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# Pleural Effusion: Aetiology, Clinical Presentation and Mortality Outcome in a Tertiary Health Institution in Eastern Nigeria – A Five Year Retrospective Study

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## Abstract

**Aim**: This retrospective notes review determined the aetiology, clinical presentation and mortality in patients with pleural effusion over a 5-year period.

**Method**: A retrospective audit of patients' folders from January 2008-December 2012. Data collected included demographics, clinical presentation, and laboratory and mortality outcome.

**Results**: Of 199 folders reviewed, 108 were males. Male:female ratio was 1.18:1. Major symptoms were cough 156(78.4%), chest pain 142(71.4%) and dyspnoea 130(65.3%). Major signs included pyrexia 120(60.3%), ascites 48(24.1%) and hypotension 42(21.1%). The more common aetiology were TB 84(42.2%), parapneumonic 28(14.07%) and cardiac failure 28(14.07%). Forty-six (37.1%) of 120 patients screened were HIV positive. Mortality was 33(16.6%).

**Conclusion**: Pleural effusion is a common presentation in our clinical practice. Bacterial infection particularly TB is the most common cause. The mortality rate in patients with pleural effusion is still high. Determining the aetiology and early intervention are needed to reduce the mortality in patients with pleural effusion.

**Keywords:** Pleural effusion; Aetiology; Clinical features; Mortality; Eastern Nigeria

## Introduction

Pleural effusion is a frequent clinical condition observed in pulmonary pathology. It also occurs in many other disease entities such as cardiac failure, liver diseases, renal diseases, endocrine disorders, malignancies and connective tissue diseases [1,2]. The clinical presentation varies from mild asymptomatic effusion to life threatening effusions with dyspnoea and chest pain.

Pleural effusion may be detected clinically when it is moderate to massive but only radiologically when it is mild. Chest x-ray is the commonest radiological approach used in detecting pleural effusion but ultrasound and computerized tomography scan of the chest are important in making a diagnosis. Qureshi et al. [3] in 2009 demonstrated the importance of thoracic ultrasound in differentiating malignant from benign pleural disease in patients presenting with suspected malignant pleural effusion. While Evans et al. [4] working in South Africa have demonstrated a high diagnostic yield of ultrasound guided trans-thoracic fine needle aspiration and ultrasound-assisted cutting needle biopsy in patients with superior vena cava syndrome with associated intra thoracic mass lesion. Cytology and laboratory evaluation of the pleural fluid is required to confirm the aetiologic cause of the effusion [1,5,6].

Aetiologic factors in pleural effusion have widely been studied in many African regions and beyond. The most common cause of the condition in low or moderate income countries has been attributed to infective causes and tuberculosis (TB) has remained the main cause in many areas; while in high income countries malignancy is a more common cause [7-10]. Its prevalence seems variable in West Africa (1.7-23%) [2,7]. In Western Nigeria, Onadeko et al. [11] found lymphocytic effusion in 76% of TB patients and 22% in patients with malignancy. Ezemba et al. [12] in Eastern Nigeria found non-specific pleurisy/empyema as the commonest cause of pleural effusion in a percutaneous needle biopsy of 37 patients. Sutherland et al. [6] in Gambia noted that TB was the commonest cause of pleural effusion but notoriously difficult to diagnose due to paucibacillary nature of the fluid. In Ghana the most common cause is TB with 63.5% of all effusions attributed to tuberculosis [10]. Desalew et al. [13] in Ethiopia noted that TB was the commonest cause of pleural effusion in that region with mortality in 6.4% of the patients. The work done in Cotonou Benin republic revealed 13% mortality in patients with pleural effusion. Likewise, a prospective study in Qatar revealed TB as the commonest cause of pleural effusion in that region with 32.5% of all causes, most patients being Asian immigrant workers [14]. Parasitic infections associated with pleural effusions have been documented; microfilaria have been detected in pleural effusions associated with malignancies [15-17].

## Objective of the Study

Our study aimed at reviewing the aetiology and clinical presentation of patients with pleural effusion and the mortality outcome of these patients in a five-year retrospective study in a tertiary health institution in the South Eastern Nigeria.

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## Methodology

This was a retrospective study which reviewed all in-patients seen with pleural effusion from January 2008 to December 2012. All in-patients folders seen during the period were selected. The folders were cross- checked with the register in the radiology Department of the Federal Medical Centre Owerri. Uncompleted folders were removed from the data. A form for data collection was created. The data collected included demographics (age, sex, location of effusion and year in review); clinical (medical history, symptoms, and physical signs elicited); laboratory (haemogram, microbiology, biochemistry, serology, cytology, radiology) and mortality outcome. Pleural effusion was radiologically classified as right hemithorax, left hemithorax and bilateral using Chest X-ray. They were also classified as exudates (pleural fluid protein>30 g/dL) or transudates (pleural fluid protein<30 g/dL).

## Ethical Clearance

The Ethical clearance was obtained from The Ethics Committee of Federal Medical Centre Owerri, Imo State Nigeria.

## Data Analysis

Data was analyzed using SPSS version 16 Chicago IL.

## Results

During the period, 214 patients' folders were reviewed. Fifteen folders were excluded due to incomplete data. One hundred and ninety-nine folders were analyzed. The mean age was 51 years. The maximum age was 96 years while the minimum was 15 years. There were 108 males and 91 females with male to female ratio of 1.18:1 (Table 1).

Average age=51years, Range=81 years (15-96 years).

The major symptoms found in these patients were cough 156(78.4%), chest pain 142(71.4%), and dyspnoea 130(65.3%). Major signs elicited were pyrexia 120(60.3%), and ascites 48(24.1%), hypotension 42(21.1%), trachea Deviation 36 (18.1%) and hypothermia 12(6.0%) (Table 2).

Medical history revealed tobacco and alcohol use in 66(33.2%) and 54(27.1%) respectively. 32(16.1%) had been treated for TB while 46(37.1%) of the 120 patients screened for HIV were positive. (Table 2).

The annual case presentation of pleural effusion increased steadily from 24 in 2008 to 56 in 2012. The commonest causes were infective with TB diagnosed in 84(42.2%) and parapneumonic in 28(14.07%). Cardiac failure was found in 28(14.07%) and malignancies in 24(12.06%) (Table 3).

Overall mortality recorded was 16.6%. Mortality remained at approximately the same level in the past four years. However, the year specific mortality rate dropped from 29.2 in 2008 to 14.7% in 2009; then with slight reduction in 2012 (Table 3). Malignancy was the commonest cause of death. The primary location of malignancy was the breast in 28%, the liver in 12%, the lung in 10% and lymphoma in 7%.

| Age Range (Years) | Frequency No. (%) |
|---|---|
| 15-24 | 36 (18.09) |
| 25-34 | 22 (11.06) |
| 35-44 | 24 (12.06) |
| 45-54 | 26 (13.07) |
| 55-64 | 32 (16.08) |
| ≥ 65 | 59 (29.64) |
| Total | 199(100.00) |
| Sex | |
| Male | 108 (54.27) |
| Female | 91(45.73) |
| Total | 199 (100.00) |

**Table 1:** Age and Sex distribution.

| Symptoms | N (%) |
|---|---|
| Cough | 156 (78.4) |
| Chest pain | 142 (71.4) |
| Dyspnoea | 130 (65.3) |
| Sputum production | 126 (63.3) |
| Weight loss | 82 (41.2) |
| Night sweats | 64 (32.2) |
| Anorexia | 56 (28.1) |
| Arthralgia | 26 (13.1) |
| **Associated Signs** | **N (%)** |
| Pyrexia | 120 (60.3) |
| Ascites | 48 (24.1) |
| Hypotension | 42 (21.1) |
| Trachea deviation | 36 (18.1) |
| Hypothermia | 12 (6.0) |
| **Medical History** | **N (%)** |
| Alcohol | 66 (33.2) |
| Tobacco | 54 (27.1) |
| Tuberculosis | 32 (16.1) |
| HIV | 46 (37.1) out of 120 patients screened. |
| Diabetes | 26 (13.1) |
| Occupation exposure/Industrial hazard | 9 (4.5) |

**Table 2**: Distribution of symptoms, signs and medical history of patients.

| Year | Frequency (%) | Year specific mortality rate No (%) |
|---|---|---|
| 2008 | 24(12.1) | 7 (29.2) |
| 2009 | 34 (17.1) | 5 (14.7) |
| 2010 | 40 (20.1) | 6 (15.0) |
| 2011 | 45 (22.6) | 7 (15.6) |
| 2012 | 56 (28.1) | 8 (14.3) |
| Total | 199 (100.00) | |
| **Aetiology** | | |
| **Frequency** | **N (%)** | **Mortality N (%)** |
| Tuberculosis | 84 (42.21) | 6 (18.2) |
| Cardiac failure | 28 (14.07) | 5 (15.1) |
| Parapneumonic | 28 (14.07) | 2 (6.1) |
| Malignancies | 24 (12.06) | 11(33.3) |
| Chronic kidney diseases | 10 (5.02) | 3 (9.1) |
| Chronic liver diseases | 8 (4.02) | 2 (6.1) |
| Systemic lupus erythematosus | 4 (2.01) | 1 (3.0) |
| Rheumatoid Arthritis | 4 (2.01) | 0 (0.0) |
| Pulmonary embolism | 3 (1.51) | 2 (6.1) |
| Unknown | 6 (3.02) | 1 (3.0) |
| Total | 199 (100.00) | 33 (100.00) |

**Table 3:** Year specific mortality rate, Aetiology and mortality in patients with pleural effusion.

The macroscopic appearance of thoracentesis fluid was documented in 118 patients. It was haemorrhagic in 49%, straw coloured in 31% and purulent in 20%. Pleural effusion was exudative in 82%.

Postero- anterior Chest X-ray finding showed that pleural effusion were frequently located on the right side of the chest in 57.5%, 24.5% on the left side and bilateral in 18% of cases (Figure 1).

## Discussion

Pleural effusion is a common presentation in medical and surgical practice both in low and middle income countries and high income countries. The cause of pleural effusion is primarily infective in low and middle income nations and malignant in the high income nations [2,7,8]. Most studies showed a tendency of more presentation in males [2,14]. Our study supported this with a slight male preponderance. The reason for this was attributed to more males who indulge in drugs

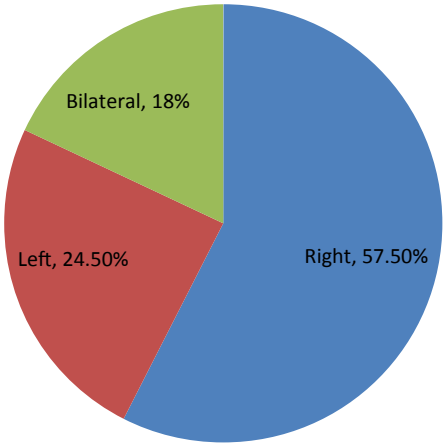


**Figure 1**: Side of location of effusion. (Chest X-ray finding)

including tobacco and alcohol in our sub-region [2,18]. In line with other findings cough, chest pain and dyspnoea were the common symptoms found in our study [2,10,13]. Pyrexia, ascites hypothermia, trachea deviation and hypotension were the main clinical signs common to many of our patients; with pyrexia and ascites as common finding in previous studies [2,10].

Our study showed that the commonest cause of pleural effusion was tuberculosis followed by parapneumonic effusions. This supported the findings in many other studies within the sub-region [2,10,13]. We further found that many of the patients with tuberculosis were on retreatment for a recurrent TB infection. A good proportion of our patients with pleural effusion had TB/HIV co-infection and this is in agreement with studies done elsewhere [19-21]. A recent work done in Spain by Ferriro et al. showed that tuberculous pleural effusion is more common in males with Human immunodiffciency virus infection; who fall within the age group of 15-45 years of age [21]. A significant number of our patients with cardiac failure also had pleural effusions that were mild to moderate and detected on chest X-ray. Other aetiologic factors like rheumatoid arthritis, systemic lupus erythematosus, chronic kidney and chronic liver diseases were observed in our study and these are established causes of pleural effusion. There was also an increase in the number of case finding with better diagnostic workup employed in the year 2012. This reflected enhancement in the level of practice because more superior investigative approach such as polymerase chain reaction (PCR) and cytology were employed. Advanced radiological approach such as computerized tomography scan (CT scan) and Magnetic resonance imaging (MRI) were increasingly being used by doctors in the centre to search for occult malignancy. The centre used to be a general hospital which used to see patients at secondary care level but over the years but has been elevated to a tertiary health care facility.

Several case reports have been documented on filariasis as a cause of pleural effusion and in association with malignant pleural effusion [15-17]. This finding was lacking in our study.

Malignancy ranked 4$^{th}$ position in our study with breast cancer being the commonest cause in women and primary liver cell carcinoma in men. Whilst the high incidence of breast cancer in women is already known [8,9], the frequent finding of primary liver cell carcinoma in our environment contrasts with the incidence of bronchogenic carcinoma in other studies. This may be related to the high prevalence of hepatitis B infection in our sub-region [22,23].

Mortality in patients with pleural effusion was high 33(16.6%). This is higher than that recorded in Ethiopia (6.4%) [13] and in Benin Republic (13%) [2]. The year specific mortality rate was highest in 2008 with 7(29.2%) recorded for that year. This remained fairly stable over a period of three years with slight drop in 2012 to 8(14.3%) table 3. This may not be readily explained but is thought to be due to early diagnosis and improvement in level of care. The highest mortality was found among our patients with malignancy, heart failure, TB/HIV co-infection and chronic kidney diseases. The reason is not far-fetched since most patients with malignancies present late and lack of equipped oncology centre in our sub-region. This calls for a need for a well equipped oncology centre with surgeons knowledgeable in the management of malignant pleural effusion with full application of the BTS guidelines for the management of malignant pleural effusion [8]. However, it is also worthy of note that malignant pleural effusion is associated with high mortality rate even in developed countries since it is a sign of metastatic spread [24,25]. The patients with heart failure were mostly elderly people and probably with other co-morbidities. The increase in mortality in TB patients was high in most of the patients who were on retreatment for TB and patients with TB/HIV co-infection due to the immune compromised state and other co-morbidities. It was noted that these patients had other complications of tuberculosis such as chronic obstructive pulmonary disease and lung collapse. There was also marginal anaemia in most of the patients which further compounded the problem. There is therefore need for early detection of TB, early initiation of anti-tuberculous chemotherapy and close monitoring of TB chemotherapy using directly observed treatment (DOT). This will in turn reduce complications of TB including pleural effusion and also reduce mortality.

## Implication for Future Research

The findings in this study shows that in our environment pleural effusion has variable aetiologic factors with tuberculosis and parapneumonic effusion topping the list. Doctors practicing in our sub region should have these differentials in mind as they are treatable causes. Further investigations such as pleural biopsy and histology should be considered to diagnose other conditions like malignancy to ensure early and appropriate therapy. The use of polymerase chain reaction, like the Gene-Xpert machine for diagnosis of mycobacterium tuberculosis and rifampicin resistance should be readily employed to enhance case detection of TB. The study is a retrospective study. A prospective study will be required to confirm some of the findings in this research work.

## Conclusion

Pleural effusion is a common clinical presentation in our clinical practice with variable aetiology. Bacterial infections particularly tuberculosis remain the commonest aetiology. The mortality rate in patients with this condition is still high. Early investigation to determine the aetiology and appropriate early intervention is needed to reduce the mortality in patients with pleural effusion.

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### References

1. Longo D L, Fauci AS, Kasper DL, Hauser SL, Jameson JL, et al. (2012) Harrison's Principles of Internal Medicine. (18th Edn.). The Mc Graw-Hill companies, New York, NY.

2. Agossou M, Bashi BJ, Azon-Kouanou A, Zannou DM, Ade g, et al. (2013)

Pleural effusion at the Internal Medicine Unit . Centre National Hospitalier Universitaire, Cotonou Benin. African Journal of Respiratory Medicine 9: 17-18.

3. Qureshi NR, Rahman NM, Gleeson FV (2009) Thoracic ultrasound in the diagnosis of malignant pleural effusion. Thorax 64: 139-143.
4. Evans AL, Gleeson FV (2004) Radiology in pleural disease: state of the art. Respirology 9: 300-312.
5. Sahn SA, Huggins JT, San José ME, Álvarez-Dobaño JM, Valdés L (2013) Can tuberculous pleural effusions be diagnosed by pleural fluid analysis alone? Int J Tuberc Lung Dis 17: 787-793.
6. Sutherland JS, Garba D, Fombah AE, Mendy-Gomez A, Mendy FS, et al. (2012) Highly accurate diagnosis of pleural tuberculosis by immunological analysis of the pleural effusion. PLoS One 7: e30324.
7. Koffi N, Aka-Danguy E, Kouassi B, Ngom A, Blehou DJ (1997) [Etiologies of pleurisies in African milieu. Experience of the Cocody Pneumology department (Abidjan-Côte d'Ivoire)]. Rev Pneumol Clin 53: 193-196.
8. Antunes G, Neville E, Duffy J, Ali N; Pleural Diseases Group, Standards of Care Committee, et al. (2003) BTS guidelines for the management of malignant pleural effusions. Thorax 58 Suppl 2: ii29-38.
9. DiBonito L, Falconieri G, Colautti I, Bonifacio D, Dudine S (1992) The positive pleural effusion. A retrospective study of cytopathologic diagnoses with autopsy confirmation. Acta Cytol 36: 329-332.
10. Afful B, Murphy S, Antunes G, Dudzevicius V (2008) The characteristics and causes of pleural effusions in Kumasi Ghana - a prospective study. Trop Doct 38: 219-220.
11. Onadeko BO, Junaid TA, Odor EI (1978) The significance of cytological examination of the pleural fluid in the diagnosis of pleural effusion in Nigerians. Ir J Med Sci 147: 383-388.
12. Ezemba N, Eze JC, Anyanwu CH (2006) Percutaneous needle pleural biopsies in pleural effusion of uncertain aetiology in a Nigerian teaching hospital. Trop Doct 36: 112-114.
13. Desalew M, Amanuel A, Addis A, Zewdu H, Jemal A (2012) Pleural effusion: presentation, causes and treatment outcome in a resource limited area, Ethiopia. Health 4: 15-19.
14. Khan FY, Alsamawi M, Yasin M, Ibrahim AS, Hamza M, et al. (2011) Etiology of pleural effusion among adults in the state of Qatar: a l-year hospital-based study. East Mediterr Health J 17: 611-618.
15. Singh SK, Pujani M, Pujani M (2010) Microfilaria in malignant pleural effusion: an unusual association. Indian J Med Microbiol 28: 392-394.
16. Navaz AK, Raikar MP, Acharya V, Shetty SK (2013) Pleural effusion: An unusual cause and association. Lung India 30: 158-160.
17. Marwah N, Singh P, Singh S, Kalra R, Manchanda M, et al. (2007) Filarial pleural effusion. Trop Doct 37: 262.
18. Jaquet A, Ekouevi DK, Aboubakrine M, Bashi J, Messou E, et al. (2009) Tobacco use and its determinants in HIV-infected patients on antiretroviral therapy in West African countries. Int J Tuberc Lung Dis 13: 1433-1439.
19. Frye MD, Pozsik CJ, Sahn SA (1997) Tuberculous pleurisy is more common in AIDS than in non-AIDS patients with tuberculosis. Chest 112: 393-397.
20. Joseph J, Strange C, Sahn SA (1993) Pleural effusions in hospitalized patients with AIDS. Ann Intern Med 118: 856-859.
21. Ferreiro L, San José E, Valdés L (2014) Tuberculous pleural effusion. Arch Bronconeumol 50: 435-443.
22. Nwokedi EE, Emokpae MA, Dutse AI (2006) Human immunodeficiency virus and hepatitis B virus co-infection among patients in Kano Nigeria. Niger J Med 15: 227-229.
23. Adewole OO, Anteyi E, Ajuwon Z, Wada I, Elegba F, et al. (2009) Hepatitis B and C virus co-infection in Nigerian patients with HIV infection. J Infect Dev Ctries 3: 369-375.
24. Bernard A, de Dompsure RB, Hagry O, Favre JP (2002) Early and late mortality after pleurodesis for malignant pleural effusion. Ann Thorac Surg 74: 213-217.
25. Ozyurtkan MO, Balci AE, Cakmak M (2010) Predictors of mortality within three months in the patients with malignant pleural effusion. Eur J Intern Med 21: 30-34.