



Palliative Care for Stenosing Central Lung Tumors: Case Report

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Abstract

General condition of a number of patients at the time of diagnosis of central lung cancer or during the therapy period may be quite severe and not allow the continuation of medication or other special treatment, as well as prolonged endoscopic treatment. Of times, the cause of the severity of the condition is total or partial tracheal obturation or primary bronchial obturation with the development of the following complications.

Keywords: Paracarcinoma pneumonia; Lung destruction; Intoxication; Acute respiratory failure; Strident breathing; Asphyxia

Introduction

Expansion of such complications requires urgent medical measures including endobronchial procedures for palliative purposes, which improve the quality of life and lifetime expectancy [1,2]. In national and foreign scientific literature there are practically no works devoted to the combination of endoprosthesis placement and local and regional combined treatment with the use of various physical influencing factors, including PDT and argon plasma coagulation of stenosing central lung cancer. There is no a single multicentre trial, but occasionally there are certain case reports [3,4]. There is no cross-light on applicability of regional treatment of unresectable central stenosing lung tumors after stenting.

For recent years there are known dynamically developing endoscopic techniques that offer the possibility of intraluminal treatment and have an advantage over other techniques due to low invasiveness and high effectiveness [5,6]. Sometimes, such variants of endoscopic treatment as photodynamic therapy and argon plasma coagulation for the purpose of destruction are the only possible methods of treatment or an alternative to surgical treatment. However, a patient's population who may be submitted to intraluminal therapy is limited due to diminution of the central bronchus or trachea and severe respiratory failure associated with this narrowing, which makes it impossible to conduct completed intraluminal treatment.

There are known results of combined treatment of regional malignant tumors of the trachea and/or bronchus (Arseniev A.I. et al. [7] patent of the Russian Federation No. 2372119, publ., 10.11.2009), as a preparation for brachytherapy and radiotherapy, including an argon plasma recanalization of the lumen of the trachea and/or bronchus at rate of 60W-80W and subsequent photodynamic therapy with the use of medications of chlorin e6 derivatives and radiation of a semiconductor laser with a wavelength of 662 nm. In comparison with, for example, laser recanalization this method allows to double duration of the recurrence-free period. However, argon plasma effect of high rate for the purpose of recanalization, for example, with complete tumor obstruction and inability to accurately establish the anatomical structure of the lumen, can lead to the wall perforation, bleeding and development of other life-threatening complications. In addition, argon plasma recanalization takes quite a long time, which limits the possibility of its use in a large number of severe patients with obstruction of primary bronchus and trachea and infectious-associated purulent complications. We have proposed a method for the safe and effective treatment of central stenosing lung cancer, which includes both endoprosthesis placement and subsequent regional therapy aimed at tumor cytoreduction, increasing and maintaining ventilation of intact lung parenchyma.

Indications for the implementation of the developed methodology are:

- Histologically proven lung cancer (bronchus).

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Figure 1: Right Lung Atelectasis.

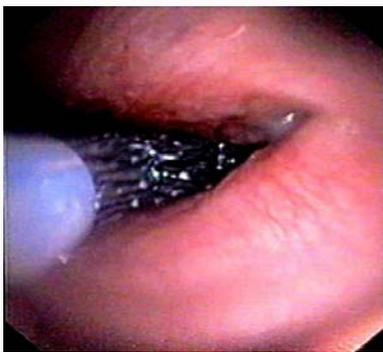


Figure 2: Endoprosthesis of right main Bronchus.



Figure 3: Stent is in the right major bronchus.

- Presence of tumor tissue visualized by bronchoscopy, lumen stenosing of the main bronchus or trachea, or extraluminal tracheal/bronchial compression (exophytic, mixed or compression version of tumor stenosis).
- Violation of ventilation of the pulmonary parenchyma distal to the bronchospasm stenosis, lung atelectasis.
- Possibility of restoring the patency of the trachea/bronchus, ventilation of the lung lobe or the entire lung after restoration of bronchial/tracheal lumen.
- Duration of atelectasis of the intact part of the lung less than 6 weeks.
- Life time expectancy is not less than 6 months.
- Assessment of general status due to ECOG scale <2.

Absolute contraindications to endoprosthesis replacement and

combination therapy:

- Total tumor lesion of the lung parenchyma.
- Acute myocardial infarction, cerebral circulation disorder.
- III degree cardiovascular insufficiency.
- Decompensated renal and hepatic insufficiency.
- Presence of any contraindications to chemotherapy and/or surgery, not mentioned above.
- Photosensitizer allergy.

Relative contraindications:

- Chronic co-morbidities not mentioned among absolute contraindications.
- Exhaustion (body weight less than 70% of that due).
- Atelectasis of the intact part of the lung for more than 6 weeks.

Technical result achieved by proposed treatment modality is to expand the patient's population who can be treated with endobronchial completed treatment. The result is achieved by the implantation of endoprosthesis into the site of the stenosing tumor, through which subsequent photodynamic therapy and argon plasma coagulation of the proliferating tumor tissue is carried out. Photodynamic therapy and argon plasma coagulation are repeated as necessary every 3-6 weeks, depending on the results of the dynamic observation. In treatment of patients with exophytic tumors, the uncoated metal frame stent ensures the implementation of argon plasma coagulation of prolapse tumor tissue through the stent, while it is sufficient to limit the activity of argon (up to 35W-45W instead of 60W-80W) to a minimum, minimizing the likelihood of complications.

Case Presentation and Discussion

Patient P., 59 years old. Clinical diagnosis: squamous cell carcinoma of the right upper bronchus with transition to the right main bronchus. Admission complaints: fever, 39°C to 40°C; Shortness of breath on moderate physical exertion, weakness, exhaustion, cough with purulent sputum. Due to Rg-logical and CT-studies, atelectasis of the entire right lung was revealed, signs of obstructive pneumonia in the atelectasized lung (Figure 1). After computer modeling an extension of oncological stenosis of the main bronchus was defined 1 cm, 8 cm in length. Videobronchoscopy has demonstrated an obstruction of the right main bronchus with formation of a narrow slot in fronterior-lateral wall, through which a mucus-purulent content is being discharged. On May 12th 2011 patient underwent surgery prior to which he was injected a Dexter loading dose (1 mg/kg) intravenously during 20 min with subsequent introduction of titration 1-1,4 mg/kg/hr. 30 min prior an intervention an ampule of Akupan (20 mg) was introduced intravenously. For sedation improvement a Propofol was injected intravenously in the dosis of 0, 3 mg/kg, fractionally. Monitoring of ECG, SpO₂, EQ was provided. During the operation via guide a stenting with endoprosthesis SES-0-12-20. Duration of surgery-4,5 min (Figure 2). After stent implantation additionally Atropin solution is injected and sanitation of bronchi of the lower and middle lobes was performed for 12 min.

Postoperative period was uneventful [1-3]. Following treatment was administered: infusion, antibacterial therapy, bronchial spasmolytics, expectorates. After 24 hours the patient's condition

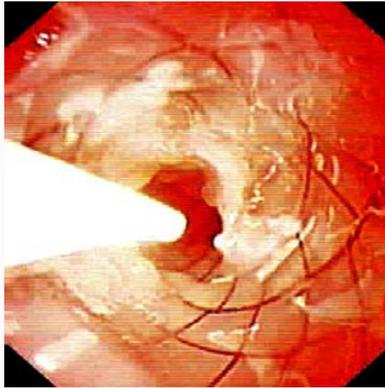


Figure 4: Photodynamic therapy «through stent».

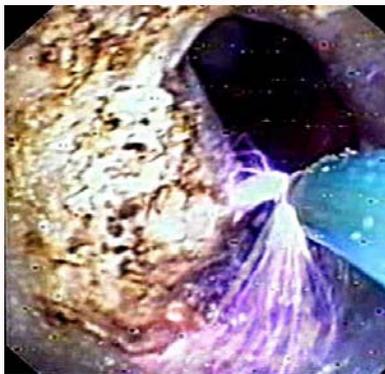


Figure 5: Argon plasma coagulation «through stent».

improved significantly, temperature normalized, signs of intoxication were absent. Control radiography on the third day revealed a stent visualized with clinico-radiographic data of adequate ventilation of the middle and lower lobes (Figure 3). Photodynamic therapy up to achieving energy density of 100 J/cm^2 is performed in a pulse mode «through stent» on May 16th 2011 (Figure 4).

Argon plasma coagulation with argon flow 1,8 liter in a minute with energy 35W is performed «through stent» right after PDT (Figure 5). Hereafter every 1, 5-2 month's patient was admitted to hospital

for dynamic examination and performing of local endobronchial treatment, which included photodynamic therapy and argon plasma coagulation [4-7]. Remission and observation period-14-months. Application of the developed method-performing of endobronchial PDT and APC in the presence of endoprosthesis of trachea/large bronchus allows significantly expanding the patients population which can receive combined treatment of central lung cancer, enables quick and total restoration of respiratory function and reducing of intoxication, to largely improve patients' condition, have longer and more frequent remissions in comparison with endoprosthesis placement without PDT.

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