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MALIGNANT MESOTHELIOMA: A CASE STUDY IN A 34-YEAR-OLD FEMALE IN A TEACHING HOSPITAL IN SOUTH EAST NIGERIA.

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ABSTRACT

Mesothelioma is a proliferative neoplasm that arises from the mesothelial epithelial cells, which comprise part of the serosal covering and lining of various organ surfaces within the body. This study is a case report of a 34-year-old female graduate who had 6months history of recurrent shortness of breath, cough, left sided chest pain and 2-month history of abdominal swelling. Examination and chest radiograph revealed left sided pleural effusion. Histology revealed mesothelioma. Management involved surgery, conservative and palliative care.

Keywords: Mesothelioma, Histology, Pleural effusion

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INTRODUCTION

Mesothelioma is a proliferative neoplasm that arises from the mesothelial epithelial cells, which comprise part of the serosal covering and lining of various organ surfaces within the body. They can broadly be divided into benign and malignant types. The benign lesions are very rare, and have demonstrated a high propensity for local recurrence after removal. They may undergo malignant transformation. One form of benign

mesothelioma is benign multi-cystic mesothelioma of the peritoneum (BMMP), a rare peritoneal neoplasm that primarily occurs in females. Malignant mesothelioma is also a rare and aggressive tumor arising from mesothelial cells. It can develop in any mesothelial layer, such as the pleura, peritoneum, pericardium and testis (tunica vaginalis). The pleural layer is most commonly affected, leading to malignant pleural mesothelioma. It is strongly associated with asbestos exposure. Among the various forms of asbestos, amosite and crocidolite are most strongly linked to the development of malignant mesothelioma. Malignant mesothelioma has also been shown to be caused by domestic or environmental exposures to asbestos, mostly from man-made origin.[1,2,3] To the best of our knowledge, no known cases of mesotheliomas have been reported from sub-Saharan African countries, except from South Africa and Zimbabwe.[4]

CASE REPORT

A 34-year-old female graduate who initially presented in a private hospital 6months prior to presentation to us with history of shortness of breath, cough, left sided chest pain. The cough was productive of scanty sputum. There was positive history of orthopnea but no paroxysmal nocturnal dyspnea and no leg swelling. There was no history of contact with chronically coughing individual and she has not been treated for tuberculosis in the past. She was a known hypertensive on Amilodipine and indapamide. She had a positive history of residing in an area where there were multiple demolitions of buildings and reconstruction, exposing her to dust inhalation several years ago. In the private hospital, she did a chest radiograph that showed left pleural effusion, which was drained. It yielded hemorrhagic effluent. She got a temporary relieve of symptoms. Following extubation, she developed a mass at that site, which was biopsied and histology made impression of a left lung pleural mesothelioma.

She presented to us 2months ago, with 6month history of recurrent shortness of breath and 2month history of abdominal swelling.

On examination, we found a young lady, chronically ill looking in obvious respiratory distress, afebrile, temperature of 36 degrees centigrade, not pale, anicteric, not cyanosed, not dehydrated, no digital clubbing, no peripheral lymphadenopathy, and no pedal edema. Respiratory Rate was 30cycles per

minute. SPO2 was 89% on room air, 98% on Intra Nasal Oxygen at the rate of 5litres per minute. There was a scar on the left chest wall. Trachea was central. There was reduced chest excursion and reduced tactile fremitus on the left lung zones. There was Stony Dull percussion note, Reduced Vocal resonance and absent breath sound on the left lung zones. The abdomen was distended, moved with respiration with no area of tenderness. The liver was enlarged, 8cm below the right costal margin, firm, smooth-surface, blunt-edged. Spleen was not palpable and kidneys were not ballotable. Ascites was demonstrable by shifting dullness and bowel sounds were normoactive. There was no hepatic or renal bruit. All the other systems were essentially normal.

Investigation showed Chest radiograph with bilateral pleural effusion, more on the left.

Chest radiograph (PA view)

Radiologists report stated as follows: The Chest radiograph as above showed, Massive Left pleural effusion, Moderate right pleural effusion, Large pulmonary mass on the left, Right lung reticulonodular opacities likely lymphangitic carcinomatosis, Suspected left

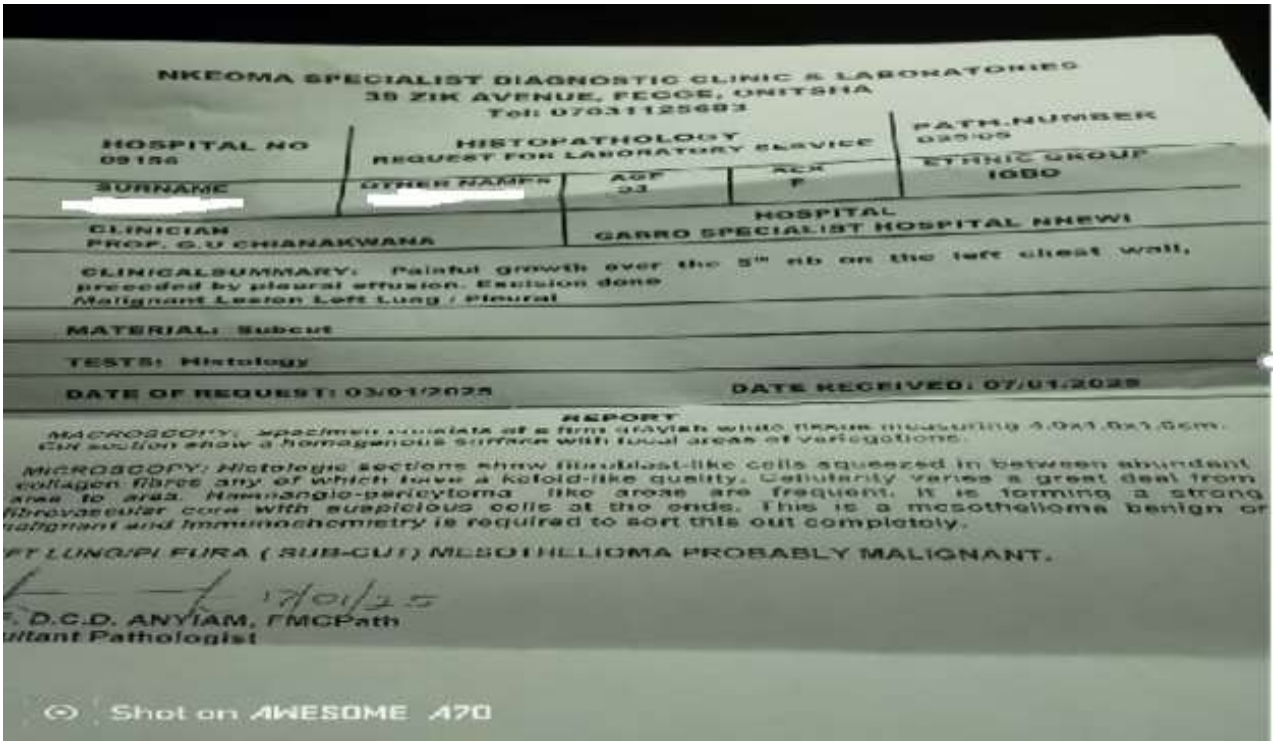
3rd rib destruction.

Abdominal ultrasound Scan report, showed the liver was Enlarged, 19cm at the Mid Clavicular Line, smooth outline with heterogenous echotexture, harboring, multiple varying size oval hypoechoic masses, largest measuring 2.3 x 2.3cm.

Impression: Hepatomegaly with multiple predominantly hypoechoic masses suggestive of hepatic metastasis. Moderate ascites.

Other investigations done were: Packed Cell Volume, 51%; Random Blood Sugar, 4.3mmol/l; Retroviral screening, non-reactive; hepatitis B surface antigen, non-reactive; hepatitis C, non-reactive; serum electrolytes, sodium(Na+), 134mmol/l (134 – 145)mmol/l, potassium(K+), 2.6mmol/l (3.5 – 5.5)mmol/l, chloride(Cl-), 95mmol/l (96 - 106)mmol/l, bicarbonate(HCO3), 23mmol/l (21 – 31)mmol/l, Creatinine, 36umol/l (68 – 102)umol/l, Urea, 2.3mmol/l (1.7 – 9.1)mmol/l. The liver function test; aspartate transaminase (AST), 31IU/l, (0 -40) IU/l, alkaline phosphatase (ALP), 270IU/l(0 – 240)IU/l, total bilirubin, 17.5umol/l(2 – 21)umol/l, alanine transaminase (ALT), 17IU/l (0 – 45)IU/l, Conjugated bilirubin, 3umol/l (0 – 3.4)umol/l.

Full blood count; red blood cell count was 4.33 x 106/uL (4-6.2), white blood cell count was 12.3 x 109/L (4-12), Neutrophils, 75.4% (50-80), lymphocytes, 11.9% (25-50), monocytes, 8% (2-10), Eosinophils, 4.7% (0-5), platelets, 266 x 109/L (150-400).



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HOSPITAL NO 09156	HISTOPATHOLOGY REQUEST FOR LABORATORY SERVICE		PATH.NUMBER 025/09
SURNAME	OTHER NAMES	AGE 33	SEX F
			ETHNIC GROUP IGBO

CLINICIAN: PROF. C.U CHIANAKWANA
HOSPITAL: GARRO SPECIALIST HOSPITAL NNEWI

CLINICALSUMMARY: Painful growth over the 5th rib on the left chest wall, preceded by pleural effusion. Excision done
Malignant Lesion Left Lung / Pleural

MATERIAL: Subcut

TESTS: Histology

DATE OF REQUEST: 03/01/2025 DATE RECEIVED: 07/01/2025

REPORT

MACROSCOPY: ...measuring 4.0x1.8x1.6cm. Cut section show a homogenous surface with focal areas of variegations.

MICROSCOPY: Histologic sections show fibroblast-like cells squeezed in between abundant collagen fibres any of which have a keloid-like quality. Cellularity varies a great deal from area to area. Haemangio-pericytoma like areas are frequent. It is forming a strong fibrovascular core with suspicious cells at the ends. This is a mesothelioma benign or malignant and Immunohchemetry is required to sort this out completely.

...FT LUNG/PLEURA (SUB-CUT) MESOTHELIOMA PROBABLY MALIGNANT.

17/01/25
...D.C.D. ANYIAM, FMCPath
...ultant Pathologist

Shot on AWESOME A70

Histology report as above made impression of Mesothelioma probably malignant.

Chest Ultrasound result showed extensive hypoechoic free fluid with multiple thick internal septations and low levels of echoes noted within the left hemithorax, extending from the apex to the level of the diaphragm. Likely pleural effusion. A wedge-shaped echogenic structure was noted medial to the aforementioned effusion and towards the midline, likely remnant of the collapsed lung tissue. Right lung showed normal sonographic appearance with no evidence of free fluid collection. Sonographic features are suggestive of Left pleural effusion.

Patient was commenced on intravenous Amoxicillin and Clavulanic acid 1.2grams, 12 hourly for 1week; intravenous metronidazole 500mg 8hourly for 5days, tabs losartan potassium 50mg daily, tabs arthrotec 75mg daily, tabs omeprazole 50mg daily. Chest tube thoracoscopy was done to drain the effusion. Patient was managed conservatively and she died on 27th day of admission.

DISCUSSION

The relation between exposure to asbestos and malignant mesothelioma was demonstrated epidemiologically in a landmark publication from South Africa in 1960 .[5] Since then, numerous studies from high, middle, and low income countries have

been published on the occurrence of malignant mesothelioma and its relation with occupational exposures in asbestos mining, the manufacture of asbestos products and the utilization of asbestos in shipbuilding, construction and many other industries .[6] Malignant pleural mesothelioma has an incidence of approximately 2500 new cases, compared to over 160,000 new cases of lung cancer reported each year. It is more common in men than in women, with a male-to-female ratio of 3:1. It has a long latency period of about 40years with peak incidence between the 6th to 7th decade of life. Approximately 3000 cases of malignant mesothelioma are diagnosed annually in the United States.[7] Of those patients, 80% have been exposed to asbestos. The majority of the African continent has remained remarkably absent from the grim statistics of asbestos-related diseases.[8] Rare cases of malignant pleural mesothelioma have been reported in children. Unlike adult cases, these are unrelated to asbestos exposure and may arise from other environmental or genetic factors. The incidence of malignant pleural mesothelioma varies globally, influenced by differences in asbestos use and regulatory oversight. countries like China, where asbestos is still widely used with limited regulation, report higher incidences of malignant pleural mesothelioma. On the other hand, in regions like Hong Kong, despite high levels of asbestos exposure, malignant pleural mesothelioma rates remain low. The underlying reasons for such geographical discrepancies remain unclear and warrant further investigation. The median survival for malignant pleural mesothelioma is approximately 1 year, with long-term survival being extremely rare. Direct or Indirect occupational asbestos exposure is a key determinant in developing malignant pleural mesothelioma. Common Types of asbestos include; chrysotile (white) (lower incidence), amolite (brown), crocidiolite (blue). Other types are, anthophyllite, tremolite,andactinolite. Professions associate d with high asbestos exposure include, shipbuilding, mining, ceramics manufacturing,cement manufacturing involv ing asbestos, auto parts productions, especially brake lining, paper mill operations, insulation work, railroad repair. Other risk factors include genetic factors (family history). The long latency period between asbestos exposure and the development of mesothelioma, is 20-40years. This suggests that multiple genetic alterations and pathogenic mechanisms are required for the conversion of normal cells to malignant

mesothelial cells.

Clinical features include dyspnea due to the pleural effusion, chest pain due to parietal pleural irritation or compression, and invasion of intercostal nerves. Systemic symptoms include fever, unintentional weight loss, appetite loss, cough, fatigue, and chest wall mass. Chest examination will show features of pleural effusion. The evaluation of malignant pleural mesothelioma requires a combination of laboratory tests, imaging studies, and histo-pathological analysis to confirm the diagnosis and guide treatment. Early diagnosis is crucial for determining the stage of the disease, assessing the extent of metastasis, and selecting the most appropriate therapeutic approach. Laboratory investigations include: Pleural fluid Analysis involving pleural fluid chemistry: glucose, protein, LDH, Pleural fluid Microscopy Culture and Sensitivity, pleural fluid cytology. Hematology investigations and Biochemistry investigations are essential for assessing the patient's overall health and determining their suitability for invasive procedures or treatment.

Molecular testing for BAP1 mutations and CDKN2A (p16) deletion through Fluorescence in situ hybridization (FISH) or immunohistochemistry (IHC) can be used to identify specific markers for mesothelioma and differentiate it from other malignancies. Radiographic imaging is crucial in the evaluation and staging of malignant mesothelioma. Chest radiograph, often the first imaging study,

may show pleural thickening, effusion, or masses.

Computed Tomography (CT) Scan with intravenous contrast are considered the standard of care for initial evaluation, providing detailed images that show pleural thickening, nodularity, effusions, and potential invasion of the chest wall or diaphragm. Positron emission tomography (PET) or PET-CT scans, using fluoro-deoxyglucose (FDG), are increasingly utilized to identify metabolically active lesions, detect masses, and assess treatment response. PET-CT is particularly valuable for accurately staging the disease. Magnetic resonance imaging (MRI) is important in evaluation of soft tissue involvement, especially in cases with suspected chest wall, diaphragmatic, or mediastinal invasion. Pleural fluid cytology will show malignant cells. Pleural biopsies with appropriate immunohistochemistry are required for the vast majority of cases. Malignant mesothelioma is a complex disease that requires an inter-professional team, including

an oncologist, thoracic surgeon, pulmonary physician, radiation specialist, and pain specialist. Enrollment in clinical trials is encouraged for eligible patients to access innovative therapies. Multimodal approach; surgery, systemic therapies, radiation, and supportive care. The treatment plan is tailored to the disease stage, histologic subtype, and the patient's performance status. Treatment options include surgery, chemotherapy using combination of Pemetrexed with either cisplatin or carboplatin, often with folic acid and vitamin B12 supplementation to reduce toxicity. Also, radiotherapy and supportive and palliative care.

Ethical Consideration

Approval for the study was obtained from the Research and Ethics Committee of the Nnamdi Azikiwe University Teaching Hospital. Confidentiality of patient information was strictly maintained, and no identifying data were collected or disclosed in the course of the study

CONCLUSION

Malignant mesothelioma is a serious and often devastating disease, primarily caused by asbestos exposure. Early detection and treatment are crucial for improving outcomes. Awareness, prevention, and support are key in addressing this challenging condition. This study can be improved upon. The handicap was inability to carry out immunohistochemistry.

Conflict of Interest

The authors declare no conflict of interest.

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