

Carcinoma breast related metastatic pleural effusion: A thoracoscopic approach

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ABSTRACT

Background: Pleural effusions are common and devastating complication of advanced malignancies. Lung and breast cancers cause approximately 75% of all malignant pleural effusions. Pleural effusions associated with carcinoma breast (either malignant or paramalignant) pose diagnostic and therapeutic dilemmas for the treating chest physician. **Materials and Methods:** In a prospective study of analysis of unexplained pleural effusions, we performed medical thoracoscopy in 9 cases of carcinoma breast between April 2011 and September 2014. All the relevant clinical and paraclinical were collected and analyzed. **Results:** Sole pleural effusion was the most common radiological finding. This article reviews 9 cases of carcinoma breast patients, who had developed recurrent lymphocytic exudative pleural effusion, within a year of diagnosis. Thoracoscopy was diagnostic in all 9 cases with a histological diagnosis of metastatic carcinoma arising from the breast. Surprisingly malignant cells were negative in pleural fluid of all cases on three consecutive occasions. **Conclusion:** Carcinoma breast related pleural effusion is a common condition encountered in respiratory medicine and oncology. Thoracoscopic guided pleural biopsy is an effective and safe technique in patients with undiagnosed pleural effusion. It not only gives an accurate diagnosis but also gives a high degree of relationship between thoracoscopic appearance and primary disease or tumor classification.

Key words: Carcinoma breast, malignant pleural effusion, medical thoracoscope

INTRODUCTION

Carcinoma breast is the commonest malignant tumor in females. Pleural metastases are common in the course of breast cancer, affecting 10–50% of breast cancer patients.^[1-3] This pleural involvement may be the first and only manifestation of recurrent disease in 20–40% of these patients.^[1,2,4]

In our case series, we included 9 cases of carcinoma breast related lymphocytic exudative pleural effusion, whose pleural fluid cytology was negative for malignant cells on three consecutive occasions. Thoracoscopy showed certain characteristic features and guided pleural biopsy revealed

metastasis from the primary carcinoma breast. Pleurodesis was done in all the cases.

MATERIALS AND METHODS

This is a prospective, nonrandomized and interventional study conducted at Department of Respiratory Medicine, J.L.N Medical College, Ajmer, India between April 2011 and September 2014. We performed thoracoscopy in 9 cases of known carcinoma breast patients, who had developed recurrent, lymphocytic exudative pleural effusion within a year of diagnosis of breast cancer and were treated by surgery alone or by multimodal therapy.

The pleural fluid analysis remained unexplained even after extensive diagnostic work up. Fluid cytology was prepared by conventional smear technique with 5 ml of

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fluid sample centrifuged at 2500 rpm for 15 min; smear was immediately fixed with 95% alcohol and stained, which showed negative for malignant cells thus failed to give any conclusive diagnosis on three consecutive occasions. Hence, we included these patients under undiagnosed category.

Undiagnosed pleural effusion in the present study was defined as a failure to achieve a diagnosis by initial pleural fluid analysis including pleural fluid adenosine deaminase (ADA) levels and at least three pleural fluid analyses negative for malignant cells.

After thorough physical examination, all routine hematological investigations were done; skiagram chest was taken to confirm the diagnosis of pleural effusion. Pleural fluid was aspirated by means of percutaneous thoracentesis and examined biochemically, cytopathologically, and microbiologically. Chest radiography was then repeated at regular intervals to see the re-expansion of the lung and the recurrence. Contrast-enhanced computed tomography of chest was also taken to look for the cause of pleural effusion.

After informed consent, medical thoracoscopy was done in all the patients, and the gross thoracoscopic appearances of the pleura and pleural cavity were videos recorded. Thoracoscopic guided pleural biopsy was taken and sent for histopathological analysis.

RESULTS

During the study period, 9 patients with past history of carcinoma breast were included with a mean age of 46.8 years. Presented with recurrent pleural effusion whose cause remained unexplained after extensive biochemical and cytological analysis.

Primary malignant tumor of the breast was localized on the left side in 7 cases, and right sided in 2 cases. Histological evaluation of pleural biopsy yielded the diagnosis of metastatic deposits from primary ductal carcinomas in 6 cases and lobular carcinomas of the breast in 3 cases.

Pleural effusion was present in all the cases, localized on the left side were 5 cases, on the right side in 2, and on both sides in 2 cases. In total, 7 cases showed pleural involvement on the same side as the primary breast cancer and 2 cases showed bilateral involvement. Pleural fluid was hemorrhagic in all the cases, with pleural fluid hematocrit <50% of peripheral blood.

Pleural fluid was negative for malignant cells on three consecutive occasions. The thoracoscopic view revealed

thickened, nonsmooth pleura which was hyperemic in nature and bled on touch [Table 1]. Pleural nodules of varying sizes grossly studded on both the pleurae with/without the involvement of diaphragmatic pleura. At places, these conglomerated pleural nodules forming “grape like pattern” [Figure 1a and b]. In some cases, isolated distribution of nodules on the parietal pleura mimicking that of “candle wax droplets” [Figure 2a]. Nodules were fragile and bled on touch. Thin fibrinous pleura-parenchymal adhesions were also noted [Figure 2b] in some cases. The diaphragmatic surface was involved in 5 cases. Pleurodesis was done in all the patients, and mean duration of chest tube drainage was 7.2 days (range of 3–15 days). Parietal pleural biopsy revealed metastatic deposits from the primary carcinoma breast [Figure 3].

DISCUSSION

In the vast majority of cases, malignant pleural effusion (MPE) signifies as an incurable disease with high morbidity and mortality. Breast cancer is the most common malignancy of women. It is the second leading cause of cancer-related death among women, after lung cancer.^[5] Breast cancer has two main histologic variants: Infiltrating ductal carcinoma and infiltrating lobular carcinoma. Although there are conflicting reports regarding survival in metastatic breast cancer, several studies have demonstrated distinct metastatic patterns for each histology.^[6-8]

Metastatic patterns of breast cancer are variable. Thorax being the most common place for recurrent disease after local/regional sites and bone.^[9] At autopsy, 57–77% of patients who had breast cancer have evidence of lung metastasis, usually multinodular.^[10,11] In addition to parenchymal disease, breast cancer frequently involves the lymphatics, pleura, and the tracheobronchial tree. The most common thoracic manifestation of metastatic breast carcinoma involves the lung parenchyma. Metastatic breast cancer is a common cause of MPE. Pleural effusion that occurs in the setting of malignant disease is due to a variety of mechanisms. Metastases can involve the pleura directly or indirectly by obstructing pleural lymphatics and interrupting lymphatic drainage.

Table 1: Gross thoracoscopic appearance of the pleura in metastatic carcinoma breast

Gross visual thoracoscopic findings	Number of cases (%)
Nodularity with/without hyperemia	8 (89)
Grape like pattern of pleural nodules	5 (55.5)
Pleural thickening	5 (55.5)
Thin fibrinous adhesions	3 (33.3)
Candle wax droplets appearance	3 (33.3)
Involvement of diaphragmatic pleura	5 (55.5)

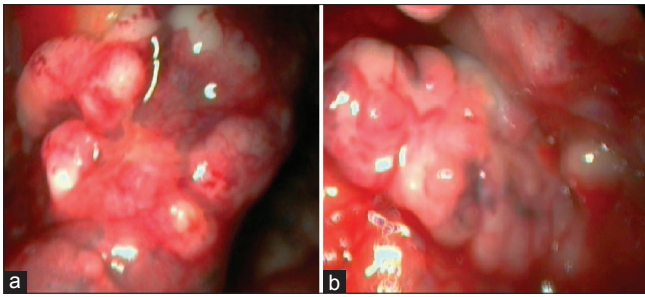


Figure 1: (a) Multiple nodules of varying sizes grossly studded on both the pleurae with hyperemia. (b) Nodules coalesced to form “grape like pattern”

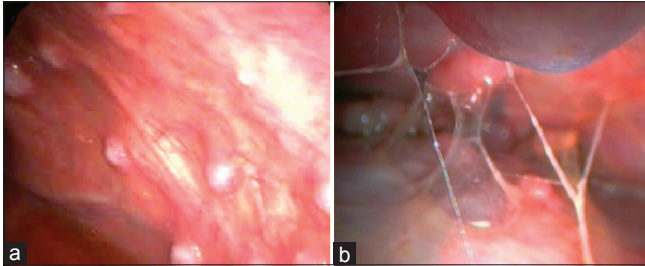


Figure 2: (a) Nodules on parietal pleura mimicking that of “candle wax droplet” appearance. (b) Multiple large nodules with thin membranous adhesions

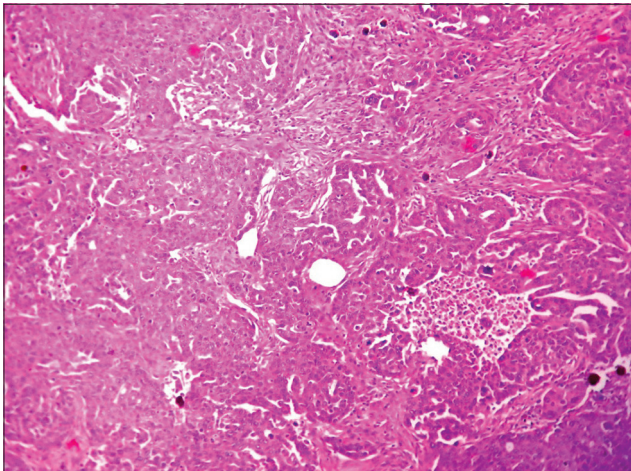


Figure 3: Photomicrograph showing metastatic deposits to pleura from carcinoma breast with infiltrating malignant glands lined by irregular hyperchromatic nuclei, prominent nucleoli and foci of necrosis (H and E, ×40)

Differentiating between malignant and para MPE in a patient with underlying carcinoma breast is a must in the further management of the patient. In approximately 50% of effusions caused by carcinomas, no malignant cells are identified. This can be because of an entity called paramalignant effusions in which there is no direct pleural infiltration such as lymphatic obstruction, bronchial obstruction with pneumonia, atelectasis, trapped lung, chylothorax, superior venacava syndrome, hypoalbuminaemia, thromboembolism and also due to chemo as well as radiotherapy etc., Hence to confirm the diagnosis the standard practice is to perform 3 repeated thoracenteses, which when combined, raise the yield of

detecting malignant cells to about 80%. If the results of the pleural fluid are still negative after repeated thoracentesis; malignancy is still being considered as a differential diagnosis and pleural biopsy should be taken. It is in this context that the thoracoscopy becomes an important investigation modality where the pleural surface can be visualized, and appropriate sample can be easily picked up.

Pleural fluid cytology on all three occasions were negative for malignant cells and predominantly lymphocytic. Along with paramalignant causes of pleural effusion tuberculosis, (TB) is another important entity in patients with immunocompromised status. Thus one must rule it out by clinico-radiological analysis and pleural fluid appearance. Another important differentiating feature is an estimation of ADA enzyme activity. If the ADA level is more than 70 IU/L is highly suggestive of TB and a level of <40 IU/L virtually excludes the diagnosis.^[12]

To the best of our knowledge, there were no case series or larger studies on thoracoscopic appearance in patients of carcinoma breast with pleural effusions are mentioned in the literature or in the available standard textbooks of thoracoscopy. Only a few books have described thoracoscopic appearance in the form of typical images seen in such patients.^[13]

In this case study, all the cases of carcinoma breast presented with recurrent pleural effusion, within a year of diagnosis and were treated either by surgery alone or by means of multi-modal therapy.

Gross thoracoscopic pictures like “grape like pattern” and “candle wax droplets” appearances of pleural nodules were the characteristic features of carcinoma breast related metastatic pleural effusion. However, grape like the pattern of pleural nodules were also been described in cases of epithelioid mesothelioma.

Though it’s a small case series, probably the first one from our country on thoracoscopic appearance in metastatic carcinoma breast with pleural effusion. Pleural infiltration is early, extensive and had a typical gross appearance. Larger case studies are needed on this entity for awareness and in decreasing the time lag in achieving the diagnosis, to initiate the treatment sooner.

Regarding pleural metastases secondary to breast cancer, medical thoracoscopy must be considered as the first choice for obtaining specimens from the pleura for histopathology, as pleurodesis is another advantage of medical thoracoscopy. Talc poudrage can be performed under visual control into the pleural cavity during a medical thoracoscopy, and is probably the most effective method.^[14-16]

CONCLUSION

Thoracoscopy should be considered in all cases of undiagnosed pleural effusion with a history of carcinoma breast without any evidence of local recurrence or pulmonary metastasis to prevent the delay in achieving the diagnosis and to initiate the treatment sooner.

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Conflicts of interest

There are no conflicts of interest.

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