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Original Article

Massive Pleural Effusion Suggesting a Malignant Effusion: A Case Series Study

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Abstract

Background: Massive pleural effusion is one of the way of presentations of malignant effusion, it is unlikely to be seen in other causes of effusions, thorough workup and follow up is necessary, in this case series most of the cases was confirmed to be of malignant etiology. **Objectives:** The main objective from this study is to detect the cause behind massive pleural effusion and for early detection of a malignant etiology. Methods: Case series study involving 11 inpatient cases of massive effusion that had been evaluated sequentially with pleural fluid cytology then if negative pleural biopsy with either medical pleuroscopy or video assisted thoracoscopy (VATS). **Results:** Six of eleven cases were discovered to have malignant effusion, two cases were tuberculous pleuritis (TB pleuritis), one case were complicated parapneumonic effusion; the other 2 cases there were no specific diagnoses. **Conclusions:** Most of the cases of massive pleural effusion were discovered to be malignant effusion.

Keywords: Malignant pleural effusion, massive pleural effusion, pleural fluid cytology, pleuroscopy, video-assisted thoracoscopy

Introduction

A pleural effusion is an abnormal collection of fluid in the pleural cavity; massive pleural effusion can be defined by that about two-third and more of the hemithorax is obliterated by fluid; it is usually unilateral; it can be caused by an excess fluid production and/or decreased fluid absorption; the list of causes of pleural effusions is long; and the majority of the cases are caused by pneumonia, tuberculosis (TB), congestive heart failure, and malignancy.[1]

Massive pleural effusion is commonly caused by malignancy.[2]

The incidence of massive effusion is 11.2%–12% of all pleural effusions and thus remains a definite health-care problem.[3]

Massive pleural effusion by definition is that the opacification by chest radiograph is over two-thirds of the hemithorax or the appearance of fluid on chest radiograph appears as complete or near-complete opacification of the ipsilateral hemithorax.[4]

On the basis of etiology, massive pleural effusion can be subdivided into malignant massive pleural effusion and nonmalignant massive pleural effusion, with malignant massive pleural effusion carrying a poor prognosis. As patients with malignant massive pleural effusion have a short survival, the main objective of management is to improve the quality of life and reduce dyspnea, chest discomfort or cough, and prevention of recollection of fluid while treatment for those with infective etiology is targeted toward a complete cure.[5]

The use of pleuroscopy/video-assisted thoracoscopy (VATS) is superior to closed biopsy or combined fluid cytology and closed pleural biopsy.[6]

Materials and Methods

This case series study involved 11 cases of massive pleural effusions discovered by chest X-ray (CXR) and chest computed tomography scan [Figure 1], that had been evaluated between January 2021 and December 2021; the patients were evaluated initially by pleural fluid biochemical analysis, TB biomarkers, pleural fluid white blood cell differential count, and by pleural fluid cytology; if they were negative, then multiple

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pleural biopsies were done with either medical pleuroscopy or VATS and sent for histopathology evaluation; if the result is nonconclusive, a follow-up visit will be scheduled for each case of pleural effusion with unknown etiology.

A written consent was taken from each patient.

The inclusion criteria were the patients who presented with massive unilateral effusion that fill more than two-third of the hemithorax on CXR.

The patients aged between 36 and 70 years, in which four females and seven males.

Results

This study involved 11 patients with massive unilateral pleural effusion; most of the cases with massive pleural effusion who had been investigated were detected to be of the malignant cause, which was six cases, two cases had TB pleuritis, and one case had parapneumonic effusion, and in 2 cases, no specific cause was found despite thorough evaluation [Table 1].

From all six cases, there were three females and three males.

Cytology was positive for three cases: bronchogenic carcinoma (squamous cell carcinoma), gastric adenocarcinoma, and lung adenocarcinoma.

The other three cases were: cytology was negative, the pleural biopsy through pleuroscopy, or VATS confirms the diagnosis of malignant pleural metastasis as a cause of the effusion; two cases had breast cancer [Figure 2] and one case had bronchogenic carcinoma (squamous cell carcinoma).

There were two cases who had been discovered to have had TB on pleural biopsy, which detects granuloma with evidence of TB bacilli in one case on histopathology, while the other case was sent for culture and sensitivity for *Mycobacterium tuberculosis*, and anti-TB treatment had been established.

Table 1: List of cases according to age, gender, smoking, site of pleural effusion, finding on cytology, and pleural biopsy

Patient number	Age (years)	Gender	Smoking	Site of pleural effusion	Cytology	Pleural biopsy
1	65	Female	No	Left	Negative	Positive breast cancer
2	70	Male	Yes	Left	Negative	Positive bronchogenic cancer
3	60	Female	No	Left	Negative	Positive breast cancer
4	42	Male	Yes	Left	Positive Bronchogenic carcinoma	Not done
5	68	Male	No	Left	Positive adenocarcinoma	Not done
6	40	Female	No	Left	Positive CA stomach	Not done
7	70	Male	Ex-smoker	Right	Negative	Positive TB
8	36	Male	Yes	Right	Negative	Positive TB
9	44	Female	No	Left	Negative Gram stain (+ve) Complicated parapneumonic effusion	Negative
10	68	Male	No	Right	Negative	Negative
11	57	Male	Ex-smoker	Right	Negative	Negative

TB: Tuberculosis, CA: Cancer

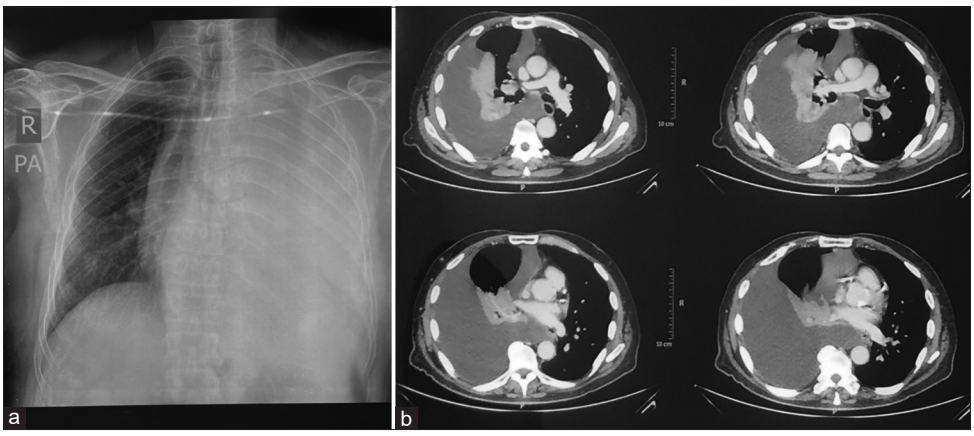

Figure 1: (a) CXR of a 70-year-old male with massive left-sided pleural effusion, pleural biopsy confirms bronchogenic carcinoma (squamous cell type), (b) Chest CT in a case of right massive malignant pleural effusion secondary to a case of bronchogenic carcinoma. CXR: Chest X-ray, CT: Computed tomography

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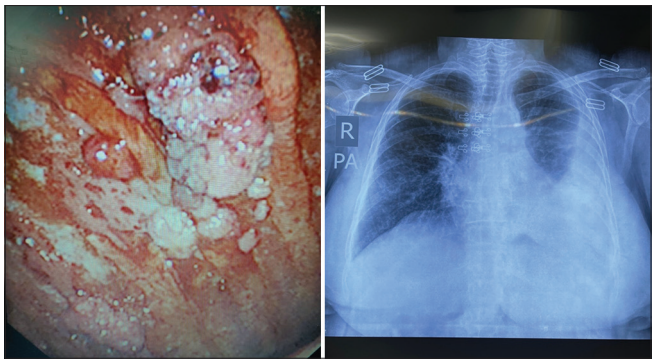

Figure 2: To the left CXR for a 60-year-old female with newly diagnosed breast carcinoma with left-sided pleural effusion, pleural biopsy confirms breast carcinoma metastasis (right image). CXR: Chest X-ray

A single case with parapneumonic effusion had been confirmed by positive Gram-stain and neutrophil-predominant exudative effusion with negative cytology for malignant cells.

Two cases with massive pleural effusion failed to detect any cause despite being exudative and predominantly lymphocytic effusion; however, cytology and biopsy were not conclusive in evaluation, but they had been scheduled for follow-up.

Discussion

Unilateral massive pleura effusion is one of the several ways of presentation of pleural fluid collection, which is mostly of malignant etiology.

All the cases had been evaluated to reach a final diagnosis, despite the fact that pleural fluid cytology yield in diagnosing malignant effusion is low; in this case series, three of 11 cases of unilateral massive effusion cytology were positive for malignant cells.

Regarding medical pleuroscopy/VATS and biopsy, they make the gold standard for diagnosing malignant effusion, including mesothelioma, in about 90%.[7]

Finding that more than half of the cases of massive pleural effusion is of malignant etiology suggests making the full evaluation is necessary, and if no diagnosis was made by simple cytology reevaluation by another cytology sample, close pleural biopsy or even more invasive technique like VATS is mandatory.

Even in nondiagnosed cases, close observation and even repeated sampling at time intervals are suggested.

Excluding and diagnosing other supposed causes of massive effusion like parapneumonic effusion or TB should be done carefully and, whenever confirmed, should be treated as early as possible to prevent long-term sequelae.

Conclusion

1. Unilateral massive pleural effusion is suggestive of malignant effusion
2. Pleural cytology and more invasive investigations like pleuroscopy/VATS are mandatory to reach a definite underlying etiology for unilateral massive effusion
3. A Careful follow-up of nondiagnosed cases should be pursued to exclude serious etiologies.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

Dr Marwan Majeed Ibrahim is a member of the Iraqi Cardiothoracic Society, the European Respiratory Society, pulmonologist at Al-Yarmouk Teaching Hospital, and lecturer in Al-Mustansiriya College of Medicine.

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