our institution for this case report.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

A copy of the written consent is available for review by the Editor-in-Chief of this journal on Request.

Author contribution

Yardesh Singh: Conceptualization, Methodology, Review and Editing, Supervision.

Aqilah Hosein: Writing original draft, Formal analysis, Methodology and Editing.

Sidiyq Mohammed: Writing original draft, Formal analysis, Methodology and Editing.

Thivy Kuruvilla: Review and Editing, Supervision.

Vijay Naraynsingh: Review and Editing, Supervision.

Registration of research studies

This case report was not registered with an international registry.

Guarantor

Dr. Yardesh Singh is the guarantor of this case report.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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References

- [1] P. van Hagen, M.C. Hulshof, J.J. van Lanschot, et al., Chemoradiotherapy for esophageal or junctional cancer, *N. Engl. J. Med.* (2012) (Accessed June 11, 2020) <https://pubmed.ncbi.nlm.nih.gov/22646630/>.
- [2] S.S. Biere, M.I. van Berge Henegouwen, K.W. Maas, et al., Minimally invasive versus open oesophagectomy for patients with oesophageal cancer: a multicentre, open-label, randomised controlled trial, *Lancet* (London, England) (2012) (Accessed June 11, 2020) <https://pubmed.ncbi.nlm.nih.gov/22552194/>.
- [3] M. Dantoc, M.R. Cox, G.D. Eslick, Evidence to support the use of minimally invasive esophagectomy for esophageal cancer: a meta-analysis, *Arch. Surg.* (Chicago, Ill.: 1960) (2012) (Accessed June 11, 2020) <https://pubmed.ncbi.nlm.nih.gov/22911078/>.
- [4] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill, For the SCARE Group, The SCARE 2018 statement: updating consensus surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 60 (2018) 132–136.
- [5] A.L. DePaula, K. Hashiba, E.A. Ferreira, R.A. de Paula, E. Grecco, Laparoscopic Transhiatal Esophagectomy With Esophagogastroplasty, 2020 (n.d.) (Accessed June 28, 2020) <https://pubmed.ncbi.nlm.nih.gov/7735533/>.
- [6] Y. Singh, S.O. Cawich, S. Mohammed, T. Kuruvilla, V. Naraynsingh, S.Y. et al., Totally Laparoscopic Whipple's Operation: Initial Report From the Caribbean, 2020 <https://www.cureus.com/articles/23957-totally-laparoscopic-whipples-operation-initial-report-from-the-caribbean>.
- [7] Y. Singh, S. Mohammed, A. Hosein, et al., A giant gallstone: the largest gallstone removed laparoscopically in the world, *Cureus J. Med. Sci.* (2020) (Accessed June 14, 2020) <https://www.cureus.com/articles/30701>.
- [8] A. Konski, M. Doss, B. Milestone, O. Haluszka, A. Hanlon, G. Freedman, et al., The integration of 18-fluoro-deoxy-glucose positron emission tomography and endoscopic ultrasound in the treatment-planning process for esophageal carcinoma, *Int. J. Radiat. Oncol. Biol. Phys.* (2005) (Accessed June 14, 2020) <https://www.sciencedirect.com/science/article/pii/S0360301604021236>.
- [9] M. Silbermann, B. Pitsillides, N. Al-Alfi, S. Omran, K. Al-Jabri, K. Elshamy, et al., Multidisciplinary care team for cancer patients and its implementation in several Middle Eastern countries, *Ann. Oncol.* (2013) (Accessed June 14, 2020) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3767159/>.
- [10] M.I. Braghetto, H.G. Cardemil, B.C. Mandiola, L.G. Masia, S.F. Gattini, Impact of minimally invasive surgery in the treatment of esophageal cancer, *Arq. Bras. Cirurgia Digest.: ABCD = Braz. Arch. Digest. Surg.* (2014) (Accessed June 15, 2020) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4743213/>.
- [11] S.F. Schoppmann, G. Prager, F.B. Langer, F.M. Riegler, B. Kabon, E. Fleischmann, J. Zacherl, Open versus minimally invasive esophagectomy: a single-center case controlled study, *Surg. Endosc.* (2020) (n.d.) (Accessed October 6, 2020) <https://pubmed.ncbi.nlm.nih.gov/20464423/>.
- [12] N.T. Nguyen, M.W. Hinojosa, B.R. Smith, K.J. Chang, J. Gray, D. Hoyt, Minimally invasive esophagectomy: lessons learned from 104 operations, *Ann. Surg.* (2020) (n.d.) (Accessed October 6, 2020) <https://pubmed.ncbi.nlm.nih.gov/19092354/>.
- [13] National Comprehensive Cancer Network, (2020). https://www.nccn.org/professionals/physician_gls/default.aspx#site (accessed October 6, 2020).
- [14] A. Cuschieri, M.A.-R.J.D. Luketich, B.M.M.B. Orringer, A.P.C. Palanivelu, Prone thoracoscopic esophageal mobilization for minimally invasive esophagectomy, *Surg. Endosc.* (1994) (Accessed October 6, 2020) <https://link.springer.com/article/10.1007/s00464-007-9193-0>.
- [15] T. Fabian, J.T. Martin, A.A. McKelvey, J.A. Federico, Minimally invasive esophagectomy: a teaching hospital's first year experience, *Dis Esophagus* 21 (3) (2008) 220–225, <http://dx.doi.org/10.1111/j.1442-2050.2007.00783.x>, PMID: 18430102.
- [16] M. Kent, J.D. Luketich, Minimally invasive esophagectomy, *Atlas Minim. Invasive Surg.* (2009) 3–15, <http://dx.doi.org/10.1016/b978-1-4160-4108-5.50007-4>.
- [17] M.K. Maus, J. Leers, T. Herbold, M. Bludau, S.H. Chon, R. Kleinert, D.A. Hescheler, E. Bollschweiler, A.H. Hölscher, H. Schäfer, H. Alakus, Gastric Outlet Obstruction After Esophagectomy: Retrospective Analysis of the Effectiveness and Safety of Postoperative Endoscopic Pyloric Dilatation (n.d.) (Accessed October 9, 2020) <https://pubmed.ncbi.nlm.nih.gov/27216809/>.
- [18] M. Lanuti, P.E.D. Delva, C.D. Wright, H.A. Gaissert, J.C. Wain, D.M. Donahue, et al., Post-esophagectomy gastric outlet obstruction: role of pyloromyotomy and management with endoscopic pyloric dilatation, *Eur. J. Cardio-thoracic Surg.* 31 (2007) 149–153, <http://dx.doi.org/10.1016/j.ejcts.2006.11.010>.
- [19] H. Kawakubo, H. Takeuchi, Y. Kitagawa, Current status and future perspectives on minimally invasive esophagectomy, *Korean J. Thorac. Cardiovasc. Surg.* (2013) (Accessed October 6, 2020) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3756154/>.

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