

PLEURISY MANAGEMENT IN BREAST CANCER

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ABSTRACT

Aims: According to the data of the Russian Ministry of Public Health, in 2014, 46% cases of breast cancer were complicated by exudative pleurisy. In management of the complication, there are two treatment modalities: Pleurodesis induced by sclerosing drugs and immunomodulators, repetitive pleural aspiration or a combination of those. However, there is still inadequate information about the optimal treatment modality. Therefore we aimed to analyze cases with exudative paracancerous pleurisy and compare treatment results in order to determine the most effective treatment mode applied.

Methods: Three patients with exudative paracancerous pleurisy were treated. One patient underwent repetitive pleural aspiration and pleurodesis was performed on two patients. Exudate volume and drainage were determined, in addition, pain assessment by the visual analog scale, general exudate analysis, X-ray, Computer Tomography and Ultrasonography were performed.

Results: The first patient diagnosed with exudative paracancerous pleurisy on the right side and treated by thoracentesis. As response to treatment, exudate volume increased from 300 ml up to 800 ml and the patient rated the pain intensity as 5. The second patient was diagnosed with exudative paracancerous pleurisy on the left side and treated by a combination of thoracentesis and pleurodesis. Pleurodesis is included when the condition worsened after thoracentesis. The treatment concluded with the reduction of exudate volume to the level considered insignificant. The third patient diagnosed with exudative paracancerous pleurisy on the right side treated by a combination of thoracentesis and pleurodesis. Pleurodesis is included when the condition became worse after thoracentesis. Unlike the second patient, including pleurodesis to treatment caused the symptoms to become heavier.

Conclusion: After repetitive pleural aspirations, the patient visited the hospital more frequently and exudate volume increased. Pleurodesis excluded the necessity of punctures and, therefore, the visits. Thus, the treatment with pleurodesis is found to be better than repetitive pleural aspirations, as it decreased the volume of exudate and the number of hospital admissions.

Keywords: Pleurisy, exudates, pleurodesis

INTRODUCTION

Exudative pleurisy is one of the complications of breast cancer. It leads to constantly increasing exudative fluid in the thoracic cavity, reducing the lung volume. It is a reason of respiratory insufficiency (1).

The number of oncological patients increases every year. According to World Health Organization (WHO), cancer incidence increased more than 1.4 million between the years 2008 and 2012, thus 14.1 million people suffer from cancer. It is estimated to reach 22 million in

2032. Comparing the statistical data for these periods, the incidence of breast cancer is increasing with a rate of more than one percent, making this disease one of the most widespread diseases in the world (2).

Today, repetitive aspiration via pleural puncture (thoracentesis) and pleurodesis are two treatment modes frequently used for management of exudative pleurisy. However unfortunately, the treatment regimens for this disorder are insufficient at the present time. Thus, the studies are still being carried out to determine the optimal treatment modality (3, 4). Therefore we aimed

to analyze cases with exudative paracancerous pleurisy and compare treatment results.

MATERIAL AND METHODS

The study took place at the Department of Thoracic Surgery of Omsk City Multidisciplinary Clinical Hospital with permission of ethical committee of Omsk State Medical University. Three patients were included in our study, whose inclusion criteria were being diagnosed with exudative paracancerous pleurisy (which was proved by laboratory and instrumental research methods), persistent pleural effusion with breath insufficiency, inefficiency or incapability for etiological therapy of exudative pleurisy. All patients gave written informed consent for medical treatment.

Patient 1 underwent pleurocentesis until cough developed. The second patient underwent thoracentesis, thoracostomy and pleurodesis with Interferon-alfa-2b; thus the third one underwent thoracentesis, thoracostomy and pleurodesis with doxycycline. Exudate volume and drainage were determined, in addition, pain assessment by the visual analog scale (VAS), general exudate analysis, X-ray, Computer Tomography (CT) and Ultrasonography (US) were performed.

RESULTS

Patient 1

Diagnosis of the patient was exudative paracancerous pleurisy on the right side. She was treated for 6 months and denied drug pleurodesis. Firstly, the patient was admitted with breath insufficiency. Exudate fluid on the right side was found on X-ray examination. The thoracentesis was performed through the 7th intercostal space along the scapular line on the right side. Pleural catheter was placed. After draining until the patient developed cough, the catheter was removed. No other treatment regime was performed. On the 1st day, 300 ml of exudate was removed upon admission. The amount of serohaemorrhagic exudate aspirate was 400 ml on 21st, 35th and 49th days; 700 ml on 63rd, 73rd, 83rd, 93rd, 103rd, 113rd, 130th, 137th, 144th, 151st and 158th days; 800 ml on 165th and 172nd days.

Subjectively, the patient's general condition worsened after each procedure. Exudate volume increased from 300 ml up to 800 ml as demonstrated in Figure 1.

The patient rated the pain intensity as 5.

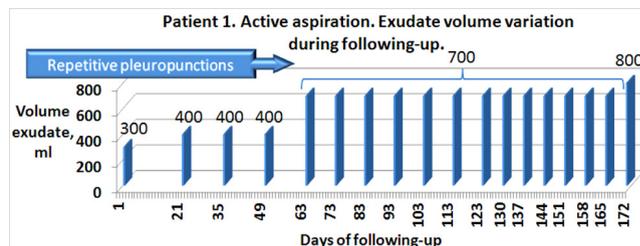


Figure 1: The exudate volume of the first patient in the days of follow-up

Patient 2

The second patient was diagnosed with exudative paracancerous pleurisy on the left side. The patient was admitted to the hospital with breath insufficiency. She was treated for 3 months as depicted in Figure 2. Exudate fluid on the left side were visible on the X-ray. The thoracentesis was performed through the 7th intercostal space along the scapular line on the left side. Pleural catheter was placed. Gravity draining was used until the patient developed cough, then the catheter was removed. The amount of serohaemorrhagic exudate aspiration were as follows: 700 ml during the first manipulation; 600 ml on the next admission three weeks later; 650 ml on the third admission two weeks later and 750 ml two weeks later. The patient agreed on pleurodesis. Ten days later, she was hospitalized for 10 days.

On the 1st day, thoracentesis was performed through the 8th intercostal space along the scapular line on the left side. Draining was performed until cough followed by closing for two hours. At the end of the day, 2000 ml of exudate was removed. On 2nd day, drainage was performed all day long. 300 ml of exudate was obtained. The patient had a rare, mild cough. On the 3rd day, 100 ml of exudate was drained. On the 4th day, 10 ml of exudate was drained in the morning and pleurodesis was performed with 2 ml -10 IU of Interferon-alfa-2b. It was injected in the left pleural cavity via pleural catheter, which was placed earlier. Later, the catheter was closed for two hours, then reopened until discharge and removed. 50 ml of exudate was obtained. On the 5-6th days, 50 ml of exudate was drained. On the 7th day, there were only traces of exudate. On the 8th day, the X-ray examination showed that the left lung was completely unfolded and there was no sign of hydrothorax on this side and also, there was no exudate. On 9th day, there was no exudate too. Pleural catheter was removed. There were no abnormalities in breathing. On the 10th day, X-ray examina-

tion showed that the left lung was completely unfolded. There were no abnormalities detected. The patient was discharged in a satisfied condition.

Patient's condition during pleurodesis: During the injection of Interferon-alfa-2b, the patient did not notice any pain or other unpleasant feeling. Pain intensity was measured as 1. Two hours later, inflammatory fever raised up to 38°C, which persisted for the next three days. Later, body temperature decreased to the normal level and exudate volume reduced. After a month, findings on the CT of chest cavity were as follows: traces of exudation on the left side were presented but was insignificant. The width of pleural plates on the left cavity was 18 mm and multiple pleurodiaphragmatic adhesions were found. During the treatment, interstitial tissue of the lungs was damaged by metastasis, which led to the deterioration of this condition.

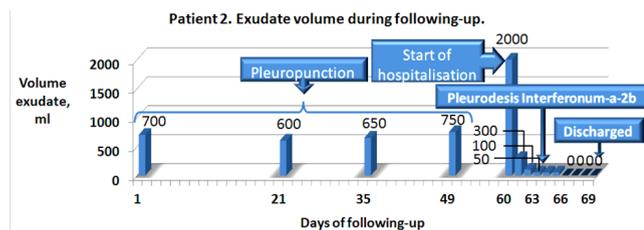


Figure 2: The exudate volume of the second patient in the days of follow-up

Patient 3

The diagnosis of the third patient was exudative paracancerous pleurisy on the right side. She was treated for 2 months as shown in Figure 3. She was first admitted to the hospital with breath insufficiency. Exudate fluid on the left side was detected on X-ray examination. The thoracentesis was performed from the 7th intercostal space along the scapular line on the left side. Pleural catheter was placed. Gravity drainage was used until the patient developed cough, then the catheter was closed and removed. During the first manipulation, 200 ml of serohaemorrhagic exudate was aspirated. The next admittance was two weeks later and 300 ml of serohaemorrhagic exudate was aspirated. The patient did not feel any relief in her pain. She admitted to the hospital for the third time after two weeks with the same complaints. 700 ml of exudate fluid on the right side was found on the CT of the chest cavity. The fluid was completely aspirated via pleural catheter, which was placed through the 8th intercostal space along the scapular line on the right side. Subjectively, general condition worsened. The

patient agreed for drug pleurodesis. After a month, she was admitted to the hospital for 10 days.

The thoracentesis was performed through the 8th intercostal space along the scapular line on the right side. Pleural catheter was placed and a vacuum aspirator was connected. On her 1st day at the hospital, the pleural cavity was drained all day long with the vacuum aspirator. 1000 ml of exudate fluid was aspirated. On the 2-3rd days 300 ml of exudate was drained. On the 4th day, the volume of serohaemorrhagic exudate reached 45 ml in the afternoon. Vacuum aspiration was stopped. The X-ray showed that the right lung was completely unfolded. Then pleurodesis was performed with use of 180 mg of Doxycycline, which was injected via pleural catheter applied before. Catheter was closed for two hours then reopened, then, gravity draining was used. At the end of the day, the collection was 100 ml. On 5-7th days, there was 100 ml collection of exudate. On the 8th day, vacuum aspirator was connected and 150 ml of exudate fluid was aspirated. Gravity draining was used. On the 9th day, there was 50 ml of exudate collection. On the 10th day, there were traces of exudate. Pleural catheter was removed. The patient was discharged. Signs of hydrothorax on the right side were found on ultrasonography. Width between pleural plates was measured as 30 mm. Thoracentesis was performed and 200 ml of serohaemorrhagic exudate with fibrin was aspirated. There were no admissions since that. Subjectively, during vacuum aspiration, the patient had painful hard cough, especially for the first 3 days. Pain intensity was rated as 6. Then pain and cough became mild but persisted during her stay. During pleurodesis these symptoms were heavier.

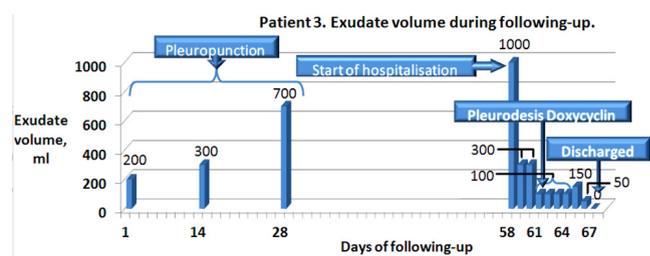


Figure 3: The exudate volume of the third patient in the days of follow-up

DISCUSSION

According to WHO and Russian Ministry of Public Health, the amount of patients with exudative pleurisy in breast cancer will be increased more than 1% annually, also presumably, this number will be approximately 1.36 million cases in 2032 (2). The total number of exudative

pleurisy which are followed by many different disorders is much bigger than amount of exudative pleurisy in breast cancer. Concerning this fact, only cases with exudative pleurisy in breast cancer were reviewed in this study.

Today, we have two ways for management for exudative pleurisy in breast cancer as also reviewed in this study: The first one is repetitive aspiration via pleural puncture (thoracentesis) and the second one is pleurodesis (3). As for the patients included to the research, thoracentesis was performed with use of temporary catheter, while pleurodesis with Interferon-alfa-2b and Doxycycline.

Repetitive thoracentesis are more frequently used as initial treatment for reducing fatal symptoms such as breathlessness in management for exudative pleurisy (3). On the other hand, thoracentesis has limited effect as a permanent therapeutic approach, as more than 98% of metastatic plural effusion associated with lung cancer will relapse within 30 days from the first thoracentesis (3). In our study complications after thoracentesis were increased exudate volume, reduced time between repetitive pleuracentesis, pain rated as VAS-5, cough and unpleasant feelings. Only the first patient was treated by this modality as main treatment while the other two patients received to relieve the fatal symptoms such as breathlessness. All patients responded to this treatment with increased exudate volume and reduced time between repetitive pleuracentesis.

Pleurodesis refers to application of sclerosing drugs into the pleural cavity to achieve symphysis between the visceral and parietal pleura. The optimal sclerosing drug for this treatment regime still remains in a matter of debate (3). In our study, two drugs were used: Interferon-alfa-2b and Doxycycline.

The second patient treated by pleurodesis with Interferon- alfa -2b responded with the absence of exudation developed in 8 days. During the injection of Interferon-alfa-2b, the patient did not notice any pain or other unpleasant feeling and the pain intensity was measured as 1.

In contrast, third patients treated by pleurodesis with Doxycycline responded to the treatment in longer time and the exudate volume increased recurrently to 200 ml after 2 weeks. During pleurodesis, the symptoms cough and pain become heavier. The patient rated the pain intensity as 6 and also had breathing insufficiency.

In the end of the study, we concluded that the repetitive pleural aspirations make the patient visit the hospital more frequently and rise exudate volume, while pleurodesis excludes the necessity of punctures and, therefore, the visits. Both Doxycycline and Interferon-alfa-2b ensured pleurodesis, while Interferon-alfa-2b induces the development of pleurodesis rapidly; reduces pain and shortens visits to the hospital. Thus, the treatment with pleurodesis is found to be better than repetitive pleural aspirations, as it decreased the volume of exudate and the number of hospital admissions.

Ethics Committee Approval: This study was approved by Scientific Researches Ethics Committee of Omsk State Medical University.

Informed Consent: Written informed consent was obtained from the participants of this study.

Conflict of Interest: The authors declared no conflict of interest.

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