Case report - Thoracic general

Photodynamic therapy for synchronous occult bronchial cancer 17 years after pneumonectomy

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Abstract

We present a patient with radiologically occult double synchronous bronchial neoplastic lesions 17 years after right pneumonectomy. Chest radiograph and CT scan of the thorax showed no abnormalities of the residual lung fields nor mediastinal lymphadenopathy. Standard white light bronchoscopy (WLB) revealed a tumour in the left lower lobe bronchus. Autofluorescence bronchoscopy (AFB) showed two abnormal fluorescent areas; one in the left lower lobe (as per WLB) and the other in the right lower lateral wall of the trachea. Both of these proved to be neoplastic. The two lesions were treated by bronchoscopic photodynamic therapy (PDT) with complete response so far for 10 months. AFB played a crucial role in diagnosis and ensuring completeness of treatment by PDT in this case with encouraging early results illustrating the respective value of AFB and PDT in such cases.

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Keywords: Fluorescence bronchoscopy; Photodynamic therapy; Post pneumonectomy

1. Introduction

Surgical resection is the treatment of choice for early stage lung cancer. However, in patients with metachronous cancer following previous pneumonectomy, further pulmonary resection is both hazardous and likely to be detrimental to the quality of post-operative survival. Under such circumstances bronchoscopic photodynamic therapy (PDT) appears an ideal method of treatment for patients whose tumour is central in type and bronchoscopically visible and accessible. Bronchoscopic PDT is a two-phase procedure; in the first a photosensitising chemical is injected intravenously to the patient in order to pre-sensitise the tumour. Time is allowed for absorption and preferential retention of the drug in the cancer compared to normal tissues. In the second phase bronchoscopic illumination is carried out to expose the pre-sensitised cancer to the specific laser light. Interaction between the chemical and light, in the presence of tissue oxygen, is cytotoxic and produces necrosis of the cancer.

We present a patient with double (synchronous) early stage, endobronchial tumours, 17 years after right pneumonectomy for cancer, treated by PDT. A literature search appears to indicate this to be the first report of such a case.

2. Case report

A 55-year-old man presented with cough and intermittent haemorrhagic expectoration. He was known to have had a right pneumonectomy for squamous cell carcinoma 17 years previously. Plain chest X-ray and CT scan of the thorax and abdomen revealed clear residual lung field, no mediastinal lymphadenopathy or abdominal lesions. Standard white light bronchoscopy (WLB) showed a small 1.5 cm nodular lesion in the left lower lobe which a biopsy showed to be squamous cell carcinoma. Pulmonary function testing showed FVC: 1.6 l (36% of predicted value) and FEV, of 1 l (30% of predicted value). Management of the patient was discussed by the multi-disciplinary team (MDT), which did not consider either surgical resection, radiotherapy or chemotherapy to be suitable treatment in this case. The patient was referred to us for bronchoscopic PDT.

On admission to our centre the patient had pre-PDT bronchoscopic mapping of the lesion [1] with WLB and autofluorescence bronchoscopy (AFB) using the Xillix LIFE lung system. WLB confirmed the left lower lobe lesion but AFB showed two areas of abnormal fluorescence; one in the left lower lobe area (LLL) similar to that seen with WLB, and a second lesion 1×1.5 cm at the lower end of the trachea near the previous right pneumonectomy stump (TBS). Biopsy from the LLL confirmed squamous cell carcinoma and brush and biopsy sampling from TBS contained malignant cells and an indication of carcinoma in-situ.

Pre-sensitisation was carried out using Photofrin™ (Porflamer Sodium) 2 mg/kg/bw intravenously. Twenty-four hours later the patient had bronchoscopic illumination. This was carried out as per our previously described method [1,2] using a 630 nm diode laser (Diomed) delivering light through an optical fibre with a 1 cm cylindrical diffusing
A tip that was introduced through the working channel of the fibreoptic bronchoscope. Illumination was carried out in the two areas namely LLL and TBS. The light dose was 150 J/cm of the tumour for each area (400 MW × 375 s). The patient was discharged home three hours after treatment. He was reviewed 3 and 9 months later in the clinic and was found to be well and asymptomatic. Bronchoscopic examination was also carried out on these visits, which revealed no evidence of residual tumour macroscopically, or on cyto/histological examination.

3. Discussion

Bronchoscopic PDT has been carried out for over 20 years to treat many hundreds of patients with central type lung cancer [3] with the objective of palliation in advanced disease and with curative intent in early stage disease [1,2,4,5]. The currently accepted indications for bronchoscopic PDT in early stage disease are: inoperability on account of poor general condition, inadequacy of pulmonary function or patients refusal of surgery [2–4]. Indications for PDT in our patient were because of his previous pneumonectomy and inadequate spirometry. He also had synchronous (bifocal) lesions and was an ideal candidate for bronchoscopic PDT. It is important to highlight the role of AFB, which was responsible for identifying the synchronous lesions in this case. Such a role has been well documented in early neoplastic, as well as synchronous endobronchial lesions [6,7]. However, to our knowledge AFB has not been used to show a synchronous (and metachronous) lesion after curative pneumonectomy. It is also important to note that in cases of early bronchial cancer such as the case of our patient, PDT can provide long survival and a potential cure [2,4,5].

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References