Perioperative Management of Severe Interstitial Pneumonia for Rectal Surgery: A Case Report

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Summary: This report describes a case of rectal cancer with severe interstitial pneumonia (IP) and chronic pneumothorax. Acute exacerbation of IP is a serious postoperative complication and the consequences are extremely poor. To provide less invasive surgery and to prevent acute exacerbation of the IP, the patient received chemo-radiotherapy for controlling locally advanced tumor following low anterior resection under combined spinal-epidural anesthesia. Adequate epidural analgesia during the postoperative period had been shown and the epidural catheter was removed on the 3rd postoperative day. The patient showed symptoms of intrapelvic abscess due to the anastomotic leakage at 10th postoperative day. In order to avoid complications due to spinal and epidural anesthesia (epidural abscess, meningitis), and to prevent acute exacerbation of the IP, general anesthesia was employed with minimal fraction of inspired oxygen (FiO2) to perform the colostomy for the anastomotic leakage. The patient recovered without any postoperative respiratory complications. We herein report the successful perioperative management of a rectal cancer patient with severe IP and chronic pneumothorax, with special attention paid to the respiratory functions.

Key words interstitial pneumonia, rectal cancer, operative management

INTRODUCTION

Interstitial pneumonia (IP) is associated with an increased risk of postoperative acute exacerbation [1]. An acute exacerbation of IP is a serious postoperative complication and the consequences are extremely poor. Therefore, a surgeon must do everything possible to prevent an acute exacerbation of IP [2]. We herein report the successful perioperative management of a rectal cancer patient with severe IP and chronic pneumothorax, while paying special attention to the respiratory functions, to less invasive surgery and anesthetic management.

CASE REPORT

A 68-year-old man who was out patient for his IP with chronic pneumothorax was referred to the division of surgery due to rectal cancer. The patient had presented with dyspnea, exhibiting Hugh-Jones grade 4. Fine crackles were audible. The results of pulmonary function testing indicated a pattern of restrictive defects, including a vital capacity (VC) of 1.44 L (44% of predicted VC) and a forced expiratory volume at 1 s (FEV1.0) of 1.42 L (98.6% of forced VC). Arterial blood gas (ABG) analysis data showed a partial pressure of oxygen (PaO2) of 141.9 torr (99.5% arterial oxygen saturation (SaO2)), a partial pressure of carbon dioxide (PaCO2) of 42.6 torr, and pH of 7.452 with 1 L
of nasal flow of oxygen in the supine position. The serum lactate dehydrogenase level was normal. The major causal factors of secondary IP include such factors, as the occupational history, the residential history, the drug history and the collagen disease were evaluated. The patient was diagnosed to have stable idiopathic IP based on clinical findings, chest X-ray films and chest computed tomography (CT) by chest physicians (Fig. 1). A total of 41.8 Gy radiation therapy for controlling locally advanced tumors was conducted for 4 weeks in the combination with 750 mg of Tegaful suppository for 2 weeks, reduction of the tumor size (partial response) was found (T3, N0, M0: stageII) (Fig. 2), and a low anterior resection was employed under combined spinal-epidural anesthesia in spontaneous respiration in the lithotomic position. An epidural catheter was placed at T10-T11 space. A test dose of 4 ml of 1% lidocaine hydrochloride was given to rule out subarachnoid or intravascular placement of the catheter, and then, spinal anesthesia was initiated by injecting 2.8 ml of 0.5% isobaric lidocaine hydrochloride and 1 ml of fentanyl citrate via a 25 gauge spinal needle into the L3-L4 interspace. Epidural analgesia was continuously injected by 2 ml of 1% lidocaine hydrochloride. Intraoperative sedation was provided with titrated doses (10 ml) of propofol; a total of 550 ml of propofol was given. The surgery lasted 4 hrs. The postoperative epidural analgesia was very satisfactory for managing the pain. ABG analysis on 30% fraction of inspired oxygen (FIO₂) showed 100%
of pulse oxygen saturation (SpO₂) and almost the same PaO₂ as that of preoperative data (PH 7.348, PaCO₂ 56.3 torr, PaO₂ 147.0 torr intraoperatively). Postoperative ABG analysis was followings, PH 7.412, PaCO₂ 48.7 torr, PaO₂ 104.5 torr and SpO₂ 99% on 1 L of mask flow of oxygen in the supine position. The postoperative respiratory functions were uneventful. About the 10th postoperative day, the patient showed symptoms of intrapelvic abscess due to the anastomotic leakage. In order to avoid complications due to spinal or epidural anesthesia and to prevent acute exacerbation, general anesthesia was employed with minimal FIO₂ (30% of FIO₂ and 1.7% of sevoflurane with intra venous administration of fentanyl citrate, tidal volume 350 L, respiration rate 6-8/min) for the colostomy. The surgery lasted 100 min. ABG data are followings respectively, PH 7.347, PaCO₂ 52.7 torr, PaO₂ 177.6 torr (intraoperatively), PH 7.438, PaCO₂ 43.4 torr, PaO₂ 84.9 torr (postoperatively). The perioperative pulmonary functions were normal and no problems were observed.

DISCUSSION

IP is associated with an increased risk of postoperative acute exacerbation [1]. Acute exacerbation of IP is a serious postoperative complication and the consequences are extremely poor. Therefore, a surgeon must aim to prevent an acute exacerbation of IP [2]. In addition, the possibility of pneumothorax due to a rupture of the bullae was an important anesthetic consideration in this patient [3,4]. Even though a lung biopsy or bronchoscopy has been recommended to diagnose IP, the high risk of mortality resulting from an acute exacerbation of IP could not be ignored [5,6]. In this case, we did not perform both a lung biopsy and bronchoscopy. To provide less invasive surgery, the patient received radiotherapy for controlling the locally advanced tumors followed by a low anterior resection under combined spinal-epidural anesthesia in spontaneous respiration. A continuous epidural infusion of fentanyl citrate with 1% lidocaine hydrochloride was used to relieve postoperative pain following the first operation and the postoperative pulmonary functions were uneventful. In order to avoid complications such as epidural abscess, meningitis, and to prevent acute exacerbation and rupture of bulla, general anesthesia was employed with minimal FIO₂ (0.3-0.4) at the 2nd operation because the patient’s condition was thought to be bacteremia. The SpO₂ was 100% after intubation. Ventilation consisted of a tidal volume of 350 ml, and a respiratory rate of 6 to 8 breaths/min. The perioperative respiratory functions were uneventful without any pulmonary complications. In this case, there was concern about anastomotic leakage because of the poor condition of the patient, the influence of radiotherapy, and the low colorectal anastomosis, which would require a temporary colostomy to reduce postoperative complications [7].

Seven of 47 lung cancer patients showed an acute exacerbation of IP within 30 days after undergoing video-assisted less invasive thoracic surgery [8]. There was no correlation between the surgical invasiveness and the postoperative complications of the IP [9-11]. However, clinical deterioration in IP is expected and the 5 year survival ranges from 30 to 50%. In addition, few studies have identified the features of IP that are associated with an increased risk of disease progression and death [12,13]. It is possible that one of these factors would restrict major surgery.

Since the high concentration of oxygen is suggested to be one of the causes of the postoperative exacerbation of IP, when a patient received an operation under general anesthesia, minimal FIO₂ must be used with the general anesthesia [9-11,14]. However, the correlation between the high concentration of oxygen and acute exacerbation is controversial and inadequately defined [8,10]. Clark and Lambertsten [15] reviewed the toxic effects of oxygen upon the lung and the mechanisms of pulmonary oxygen toxicity. These results suggested that intraoperative oxygen concentration should be reduced as much as possible [9,10,14,16].

It was difficult to predict the development acute exacerbation of IP [11,14], further studies to investigate the correlation between acute exacerbation and intraoperative FIO₂ in cooperation with an anesthesiologist are needed. For the perioperative administration to prevent an acute exacerbation, methylprednisolone and bronchodilators may be useful [17]. In addition, the presence of inflammation might contribute toacute lung tissue damage and exacerbation. We should avoid surgery in patients demonstrating the presence of inflammation or an active phase of IP. In conclusion, this report documents the successful perioperative management of IP with chronic pneumothorax during rectal surgery. For major surgery for a patient with severe IP, the selection of appropriate therapy under the evaluation of activity of IP, the careful observation of respiratory state after surgery and the cooperation between surgeons and anesthesiologists in order to perform less invasive surgery and prevent postoperative acute exacerbation is thus considered to be important.
REFERENCES


