Bronchoscopic Debulking Followed by Bronchoplastic Procedure Helps in Limiting Lung Resection in a Bronchial Carcinoid: A Case Report

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Abstract Bronchoplasty is a conservative procedure in lung surgeries used in the past for patients with poor functional status but recently these procedures have been performed in low grade malignant tumors of lung avoiding extensive morbid procedure like pneumonectomy without compromising the oncologic outcome. We describe a case of bronchial carcinoid treated by bronchoscopic intervention followed by wedge bronchoplasty. The importance of bronchoscopic debulking of the tumor for accurate assessment of its extent has been highlighted. A parenchyma preserving pulmonary resection can then be performed with bronchoplastic technique, thus avoiding pneumonectomy.

Keywords Carcinoid · Wedge bronchoplasty · Thoracic surgery

Introduction

Bronchoplastic procedures were popularised by Khargi and colleagues in 1996 [1]. These procedures were introduced for patients with poor pulmonary reserve in the past but are

recently considered as standard procedure in low grade lung cancers regardless of functional status.

Case Report

An 18-year old boy presented with dry cough and breathlessness for four years. Clinical examination and chest x-ray revealed right lung collapse with mediastinal shift towards right. Computed tomography (CT) of chest showed polypoidal mass in right main bronchus with complete obliteration of right main bronchus and proximal lobar bronchi near hilum, with almost complete collapse of the right lung (Fig. 1). Bronchoscopy showed a polypoidal mass almost completely occluding the right main bronchus and extending through the carina into lower trachea (Fig. 2). Biopsy of the tumor revealed typical carcinoid tumor. Staged treatment - bronchoscopic debulking of the tumor followed by definitive surgery was planned. Bronchoscopic snaring of the polypoidal tumor was performed as an initial measure. Bronchoscopic evaluation following the procedure showed tumor localised to right upper lobar bronchus and minimal extension to lateral wall of the right main bronchus.

A week later, he underwent right posterolateral muscle sparing thoracotomy. There was a palpable residual tumor in right upper lobe bronchus, with dense adhesions of lung with parietal pleura and mildly enlarged peribronchial lymph nodes. With intraoperative bronchoscopy guidance, right upper lobectomy was performed along with a cuff of right main bronchus. Frozen section analysis was not done in view of adequate margin and routine mediastinal lymph node dissection not done for typical carcinoid. Wedge bronchoplasty was performed by closing the defect transversely with 4–0 polydioxanone (PDS) single layered interrupted sutures. Parietal pleural flap was used to reinforce the closure.

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Fig. 1 CT chest showing right main bronchus growth into carina

Postoperatively, he developed collapse of right lung because of mucus plug occluding the bronchus; this was treated with bronchoscopic toileting and chest physiotherapy. The patient was discharged on the eleventh postoperative day.

Histopathology report showed well differentiated neuroendocrine tumor, typical carcinoid of right upper lobar bronchus, immunopositive for chromogranin and synaptophysin. Ki-67 index was less than 2 %. Margins and peribronchial lymph nodes were free. One year following the surgery, the patient is doing well.

Discussion

Bronchial carcinoids are neuroendocrine neoplasms arising from Kulchitsky cells of the bronchial epithelium representing 2 % of all primary lung carcinomas [2]. They are locally invasive indolent tumors with 10 to 15 % regional lymph node involvement [3]. Majority (90 %) arise in the central bronchi with symptoms of postobstructive pneumonia, dyspnoea, hemoptysis or cough. Preoperative bronchoscopic intervention solves the problem of obstructive pneumonia and gives a clear assessment of real margins of the tumor [4].

Pneumonectomy has generally been performed for centrally located tumors but recently conservative resection for low grade tumors been performed without compromising oncologic outcome [5–8] avoiding pneumonectomy, whenever distal lung function is conserved and surgical planes of resection are adequate [9, 10]. Wedge bronchoplasty, flap bronchoplasty, sleeve lobectomy and lung parenchyma preserving bronchotomy are the types of lung conservative surgery. Parenchyma sparing bronchotomy is performed in benign or low grade malignancy without extrabronchial spread, without regional lymphadenopathy and with a small base of origin. Frozen section of margin and nodes is preferable whenever conservative surgery is attempted. Anastomotic site is covered with pericardial fat, parietal pleura, internal intercostal muscle or fibrin glue to prevent leak and fistula [11]. Sleeve lobectomy has been reported to have higher rates of

anastomotic complications, similar tumor and nodal clearance and similar local recurrence [5–24 %] and operation mortality [2.7–7.5 %] when compared to wedge bronchoplasty [12–14]. Postoperative sputum retention has been reported to be as high as 14.7 % after wedge bronchoplasty and often requires bronchoscopic toileting [14].

In the present case, the patient had a centrally located carcinoid that appeared to involve the right main bronchus extending across the carina into the lower trachea. This would otherwise have necessitated right pneumonectomy with carinal resection and reconstruction. Bronchoscopic debulking by snaring the polypoidal component of the tumor allowed accurate assessment of the tumor that was seen to involve the right upper lobe bronchus with small extension into the main bronchus. This allowed right upper lobectomy with wedge bronchoplasty, thereby avoiding pneumonectomy and a complex carinal reconstruction. An extensive resection with potential morbidity could be avoided without compromising the oncologic outcome.

We consider this two-staged procedure (bronchoscopic intervention followed by parenchyma preserving surgical

Fig. 2 Bronchoscopy showing bronchial carcinoid

resection) to be safe, easy, and useful to preserve postoperative pulmonary function. This approach should be used more often for the surgical management of tumors of low-grade malignancy, such as bronchial carcinoid.

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