CASE REPORT

Successful surgical management of early esophageal cancer in a patient with cystic fibrosis post-bilateral lung transplantation

Siun M Walsh,¹ Nomsa Maphango,¹ Jim J Egan,² John V Reynolds¹

¹St James's Hospital, Dublin, Ireland
²Mater Misericordiae Hospital, Dublin, Ireland

Correspondence to

Siun M Walsh,
 siunwalsh@gmail.com

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SUMMARY

We present the first reported case of successful surgical management of esophageal cancer post-lung transplantation for cystic fibrosis. This case of a 42-year-old man highlights the risk factors for esophageal adenocarcinoma associated with cystic fibrosis and lung transplantation, the management options for early esophageal cancer and the surgical option chosen to minimise respiratory risks. Individualised patient care may allow for curative surgical approaches, even where complex surgery is required.

issues were involved, and highlight the basis for the key management decisions.

CASE PRESENTATION

A 42-year-old man with CF, 13 years post-bilateral LT, with a 20-year history of GERD, on proton-pump inhibitor therapy, presented with weight loss and abnormal liver function tests. His medications included tacrolimus, mycophenolate mofetil and prednisolone. He was also taking creon for pancreatic insufficiency. He was on long-term cefixime and colistin for chronic apical lower respiratory tract infection, for which he had undergone insertion of a right bronchus intermedius stent. He had not undergone previous functional esophageal testing.

INVESTIGATIONS

Endoscopy revealed a 2.5 cm mucosal nodule within 4 cm of Barrett's esophagus ([figure 1](#)). Histology revealed invasive EAC, staged as T1N0 by CT- positron emission tomography and endoscopic ultrasound ([figure 2](#)). Imaging showed fluorodeoxyglucose uptake in the lower esophagus, chronic right upper lobe inflammatory changes and a right main bronchus stent ([figure 3](#)).

DIFFERENTIAL DIAGNOSIS

Following multidisciplinary team (MDT) discussion, the patient's tumour was resected by EMR, with a plan to add RFA if negative margins could be achieved ([figure 4](#)). However, pathological evaluation revealed submucosal invasion and

BACKGROUND

Esophageal cancer has been described in cystic fibrosis (CF), but is associated with dismal reported outcomes.^{1 2} The increased risk of esophageal adenocarcinoma (EAC) in CF is due to chronic gastroesophageal reflux disease (GERD), as well as immunosuppression from CF treatment, or immunosuppressive treatment post-lung transplantation (LT). The surgical treatment of EAC is associated with significant risks of major morbidity and mortality, and the surgical management of patients with CF+LT is fraught with potential risks, particularly from pneumonia, respiratory failure and sepsis. Where EAC presents early, new approaches, including endoscopic mucosal resection (EMR) and radiofrequency ablation (RFA), may be curative. We report a case successfully managed where all these

Figure 1 Endoscopy showing 2.5 cm nodule in the lower esophagus.

Figure 2 Endoscopic ultrasound.

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Figure 3 CT-positron emission tomography showing fluorodeoxyglucose uptake in the lower esophagus (white arrow) and right main bronchus stent (red arrow) and chronic inflammatory changes in the right upper lobe.

involved margins, therefore, a further MDT consensus recommended surgery. This was discussed between cancer specialists and the transplant and CF team, who agreed that surgery could be entertained; an option the patient was keen to pursue.

His pulmonary function tests showed normal airway function with an FEV₁ of 3.04 L and minimal impairment of alveolar efficiency (diffusion capacity 80%). He was therefore deemed to be fit for surgery.

TREATMENT

A transhiatal esophagectomy was performed, with immediate postoperative extubation. Immunosuppressive therapy was recommenced 3 days after the surgery. The patient was monitored for 5 days in the high dependency unit.

OUTCOME AND FOLLOW-UP

The patient developed no major respiratory complications and was discharged home on postoperative day 16. He was recommenced on immunosuppressive therapy in the early postoperative period. Histopathological analysis showed a pT1b N0 EAC with negative margins. He remains well and disease free 2 years postsurgery. He has had endoscopic assessment, which has shown no evidence of recurrence.

DISCUSSION

GERD is common in CF, affecting over 60% of patients clinically, and approximately 90% if evaluated by physiological studies.^{3–5} This may be due to alteration of the thoracoabdominal pressure gradient and the presence of abnormally depressed lower esophageal sphincter tone.³ The consequences of GERD in patients with CF include impaired pulmonary function from aspiration,⁶ with increased risk of EAC from chronic or severe reflux. For patients with LT, GERD is also common,⁷ with Barrett's esophagus reported in 19% of patients. The 5 year survival rates following LT for CF is approximately 60%.⁸ Patients with LT with CF have higher rates of GERD (90% vs 54% in non-CF controls), and, consequently, the risk of EAC for LT and

CF is likely to be cumulative.⁵ In addition to severe and chronic GERD, inflammation secondary to inadequate pancreatic secretions, high concentrations of bile acids and exposure to exogenous pancreatic enzymes may also be contributory.¹ Tumour markers including cancer antigen (CA) 19-9 and CA 125, which are mucin-associated genes, have been shown to be overexpressed in CF patients.⁹ A study of 41 188 patients with CF demonstrated a standardised incidence ratio of 13.2 for esophagogastric cancer and 35.8 for esophageal cancer among patients with post-LT CF.²

Major operative surgery had to be considered for this patient, since EMR could not achieve a cure, and there is no strong evidence base to support chemoradiation in EAC, in contrast to that in squamous cancers. The operative risks of esophagectomy are considerable, albeit significantly improved in the modern era, but this case presented distinct challenges.¹⁰ In addition to CF and immunosuppression with risks of sepsis and anastomotic failure, this patient's previous LT surgery potentially threatened technical aspects of mediastinal dissection. Since a transhiatal esophagectomy avoids a thoracotomy and lung collapse and manipulation, this was chosen in preference to a transthoracic esophagectomy (TTE), as a previous randomised trial established a lower respiratory morbidity compared with TTE, and equivalent oncological outcomes for early node negative tumours.^{11–13}

To the best of our knowledge, this is the first reported case of esophagectomy for EAC in a patient with CF who has undergone LT. The surgery was straightforward and the recovery unremarkable with respect to all potential major risks, and the final pathology should equate with oncological cure. We highlight that, with improved life expectancy of CF and long-term survival of LT, individualised patient care may allow for curative surgical approaches in what may be an increasingly recognised cancer, even where complex surgery is required. Moreover, effective treatment of GERD, and surveillance of patients with CF and LT for early cancer, may improve outcomes for this at-risk group.

Figure 4 Endoscopic mucosal resection—application of the band and postresection.

Learning points

- ▶ Patients with in cystic fibrosis (CF) who have undergone lung transplantation (LT) should be considered for surgical treatment of esophageal cancer, given their improved expected survival in recent years.
- ▶ Gastroesophageal reflux disease should be monitored and effectively treated in patients with CF, in particular those who have undergone LT, in order to minimise the risk of development of esophageal malignancy.
- ▶ Close surveillance of patients with CF and LT for early cancer may improve early detection and outcome of esophageal cancer.

Competing interests None declared.

Patient consent Obtained.

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