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Editorial

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Minimally Invasive Oesophagectomy

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Oesophageal cancer is the eighth most common cancer worldwide, with nearly 456,000 new cases diagnosed in 2012.[1] Surgery alone or in combination with chemotherapy or chemoradiation is the mainstay of cure for oesophageal adenocarcinoma. Oesophageal squamous cell cancer is also treated with the options described and may be treated with definitive chemoradiotherapy or radiotherapy alone.

Oesophagectomy for oesophageal cancer is a complex operation and the mortality from oesophagectomy can be significant. Audit results in England and Wales from 2960 oesophagectomies performed between April 2011 and March 2013 showed that 33% of patients would have a significant complication with a 90 day mortality of 4.4%.[2]

Increased experience in laparoscopic and thoracoscopic techniques has led to the development of Minimally Invasive Oesophagectomy (MIO) in order to decrease the associated morbidity. The term MIO has been used to describe totally minimally invasive surgery or hybrid operations whereby either the thoracic or abdominal component being performed endoscopically. The advantages of MIO are that there is less tissue trauma and hence better recovery. Cuschieri, et al. in 1992 were one of the first to describe their experience in thoracoscopic mobilisation of the oesophagus thus avoiding a thoracotomy.[3] Since their experience there has been a plethora of case control series describing both totally minimally invasive and hybrid oesophagectomies.

In England and Wales data from the national oesophago-gastric cancer audit of 2014 has shown that 41.5% of oesophagectomies were performed by minimally invasive or hybrid techniques.[2] The majority of operations were laparoscopically assisted two-phase approaches (minimal access approach for the abdomen and open right chest incision). Given this increasing trend towards minimally invasive techniques the inpatient complication rates of these patients were also studied over the two year period. Patients undergoing minimally invasive oesophagectomies appeared to have a statistically higher rate of anastomotic leaks compared to patients undergoing open oesophagectomies (11.7% *vs.* 6.7%).[2] There was also an increased need for re-operation in patients undergoing minimally invasive oesophagectomies compared to open, although this was not statistically significant (13.5% *vs.* 8.7%).[2]

On the other hand, pulmonary complications from a thoracotomy incision appear to be higher in open chest oesophagectomy compared to thoracoscopic assisted oesophagectomy. This was reflected in the UK audit (18.1% *vs.* 14.1%).[2] This has also been shown in other large centre series.[3,4] An important study published in the Lancet reported the results of a randomized study with the primary end point being postoperative pulmonary infection in minimally invasive oesophagectomy (59 patients) *versus* open oesophagectomy (56 patients). 16(29%) patients in the open oesophagectomy group had pulmonary complications in the first two weeks compared with 5(9%) patients in the minimally invasive group (p=0.005).[5] This translated into a shorter hospital stay and better short-term quality of life.

Although a number of systematic reviews have been conducted, these all focus on observational studies.[4,6-8] Whilst these studies suggest that minimally invasive techniques improve short-term clinical outcomes, there is very little data available on long-term survival.

There are a limited number of small randomized trials. The Dutch TIME trial (Tra-

ditional invasive *versus* minimally invasive oesophagectomy) by Biere and colleagues described earlier reported only on short term outcome data.[5] The French MIRO (oesophagectoMIe pour cancer paR voie conventionnelle ou coeliO-assistee) is currently in progress randomly allocating 200 patients to either open or laparoscopically-assisted oesophagectomy but with the primary end-point being short-term complication (major morbidity within 30 postoperative days).[9] A recently published prospective, phase II multicentre trial did look at the long term survival of patients following totally minimally invasive oesophagectomy as one of its secondary end-points. At a median follow-up of 35.8 months, the estimated 3-year overall survival was 58.4% with locoregional recurrence occurring in only 6.7% of patients.[10]

It is challenging to perform randomized controlled trials evaluating procedures that are novel and require skilled surgeons beyond their learning curves in the procedure. The eagerly awaited results from the pilot ROMIO (Randomized Oesophagectomy: Minimally Invasive or Open) trial will hopefully help inform measures of recruitment, methods to monitor quality of surgery and commitment to a surgical protocol.[11]

Robotic surgery is increasingly being used in modern surgical practise. Some of the limitations of laparoscopic and thoracoscopic approaches to oesophagectomy include instrumentation, narrow field and 2-dimentional view obtained. Robotic surgery allows for greater degrees of freedom and hence improved dissection. However, centres performing robotic surgery describe case series with no real long term outcome data.[12-14]

Several MIO techniques have been described and appear safe in the management of oesophageal cancer in centres with high volume and surgeons experienced in MIO. In large centres, MIO has been shown to have equivalent morbidity and mortality.[3,4] The numerous MIO techniques complicates the debate on defining the optimal technique for the surgical treatment of oesophageal cancer. There is a real need for quality randomized controlled trials comparing MIO with open oesophagectomy to elucidate the ideal procedure with the lowest postoperative morbidity, the best quality of life and longest long term survival.

REFERENCES

1. Ferlay J, Soerjomataram I, Ervik M, et al. GLOBOCON 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11. Lyon, France: International Agency for Research on Cancer. Available from: http://globocan.iarc.fr 2012; Accessed 2013.

2. National Oesophago-gastric cancer audit 2014. Available at: http://www.hscic.gov.uk/org 2013; Accessed March 27, 2015.

3. Palanivelu C, Prakash A, Senthilkumar R, et al. Minimally invasive oesophagectomy: thoracoscopic mobilization of the esophagus and mediastinal lymphadenopathy in prone position-experience of 130 patients. *J Am Coll Surg*. 2006; 203: 7-16. doi: 10.1016/j.jamcollsurg.2006.03.016

4. Luketich JD, Alvelo-Rivera M, Bunaventura PO. Minimally invasive esophagectomy: outcomes in 222 patients. *Ann Surg*. 2003; 238: 486-494. doi: 10.1097/01.sla.0000089858.40725.68

5. Biere SS, van Berge Henegouwen MI, Maas KW, et al. Minimally invasive versus open oesophagectomy for patients with oesophageal cancer; a multicentre, open-label, randomised controlled trial. *Lancet*. 2012; 379(9829): 1887-1892. doi: 10.1016/S0140-6736(12)60516-9

6. Decker G, Coosemans W, De LP, et al. Minimally invasive esophagectomy for cancer. *Eur J Cardiothorac Surg*. 2009, 35: 13-20.

7. Gemmill EH, McCulloch P. Systematic review of minimally invasive resection for gastro-oesophageal cancer. *Br J Surg*. 2007; 94: 1461-1467. doi: 10.1002/bjs.6015

8. Biere SS, Cuesta MA, Van der Peet DL. Minimally invasive versus open esophagectomy for cancer: a systematic review and meta-analysis. *Minerva Chir* . 2009; 64: 121-133.

9. Briez N, Peissen G, Bonnetain F, et al. Open versus laparoscopically-assisted oesophagectomy for cancer: a multicentre randomised controlled phase III trial- the MIRO trial. *BMC Cancer*. 2011; 11: 310. doi: 10.1186/1471-2407-11-310

10. Luketich JD, Pennathur A, Franchetti Y, et al. Minimally Invasive Esophagectomy: Results of a Prospective Phase II Multicenter Trial- The Eastern Cooperative Oncology Group (E2202) Study. *Ann Surg*. 2015; 261(4): 702-707. doi: 10.1097/SLA.0000000000000993

11. Avery KN, Metcalfe C, Berrisford R, et al. The feasibility of a randomized controlled trial of esophagectomy for esophageal cancer- the ROMIO (Randomized Oesophagectomy: Minimally Invasive or Open) study: protocol for a randomized controlled trial. *Trials*. 2014; 15: 200. doi: 10.1186/1745-6215-15-200

12. Puntambekar S, Kenawadekar R, Kumar S, et al. Robotic transthoracic esophagectomy. *BMC Surg*. 2015; 15: 47. doi: 10.1186/s12893-015-0024-2

13. Mori K, Yamagata Y, Aikou S, et al. Short-term outcomes of robotic radical esophagectomy for esophageal cancer by a nontransthoracic approach compared with conventional transthoracic surgery. *Dis Esophagus*. 2015. doi: 10.1111/dote.12345

14. Trugeda Carrera MS, Fernandez-Diaz MJ, Rodriguez-Sanjuan JC, et al. Initial results of robotic esophagectomy for esophageal cancer. *Cir Esp*. 2015; 93(6): 396-402. doi: 10.1016/j.ciresp.2015.01.002