



ESOPHAGECTOMY FOLLOWING A LEFT PNEUMONECTOMY

Surgery

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ABSTRACT

A surgical challenge, that any thoracic surgeon can be exposed to, is transthoracic esophagectomy post pneumonectomy. It has been rarely described in the literature.

Herein, we report a case of a 68 year old female patient, with history of left lung adenocarcinoma treated by left pneumonectomy followed by chemotherapy and radiotherapy, admitted for surgical management of a second primary esophageal cancer by esophagectomy.

KEYWORDS:

Esophageal cancer, Lung cancer surgery, Pneumonectomy

INTRODUCTION

The incidence of esophageal carcinoma in patients with previous history of lung carcinoma is rare, ranging from 0.05 to 0.5%^[1,2]. Very few cases have been reported in the literature describing an esophagectomy post pneumonectomy.

Esophagectomy is the surgical removal of all or part of the esophagus. Several procedures are described for resection of the esophagus. Transhiatal esophagectomy is done through a laparotomy and a cervical incision. Transthoracic esophagectomy can be done through 2 incisions, laparotomy and a thoracotomy incision, or 3 incisions, laparotomy, thoracotomy and cervical incision.

The post pneumonectomy space is a challenge due to anatomic changes and dense adhesions. Transhiatal esophagectomy could help theoretically avoiding the postpneumonectomy space, but this surgical option may not be technically feasible due to the adhesions after pneumonectomy and nodal dissection^[3]. The transthoracic esophagectomy may be a better option but may still be considered as a surgical challenge due to the passage through the postpneumonectomy space with all the risks of reentering this space.

CASE DESCRIPTION

A 68 year old woman with a 60 pack/year history of smoking was admitted to our institution for evaluation of dysphagia. Her medical history was significant for a non-small cell carcinoma (poorly differentiated Adenocarcinoma) of the left lung treated by neoadjuvant chemotherapy and radiotherapy followed by a left pneumonectomy 1 year prior to this admission.

The patient described a 1 month history of dysphagia mainly to solid foods, increasing progressively over this period of time, and a 3 Kg weight loss. Gastroscopy showed a mid-esophageal lesion with biopsy showing poorly differentiated carcinoma compatible with the primary lung carcinoma.

PET scan showed a hot lesion on the mid-esophagus without any evidence of distant metastasis.

Pulmonary function tests revealed a forced expiratory volume (FEV1) of 1.19 L (55% predicted), forced vital capacity (FVC) of 1.45 L (49% predicted), FEV1/FVC of 82%, and diffusion lung capacity of oxygen DLCO of 2.7 mmol/kPa.min (48% predicted). Cardiac Ultrasound

showed a normal Ejection Fraction (64%) and cardiac angiography showed normal coronaries.

Based on the clinical data indicating surgical respectability, the decision was made to proceed with esophageal resection.

The patient underwent a left posterolateral thoracotomy through the previous incision. The left thorax was entered through the fourth intercostal space to avoid the elevated diaphragm postpneumonectomy. Small quantity of fluid was found with some heavy fibrosis and thickened parietal pleura. After extensive sharp dissection the esophagus, left bronchial stump, left pulmonary artery stump and descending aorta were identified. Extreme attention should be given to the dissection due to the anatomical distortion and dense adhesions surrounding those 4 vital structures.

After liberation of the thoracic esophagus, abdominal midline incision was made, opening the peritoneum and identification of the stomach which was dissected completely. Division of the stomach was next with creation of a gastric pouch which was tunneled to the cervical region, and side to side esogastric anastomosis was done using endo GIA45.

The patient's postoperative course was uncomplicated. She was discharged home on postoperative day 13.

Pathology revealed a second primary cancer (esophageal squamous cell adenocarcinoma).

One year postoperatively, the patient was doing well when examined on a scheduled follow-up visit.

DISCUSSION

Rarely a postpneumonectomy space has been explored by surgical intervention. All the anatomic changes of this space described in the literature have been the result of autopsies and radiologic studies mainly. Among those changes, the most evident ones are: mediastinal shift toward the operated side, elevation of the ipsilateral hemidiaphragm, narrowing of intercostal spaces and hyper expansion of the remaining lung. To a lesser degree we can also note a pulmonary herniation with a posterolateral shift of the heart, esophagus, trachea and great vessels. That's what makes the postpneumonectomy space a challenging area.

The shifted mediastinum, elevated diaphragm, narrowed intercostal spaces along with proliferation of the parietal pleura; partially obliterate the space with little fluid or fibroblast impregnated material remaining^[4]. Add to this, the dense adhesions formed and their contribution to the risk of reentering the postpneumonectomy space.

Rarely transthoracic esophagectomy postpneumonectomy have been described in literature, and to our knowledge all cases reported were through right transthoracic approach including those done by minimally invasive procedures.

Hence, due to the above mentioned changes transthoracic esophagectomy post pneumonectomy should be done at level of fourth intercostal space to avoid injury to diaphragm and decrease the risk of entering the abdomen.

On the other hand, reentering the postpneumonectomy space through a left transthoracic approach rises the risk of injury of major vessels and structures including aortic arch, descending aorta, trachea, bronchial stump and hemiazygous vein.

Indications for re exploration of the postpneumonectomy space include esophagectomy, trauma, cardiac procedures, and surgical intervention for a complication postpneumonectomy such as empyema.

Once indicated it is essential to know the physiologic and anatomical changes that occur postpneumonectomy. Here lies the importance of preoperative planning by CT - scan, not only for oncological staging but also for defining the anatomy of this challenging space.

CONCLUSION

Mediastinal shift toward the operated side, elevation of the ipsilateral hemidiaphragm, narrowing of intercostal spaces, hyper expansion of the remaining lung, post-operative adhesions, and thickening of the pleural contribute synergistically to the risk of reentering the postpneumonectomy space. Careful and accurate dissection is required to avoid injury to major vessels and structures including aortic arch, descending aorta, trachea, bronchial stump and hemiazygous vein.

Consequently, if re exploration of the postpneumonectomy space is indicated it is essential to know the physiologic and anatomical changes that occur postpneumonectomy.

REFERENCES

1. Fekete F, Sauvanet A, Kassisserian G Associated primary esophageal and lung carcinoma: a study of 39 patients. *Ann Thorac Surg* 1994;58:837–842.
2. Barbone G, Longo G, Fiore T. The treatment of the patient undergoing thoracotomy after pneumonectomy. *Minerva Chir* 1991;46:1183–1185.
3. Michael J. Reardon, Anthony L. Estreza, Lori D. Conklin, Patrick R. Reardon, F. Charles Brunicardi, and Arthur C. Beall. Esophagectomy after pneumonectomy: a surgical challenge. *Ann Thorac Surg* 2000;69:286–288.
4. Biondetti PR, Fiore D, Sartori F Evaluation of the post-pneumonectomy space by computed tomography. *J Comput Assist Tomogr* 1982;6:238–242.
5. A Thomas Pezella, A Alan Conlan, Gerald J Carroll. Early management of the postpneumonectomy space. *Asian Cardiovasc Thorac Ann* 2000;8:398-402