PHOTOFRIN® should not be used in patients with porphyria, existing tracheoesophageal or bronchoesophageal fistula, tumors eroding into a major blood vessel, emergency treatment of patients with severe acute respiratory distress caused by an obstructing endobronchial lesion because 40 to 50 hours are required between injection of PHOTOFRIN® and laser light treatment, and esophageal or gastric varices or esophageal ulcers >1 cm in diameter.

IMPORTANT WARNINGS AND PRECAUTIONS USING PHOTOFRIN® INCLUDE:
Gastroesophageal Fistula and Perforation: Do not initiate PHOTOFRIN with photodynamic therapy (PDT) in patients with esophageal tumors eroding into the trachea or bronchial tree or bronchial wall.
Pulmonary and Gastroesophageal Hemorrhage: Assess patients for tumors eroding into a pulmonary blood vessel and esophageal varices. Do not administer light directly to an area with esophageal varices.
High-Grade Dysplasia (HGD) in Barrett's Esophagus (BE): After treatment of HGD in BE, conduct endoscopic biopsy surveillance every 3 months, until 4 consecutive negative evaluations for HGD have been recorded.
Photosensitivity and Ocular Photosensitivity: Observe precautions to avoid exposure of skin and eyes to direct sunlight or bright indoor light for at least 30 days. Instruct patients when outdoors to wear dark sunglasses which have an average light transmittance of <4% for at least 30 days and until ocular sensitivity resolves.
Use Before or After Radiotherapy: Allow 2-4 weeks between PDT and subsequent radiotherapy.
Chest Pain: Substernal chest pain can occur.
Airway Obstruction and Respiratory Distress: Administer with caution to patients with tumors in locations where treatment-induced inflammation can obstruct the main airway. Monitor patients closely between the laser light therapy and the mandatory debridement bronchoscopy for any evidence of respiratory distress.
Esophageal Strictures: Esophageal strictures can occur
Hepatic and Renal Impairment: Patients with hepatic or renal impairment may need longer precautionary measures for photosensitivity.
Thromboembolism: Thromboembolic events can occur.
Embryo-Fetal Toxicity: May cause embryo-fetal toxicity. Advise females of reproductive potential of the potential risk to a fetus and to use effective contraception.

MOST COMMON ADVERSE REACTIONS reported during clinical trials (>10% of patients) are:

Esophageal cancer: Anemia, pleural effusion, pyrexia, constipation, nausea, chest pain, pain, abdominal pain, dyspnea, photosensitivity reaction, pneumonia, vomiting, insomnia, back pain, pharyngitis
Obstructing Endobronchial Cancer: Dyspnea, photosensitivity reaction, hemoptysis, pyrexia, cough, pneumonia
Superficial Endobronchial Tumors: Exudate, photosensitivity reaction, bronchial obstruction, edema, bronchostenosis
High-Grade Dysplasia in Barrett's Esophagus: Photosensitivity reaction, esophageal stenosis, vomiting, chest pain, nausea, pyrexia, constipation, dysphagia, abdominal pain, pleural effusion, dehydration

Other photosensitizing agents may increase the risk of photosensitivity reaction. Because of the potential for serious adverse reactions in the breastfed infant, advise patients that breastfeeding is not recommended during treatment with PHOTOFRIN and for 5 months after the last dose.

Please see full Prescribing Information for PHOTOFRIN® (porfimer sodium) for Injection at: www.photofrin.com

FOR MORE INFORMATION about PHOTOFRIN®, or if there are any questions regarding the information provided, visit **www. photofrin.com** or please contact the Medical Information Department at **1-866-248-2039**. You are encouraged to report negative side effects of prescription drugs to the FDA. Visit **www.fda.gov/medwatch**, or call **1-800-FDA-1088**.

PDT with PHOTOFRIN® [porfimer sodium] for injection

PINNACLE BIOLOGICS™

Management of Endobronchial Mucoepidermoid Carcinoma with Photodynamic Therapy

Courtesy of Omar Awais, MD
Chief of Thoracic Surgery, Mercy Hospital
University of Pittsburgh Medical Center

Patient History

This 54-year-old female presented with a history of thyroid cancer and total thyroidectomy. The patient was seen by a local pulmonologist with shortness of breath, malaise, fever, and cough. The patient's symptoms were not responsive to inhalers, prednisone, and antibiotics. The patient underwent a chest x-ray, showing a mass in the left chest. This was followed by bronchoscopy with a biopsy and a computed tomography (CT) of the chest. Subsequently, the patient was referred to our institution for further management.

Examination

On physical exam, the patient appeared anxious and short of breath. She had no lymphadenopathy, a healed surgical incision from prior surgical thyroidectomy, and decreased breath sounds in the left lung with scattered bronchi and wheezing across the left lung fields. Past significant medical history included thyroid cancer and thyroidectomy. She reported no occupational exposures and denied history of smoking.

Diagnostic Evaluation

The CT revealed a mass in the left main bronchus with complete atelectasis of left lower lobe (Figure 1).

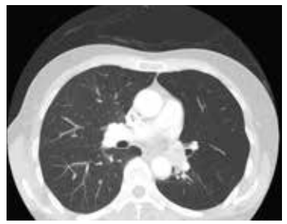

Figure 1 – Preoperative CT scan showing obstruction of left main bronchus.

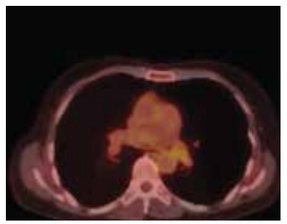

Figure 2 – Preoperative PET CT of left Hilar Mass.

A positron emission tomography (PET) scan and a CT scan revealed a mildly hypermetabolic left hilar mass with endobronchial component. There was no evidence of metastatic disease (Figure 2). Bronchoscopy revealed complete obstruction of left main bronchus with an endobronchial tumor (Figure 3). Biopsy of the mass revealed a mucoepidermoid tumor. Pulmonary Function Tests (PFT) revealed an FEV1 (forced expiratory volume in 1 second) of 43% and severe obstructive airways disease.

See important prescribing and safety information for PHOTOFRIN® (porfimer sodium) for Injection on pages 3 and 4.

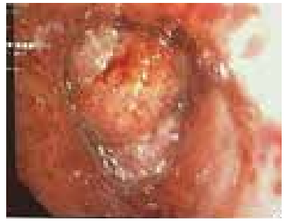
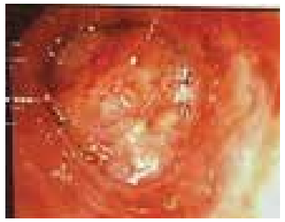

Figure 3 – Preoperative Bronchoscopy showing complete left main bronchus.

Lung ventilation and perfusion imaging revealed the right lung had 91.3% of total lung activity and the left lung had 8.7% of total lung activity.

Due to airway obstruction from the endobronchial tumor, PDT treatment was chosen initially to resect the endobronchial tumor, establish luminal patency, and determine the origin of the tumor in hopes to properly evaluate for surgical resection and avoid a pneumonectomy

Course of Treatment

The patient was administered 2mg/kg of PHOTOFRIN® (porfimer sodium) for Injection intravenously on day 1. On day 3, the patient underwent a bronchoscopy with an application of the PDT laser at the energy setting of 200 joules, using a 2.5-cm rigid, diffusing fiber for 500 seconds. On day 5, the patient was taken back to the OR for debridement, and complete luminal patency was established of the left upper lobe (Figure 4). A repeat light application of the PDT laser was performed at 200 joules with a 1.5-cm fiber for 500 seconds; the treatment was divided by giving 200 seconds into the superior segment of the left lower lobe, and 300 seconds in the basilar segment of the left lower lobe.

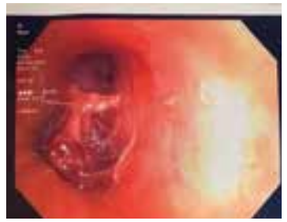

Figure 4 – Bronchoscopy image after first debridement showing patent left upper lobe.

On Day 7, the patient returned to the OR for further debridement of the left lower bronchus with another repeat application of PDT set at 50 joules with a 1.5-cm fiber to the left lower lobe basilar segment for 125 seconds. In addition to PDT, a YAG laser with 40 watts, 2105 joules with 143 pulses was also used to assist in the debridement (Figure 5). Final debridement of the left lower lobe was performed on day 10 to open the entire airway.

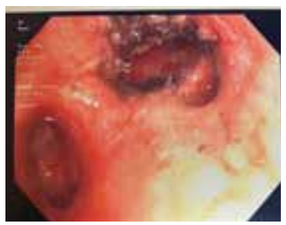
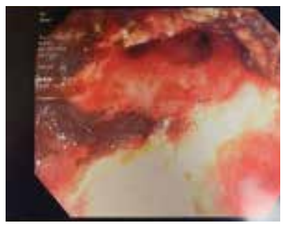

Figure 5 – Bronchoscopy image after second debridement showing patent left upper and lower bronchus (Post PDT, Yag).

Clinical Outcomes

At the clinical follow-up, patient reported significant improvement in wheezing, coughing and shortness of breath. On bronchoscopy, left upper lobe bronchus and lower lobe bronchus were completely patent, and it was evident that the tumor was originating from the basilar segment of the left lower lobe bronchus (Figures 6 and 7). Repeat PFTs demonstrated an FEV1 of 68% with DLCO (diffusing capacity of the lungs for carbon monoxide) of 67%, postoperatively. Perfusion scan was completed as well, which showed the right lung having 65.7% of total lung activity, and left lung improvement to 34.3% of total lung activity.

Follow-up CT scan showed a decrease in bulk in tumor of the left hilum with resolution of tumor involving the left upper lobe bronchus and left lower lobe bronchus.

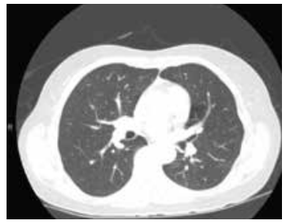

Figure 6 – Post-treatment CT showing patent left upper and lower bronchus.

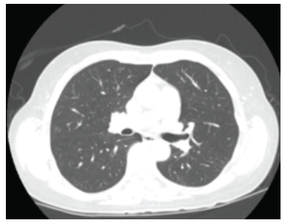

Figure 7 – Post-treatment CT showing patent distal left main bronchus.

Discussion

This case demonstrates applications of PDT for endobronchial ablation of mucoepidermoid carcinoma to establish luminal patency and relieve patient's clinical symptoms. In addition, we were able to determine the site of origin of the tumor more accurately after debridement. Since the tumor originated from left basilar segment, we were able to properly stage and perform a lobectomy versus potential pneumonectomy. This case is a good example of the utilization of PDT for induction therapy.

The information contained in this case study has been supplied by the medical professional whose name appears here. The advice, opinion, statements, materials, and other information expressed and contained in this case study are from the authors and reflect their personal experience with the specific patient. Results may vary. Pinnacle Biologics, Inc. makes no claim that similar treatment will result in a similar outcome.

Important Safety Information About PHOTOFRIN® (porfimer sodium) for Injection

Palliation of patients with completely obstructing esophageal cancer, or of patients with partially obstructing esophageal cancer who, in the opinion of their physician, cannot be satisfactorily treated with Nd:YAG laser therapy.
Treatment of microinvasive endobronchial non–small cell lung cancer (NSCLC) in patients for whom surgery and radiotherapy are not indicated.
Reduction of obstruction and palliation of symptoms in patients with completely or partially obstructing endobronchial NSCLC.
Ablation of high-grade dysplasia (HGD) in Barrett's esophagus (BE) patients who do not undergo esophagectomy.