Palliative Care and Supportive Therapy for Lung Cancer Patients

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Abstract: Palliative medicine occupies an important position in cancer treatment. It is a specialty in cancer medicine ranking with surgery, radiotherapy, anticancer chemotherapy, and immunotherapy. Palliative medicine should be provided to patients throughout the whole process from the diagnosis of cancer to the terminal stage. In a wider sense, it also includes supportive therapy performed during treatment. The management of pain symptoms, which is a pillar of palliative medicine, requires a whole-person approach covering not only physical pain but also mental, social, and spiritual pain. In addition, treatment must be addressed to not only patients but also to their families. The end point of this approach is the improvement of Quality of Life (QOL) paying attention to prognosis. This article discusses the management of coughs, pain, dyspnea, and mental symptoms, which occur frequently; the management of brain metastasis, spinal cord compression, and hypercalcemia, which may develop suddenly and cause considerable deterioration of QOL; and the management of G-CSF-producing tumors and superior vena cava syndrome. Medication, radiotherapy, and mental support for these conditions are considered paying attention to the median survival period after the onset of symptoms.

Key words: Lung cancer; Palliative care; Symptom management; Supportive therapy

Introduction

Palliative care and supportive therapy are forms of comprehensive care addressing the patient as a whole person throughout the whole process of treatment. In Japan, Lung cancer is the leading cause of death from cancer. The median length of survival after the diagnosis of lung cancer is reported to be 11 months. In view of this fact, palliative care and supportive therapy must be introduced from the early days of treatment. Patients with lung cancer experience dyspnea and mental anxiety more strongly than patients with other types of
cancer. Patients with lung cancer also experience frequent coughs during the early phase of treatment, pain from chest wall infiltration and bone metastasis during the middle phase, and dyspnea and mental symptoms during the terminal phase.

Management of Coughs

The explosive exhalation triggered by the cough reflex consumes as much as 2 kcal of energy each time. Persistent coughing causes sleep disorder, dyspnea, general malaise, pain, and anorexia, as well as it induces hemoptysis, pneumothorax, and other complications. This results in considerable deterioration of the patient’s QOL.

1. Treat the causes of coughs, if such an approach is possible. This may apply to wet coughs from heart failure, pleuritis carcinomatosa and infection and interstitial pneumonia as a complication of radiotherapy and anticancer chemotherapy.

2. Sputum retention and wet coughs from a loss of ciliary movement caused by radiotherapy should be treated with expectorant and inhalation therapy combined with respiratory physical therapy for sputum removal.

3. Suppression of coughs should be attempted, if coughs are not contributing to the clearing of airways and persistent. Use dextromethorphan, codeine phosphate, and other oral central antitussive and lidocaine, morphine hydrochloride, and other inhalations.

4. Sufficient pain control should be practiced, because pain in the ribs and lumbar vertebrae prevent coughing and sputum removal, leading to a risk of complications such as pneumonia.

5. When a patient starts coughing, ensure a comfortable body position and maintain appropriate moisture and temperature conditions.

Management of Pain

1. Bone metastasis

The median survival time for stage IV lung cancer with remote metastasis is 6 months. Bone metastasis is usually multifocal and treated with medication. A combination of morphine and nonsteroidal anti-inflammatory drugs (NSAIDs) is preferable to morphine alone. Medication is usually started with oral morphine 20 to 30 mg/day and control is achieved at 60 to 120 mg/day in many cases. Radiotherapy is effective for sudden breakthrough pain caused by body movement.

2. Pain from chest wall invasion and visceral metastasis

This pain usually responds to morphine.

3. Neurogenic pain such as Pancoast syndrome

Although morphine is used in combination with anticonvulsants, ketamine, antiarrhythmic drugs, and other adjuvant analgesic drugs, neurogenic pain is refractory.

Management of Dyspnea

In contrast to respiratory insufficiency documented by arterial blood gas analysis, dyspnea is a subjective feeling described as the “sensation of respiratory effort” and “discomfort in breathing.” The term “dyspneic feeling” is sometimes used to clarify the distinction from respiratory insufficiency. Lung cancer more frequently causes dyspnea than other types of cancer; over 90% of patients experience dyspnea before death.

1. Pathophysiology of dyspnea

The breathing center of the brain transmits respiratory effort signals to respiratory muscles in response to the mechanical stimuli from the stretch receptors of the lungs, muscle spindles and tendon spindles of intercostal muscles and the diaphragm, etc. Copies of respiratory effort
signals are considered to reach the dyspnea detection area of the cerebral cortex via alternative pathways to cause the “sensation of respiratory effort” and “discomfort in breathing” (motor command theory).

2. Causes and nature of dyspnea in terminal lung cancer patients

(1) Dyspnea due to the decrease in respiratory surface
This type of dyspnea is often severe and presents a marked decrease in arterial oxygen tension (PaO₂) and tachypnea. Sensation of effort is considered the main symptom. Typical causes are complications with lymphangitis carcinomatosa, pleuritis carcinomatosa, and pneumonia.

(2) Dyspnea due to airway obstruction
This type of dyspnea is severer than expected from blood gas values. Discomfort in breathing is considered the main symptom. In addition to tracheal stenosis, difficulty in expectoration, coughing, and wheezing may cause dyspnea in many cases.

(3) Psychogenic dyspnea
Dyspnea is associated with the immediate fear of death. This type of dyspnea often occurs at night, and may cause a vicious cycle of dyspnea/suffocation panic attacks.

3. Management principles

(1) Method of evaluation
Evaluation by the patients themselves is important for the control of symptoms. Commonly used evaluation scales are the Borg scale, visual analogue scale, face scale, and cancer dyspnoea scale.²)

(2) Oxygen therapy
While the administration of oxygen is effective in patients with hypoxemia, there are large individual variations in hypoxic respiration response and the placebo effect may be considerable.³) Arrangements should be made so that the patients can be freed from oxygen supplementation when they are at rest and experiencing less subjective symptoms, while they can use oxygen during physical activity.

(3) Systemic administration of morphine
Opioids improve dyspnea via the mechanism of respiratory depression. In other words, they reduce the respiration rate and weaken the sensation of the need for respiratory effort. Opioids are effective in about 70% of cases.⁴) Oral morphine hydrochloride should be started from small doses. If no effect is seen after titration up to 30 mg/day, the patient is likely to be non-responsive.⁵) Dangerous respiratory depression can be avoided using sufficient precaution, because it is preceded by strong sleepiness. Drugs preventing nausea, vomiting, and constipation should be administered concurrently.

(4) Morphine inhalation
Morphine inhalation exerts direct effects of the suppression of airway secretion and coughing and relaxation of airway smooth muscles, as well as systemic effects after absorption. Advantages of this treatment include rapid action, low occurrence of systemic side effects, and ease of use allowing self-control by the patient. A 10 mg dose of morphine in physiological saline and inhalation is administered so that inhalation is completed within 5 minutes. The effect of this treatment comprises the effect of morphine, the effect of the inhalation of physiological saline, and psychological effect. This treatment is effective in about 40% of cases.⁵)

(5) Pleuritis carcinomatosa
This is the most frequent cause of dyspnea in patients with lung cancer. In cases with terminal lung cancer, pleurodesis is indicated only for cases in which the space between the visceral pleura and parietal pleura is eliminated by continuous drainage. Intermittent needle drainage at about 500 to 1,000 ml is preferred in many cases. Intermittent pleural drainage using IVH tube is suitable for cases requiring frequent discharge, and this method causes less pain.⁶)

(6) Respiratory physical therapy
(i) Extracorporeal assisted ventilation is a method of helping sufficient expiration
using compression of the lower part of the chest in time to expiration. This method is effective for stopping the vicious cycle of respiratory panic attacks.

(ii) Squeezing operation is a method in which the operator places his hands on the chest of the patient with sputum retention and applies pressure toward the tracheal bifurcation along the direction of the movement of the ribs during expiration. This method is effective for releasing sputum from bronchi.

(7) Death rattle
Death rattle is caused by secretion in the lower pharynx. Hypoglossal administration of scopolamine hydrobromide (Hysco) injection is effective for alleviating death rattle through suppression of airway secretion.

(8) Furosemide inhalation
Furosemide increases the activity of stretch receptors and decreases the activity of irritant receptors in the lungs, and this alleviates dyspnea. It is also reported to elongate the breath holding time needed for speech, swallowing, and defecation. A 20 mg/A dose of furosemide in physiological saline is inhaled. This treatment does not cause significant side effect.

(9) Sedation
Dyspnea is a distressing symptom that is not easily controlled and involves direct risk of death. Dyspnea often triggers initiation of sedation. In such cases, patients need urgent establishment of palliative treatment, as well as better psychological support and communication. As a rule, sedation should be given with the consent of the patient. The therapy should start with intermittent shallow sedation using such agents as midazolam.

(10) Others
Opening of windows and breezes from an electric fan stimulate the trigeminal nerve on the face and directly improve dyspnea. Oxygen administration is also considered effective. In addition, application on the chest alleviates dyspnea through the action of cold receptors in the airway.

Management of Mental Symptoms
Patients with lung cancer experience fear and anxiety starting from when they undergo diagnostic examinations. These feelings develop into a concrete fear of death with the aggravation of dyspnea. At the same time, various experiences of loss cause depression. Depression is the most frequent mental burden experienced by patients with lung cancer. It has been pointed out that the patients tend not to complain about depression, and this condition is often neglected as being a natural reaction of cancer patients.

Akechi et al. claimed that 10 to 20% of depressed patients need therapeutic intervention, adjustment disorder as a form of slight depression should not be overlooked, patients should be asked specifically using questions such as “Have you felt gloomy or depressed for several days recently?.” They also indicated that screening and diagnosis criteria for depression based on Hospital Anxiety and Depression Scale (HADS) should be introduced.

Management of Brain Metastasis
The median survival time of cases with brain metastasis is 3 to 5 months, and 1-year survival rate is about 10%. MRI should be used in deciding treatment strategy, because brain metastasis appearing as unifocal on CT can be multifocal on MRI. Because small cell lung cancer often accompanies meningeal metastasis, patients with this cancer require cranial irradiation including the base of skull at doses of 30 to 40 Gy. Localized solitary brain metastasis within 2 cm in diameter and consisting of no more than several lesions responds to gamma knife (stereotactic radiation therapy), which can offer good local control in a short time.
Management of Spinal Cord Compression

About 95% of cases with spinal cord compression are caused by the epidural infiltration of vertebral metastasis. Most patients presenting paralysis experience pain arising from the spinal cord or spinal roots several weeks or several months before onset of paralysis.

If vertebral metastasis is confirmed, close follow-up should be continued to avoid overlooking early symptoms and the patient should be informed of the nature of early symptoms. Rapid development of severe compression requires prompt treatment within a few hours. Even in the case of chronic compression, paralysis is inevitable unless radiotherapy is initiated within 2 or 3 days. Paralysis can be avoided in many cases in which treatment is started while the patients are ambulatory. On the other hand, only about one-half of patients presenting paresis and 10% of patients with paraplegia can restore the ability to walk.

Management of Hypercalcemia

Hypercalcemia accompanying cancer is caused by direct bone destruction due to bone metastasis and the increased calcium absorption from bones and uriniferous tubules mediated by parathyroid hormone-related peptide (PTH-RP) produced by cancer. Unless treated promptly, this condition is life threatening. The frequency of hypercalcemia in lung cancer is reported to be 12 to 35%, following breast cancer and multiple myeloma. This condition develops more frequently in cases with squamous cell carcinoma. The median survival time from the onset of this condition is about 1 month.

Major symptoms include nausea, anorexia, weakness, and sleepiness. Care must be taken not to confuse these symptoms with the terminal-stage symptoms of cancer. The standard treatment for moderate and severe cases is the intravenous drip infusion of pamidronate (Aredia®). Among the drugs used for cancer patients, thiazide, NSAIDs, and H₂ receptor antagonists require special attention, as they block calcium excretion.

Management of G-CSF-Producing Tumor

G-CSF (granulocyte colony-stimulating factor), which is mainly produced by large cell carcinoma, causes leukocytosis, fever (≥38°C), and general malaise without evident infection. The standard treatment for tumor fever is naproxen. When control becomes difficult, corticosteroid should be used in combination with naproxen.

Management of Superior Vena Cava Syndrome

About 70% of cases with superior vena cava syndrome are caused by lung cancer. This condition develops more frequently in cases with small cell carcinoma, which tend to develop mediastinal lymph node metastasis. Because this syndrome by itself is not life threatening and treatment strategies depend on histologic typing, histologic diagnosis should be established before treatment whenever possible. The standard initial treatments are chemotherapy or combined chemotherapy and radiotherapy in the case of small cell lung cancer and radiotherapy in the case of non-small cell lung cancer. Carboplatin is usually preferred to cisplatin, which requires large-volume infusion.

Conclusion

This article discusses the management of frequent symptoms in lung cancer, including coughs, pain, dyspnea, and depression, as well as the symptom management of complications, including brain metastasis, spinal cord compression, hypercalcemia, G-CSF-producing tumor, and superior vena cava syndrome. Medication, radiotherapy, and mental support for these
conditions are considered paying attention to the median survival time after the onset of symptoms.

REFERENCES


