ALNAHRAIN UNIVERSITY

COLLEGE OF MEDICINE

DEPATMENT OF MEDICINE

REVIEW OF CAUSES OF PLEURAL EFFUSION IN

PATIENTS ADMITTED TO THE MEDICAL WORD

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DEDICATION

"If you really want to achieve something you will find a way "

To my parents for their support and encouragement throughout the studying years and to every person that taught me a letter in My Life

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Content

Abstract

Aim of the study: -

The aim of our study is to determine the causes of pleural effusion in patients admitted to the medical ward.

Design: -

Prospective.

Patients and Method: -

A cross-sectional study included a sample of 25 patients (15 females and 10 males) ages between (21-98) years, suffering from pleural effusion admitted to the medical ward at Al-Imamein Al-Kadhemein Medical City from the period of October 2018 to March 2019

Results: -

Nine cases were due to Heart Failure (36%), Pneumonia 7 cases (28%), Renal Failure 5 cases (20%), COPD 1 cases (4%), Bronchiectasis 1 cases (4%), TB 1 cases (4%) and Myocardial infarction 1 cases (4%).

Conclusion: -

In this study of 25 patients with pleural effusion, admitted to the medical ward, showed that the most common causes of pleural effusion is due to Heart failure, less frequently Pneumonia and Renal Failure.

Introduction

- **Pleural Effusion** : is abnormal collection of fluid in the pleural space resulting from excess fluid production or decreased lymphatic absorption.[1]
- **Anatomy:**
  The pleural space (cavity) in a healthy patient is a potential space sandwiched between the parietal and visceral pleurae.
  the potential space of the pleural cavity in healthy patients conjoins the natural outward movement of the chest wall to that of the natural inward movement of the lungs via two mechanisms. First, the potential space's relative vacuum sustains the visceral and parietal pleurae's extreme adherence and is uninterrupted and not disrupted. Second, a diminutive volume of pleural fluid serves as the lubricant to facilitate the normal physiologic sliding motion of both pleural surfaces against each other during inspiration and expiration.[2],
  a small amount of fluid is present in the pleura (10-20mL).[3],This small volume of lubricating fluid is maintained via a delicate balance of hydrostatic and oncotic pressure and peripheral sulcal lymphatic drainage; disturbances in any of these mechanisms may lead to pathology and, possibly, manifest as a pleural effusion.[4]
  pleural effusion is an indicator of a pathologic process that may be of primary pulmonary origin or of an origin related to another organ system or to systemic disease. it may occur in the setting of acute or chronic disease and is not a diagnosis in itself.[5,6]

- **Etiology :**pleural fluid accumulates when pleural fluid formation exceeds pleural fluid absorption.

  or when there is decreased fluid removal by the lymphatics.

  Transudative pleural effusion:

  1. congestive heart failure (most common)
  2. cirrhosis wih hepatic hydrothorax
  3. nephroticsyndrom
  4. peritoneal dialysis
  5. superior vena cava obstruction
  6. myxedema
  7. urinothorax
  8. csf leak to the pleural space[7]

  Exudative pleural effusion:

  1. pneumonia
  2. malignancy
  3. tuberculosis
  4. pulmonary embolism
  5. fungal infection
  6. GIT disease: Esophageal perforation,INtraabdominal abscesses
  7. collagen-vascular diseases: RA, SLE
  8. chylothorax[7]

TRANSUDATIVEEFFUSION DUE TO LEFT SIDED HEART FAILURE :
the most common cause of pleural effusion is left ventricular failure beacause the increased amounts of fluid in the lung interstitial space.[8]

PLEURAL EFFUSION DUE TO CONGESIVE HEART FAILURE: Pleural effusions are commonly seen in patients with congestive heart failure. They are usually bilateral or right sided and are rarely left sided.**[9]**

PARAPNEUMONIC EFFUSION:

Are associated with bacterial pneumonia, lung abscess, or bronchiectasis and are propably the most common exudative pleural effusion. empyema refers to a grossly purulent effusion.[10], [11]

TUBERCULOUSPLEURITIS:

result from hypersesitivity reaction to the mycobacterium rather than microbial invasion.

TUBERCULOUS PLEURAL EFFUSION:

Tuberculous pleural effusions can occur in association with reactivation disease or primary tuberculosis . In adults, most often they occur due to reactivation disease; in children, most often they occur in the setting of primary disease .[12]

EFFUSION SECONDARY TO MALIGNANCY:

are the second most common type of exudative pleural effusion.three tumors that cause 75% of all malignant pleural effusions are :

1. lung carcinoma
2. breast carcinoma
3. lymphoma

- **Diagnosis :**

- clinical diagnosis:

  History:

1. **Dyspnea**: Dyspnea is the most common symptom associated with pleural effusion and is related more to distortion of the diaphragm and chest wall during respiration than to hypoxemia.[13]
2. **cough** (non productive)
3. **chest pain**: which results from pleural irritation, raises the likelihood of an exudative etiology.[13]

Physical Examination:[14]

1. dullness or decreased resonance to percussion
2. diminished or inaudible breath sounds
3. decreased tactile fremitus
4. egophony
5. pleural friction rub
6. asymmetric expansion of thoracic cage
7. mediastinal shift with massive effusion

- Lab Studies:

the initial step in analyzing pleural fluid is to determine whether the effusions is transudate or an exudate. A transudate pleural effusions occurs when systemic factors that influence the formation and absorption of pleural fluid are altered.exudative pleural effusions occurs when local factors that influence the formation and absorption of pleural fluid are altered.[15]

Exudative pleural effusions meet at least one of the following criteria, whereas transudative pleural effusions meet none:[15]

1. pleural fluid protein/serum protein _0.5

2. pleural fluid LDH/serum LDH _0.6

3. pleural fluid LDH more than two-third normal upper limit for serum.

PLEURAL FLUID CULTURE AND CYTOLOGY:
Cultures of infected pleural fluids yield positive results in approximately 60% of cases. This occurs even less often for anaerobic organisms. Diagnostic yields, particularly for anaerobic pathogens, may be increased by directly culturing pleural fluid into blood culture bottles.[16]

- **Imaging Studies**:

1. **CHEST RADIOGRAPHY:[17]**
   Is the primary diagnostic tool, most common radiological appearance is :
   A. blunting of the costophrinic angle/or sulci(sharp angle between the diaphragm and rib).
   B. upwaedly concave meniscus seems to ascend the lateral chest wall;(meniscus sign).
   C. generalized homogenous opacity and diffuse haziness (ground-glass appearance),visibility of pulmonary vesseles through the haziness,and an absence of air bronchogram.

2. **ULTRASONOGRAPHY:**[18]
   can be used to detect as little as 5-50 mL of pleural fluid, with 100% sesitivity for effusions of 100 mL or more.

3. **CT SCANNING:**[18]
   chest CT scan with contrast should be performed in all patients with an undignosed pleural effusion,to detect thickened pleura or signs of invasion of underlying or adjacent structure.
   CT angiography should be ordered if pulmonary embolism is suggested.

- **Thoracocentesis:**

  -Indicated in cases in which the specific cause of the effusion is unknown or has never been investigated or when the thickness of the free pleural fluid level is more (10 mm)on the lateral decubitus.-its also indicated if the patient has respiratory compromise, hemodynamic instability, or massive effusion with contralateral mediastinal shift.

Aim of the study: -

The aim of our study is to determine the causes of pleural effusion in patients admitted to the medical ward.

❖ Patients and methods:

The research was done on patients admitted to the medical ward at Al-imamein Al-kadhemein Medical City from the period of October 2018 to March 2019& we collected information from 25 patients randomly including 15 females and 10 males. All these patients were diagnosed as having pleural effusion (either at admission or thereafter during their stay in the ward) depending on the clinical picture, physical examination and laboratory results.

We collected information to this research by subjecting these patients to specific questions, clinical examination in addition to interpretation of the radiological findings and laboratory findings, we collected information according to the following questioner :

- Name: Age:
- Sex: Address:
- Occupation: Chief complaint:
- Unilateral or bilateral:
- Time of developing pleural effusion:

(at admission or thereafter)

- Past medical history:
- Past surgical history:
- social history:
- Local examination (chest):
- Radiological findings:
- Laboratory findings:
- Sputum analysis (transudate or exudates):
- Diagnosis:

Results:

The over all results of this research are as follows:

Total number of cases=25

of these 15 are female and 10 are male cases.

The age of the patients selected was between (21-98) years old & the age distribution among patients with pleural effusion,**24%** are of the young age group,**28%** are middle age &**48%** are old age group.

		Frequency	Percent	Cumulative Percent
Valid	< 45`	6	24.0	24.0
	45-60	7	28.0	52.0
	> 60	12	48.0	100.0
	Total	25	100.0	

Table 1: shows the age distribution among the sample patients, number of cases and the percentage in each age group.

-The sex distribution of the sample, 60% are female patient & 40% are male patient.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	15	60.0	60.0	60.0
	Male	10	40.0	40.0	100.0
	Total	25	100.0	100.0	

Table 2: shows the sex disribution among the sample cases, number of cases and their percentage.

THE CAUSES OF PLEURAL EFFUSION IN THIS STUDY ARE:

- Heart failure is the most common cause which is found in 9 cases (36%).
- 7 cases were due to pneumonia (28%).
- 5 cases were due to Renal failure (20%).
- 1 cases were due to COPD (4%).
- 1 cases were due to Bronchiectasis (4%).
- 1 cases were due to Tuberculosis (4%).
- 1 cases were due to myocardial infarction (4%).

		Frequency	Percent	Cumulative Percent
Valid	heart failure	9	36.0	36.0
	Pneamonia	7	28.0	64.0
	Renal failure	5	20.0	84.0
	COPD	1	4.0	88.0
	Bronchiectasis	1	4.0	92.0
	Tuberculosis	1	4.0	96.0
	Myocardial infarction	1	4.0	100.0
	Total	25	100.0	

Table 3: shows the cause distribution among the sample, number of cases for each and their percentage.

-The distribution of the pleural fluid type among the sample, transudate in 60% of the cases (15 cases), and exudates in 40% (10 cases).

		Frequency	Percent	Cumulative Percent
Valid	transudate	15	60.0	60.0
	Exudates	10	40.0	100.0
	Total	25	100.0	

Table4:shows the distribution of the 2 types of pleural fluid, number of cases and their percentage.

	Cause							
	heart failure	***pneamonia***	***Renal failure***	***COPD***	***Bronchiectasis***	***TB***	***MI***	
Sex= male	***4***	***2***	***3***	***0***	***1***	***0***	***0***	
female	***5***	***5***	***2***	***1***	***0***	***1***	***1***	
Total=	***9***	***7***	***5***	***1***	***1***	***1***	***1***	

Table 5:shows the relation between the sex and the cause.

		Total								
		heart failure	pneumonia	Renal failure	COPD	Bronchiactasis	TB	MI		
Age	< 45	2	0	3	0	0	1	0		
	45-60	4	2	0	0	0	0	1		
	> 60	3	5	2	1	1	0	0		
Total		9	7	5	1	1	1	1	25	

Table 6:shows the relation between the cause of the effusion and age of the patient. there is no significant relationship.

		Cause							
		heart failure	Pneumonia	Renal failure	COPD	Bronchiactasis	TB	MI	
type	Transudate	9	0	5	0	0	0	1	
	Exudate	0	7	0	1	1	1	0	
Total		9	7	5	1	1	1	1	

Table 7:shows the relation between the cause of effusion and the type of fluid.(there is significant relationship).

		Caus						
		heart failure	pneamonia	Renal failure	COPD	TB	bronchisctasis	MI
Site=	right	5	3	3	0	1	1	0
	left	1	1	0	0	0	0	1
	bilateral	3	3	2	1	0	0	0
Total count=		9	7	5	1	1	1	1

Table 8 :shows the relation between the cause and the side involved.there is no significant relationship.

Discussion:

This study was conducted on 25 randomly selcted patients with pleural effusion who are admitted to the medical ward due to variable causes. of these, heart failure is the most common cause which was found in 9 patients(36%). this result is similar with a study which was done on 100 patients complaining from pleural effusion admitted to the medical ward **at the university of South Carolina** including patients in the intensive care unit, in which heart failure was the leading cause of pleural effusion accounting for (35%) of the causes,[19]

All of which had bilateral transudative effusion. of these 8 patients, 5 were males and 3 were females, 3 were middle age and 5 were old age, 4 patient had bilateral effusion and 4 patients had right sided effusion.

Pneumonia is the second most common cause found in 7 cases of the 25 cases (28%), of these 2 are males and 5 are females, 2 of middle age and 5 of the old age,3 are right sided, 3 are bilateral effusion and 1 is left sided effusion.which is not the same **to south carolinastudy**,asparapneumonic effusion was(11%).[19],due to delay treatment in our center.

Renal failure is the third most common cause which was found in 5 cases (20%),3 are middle age and 2 are old age. in contrast to the study **of south carolina,** effusion due to renal failure was found in (4%)of the cases.[19] , because there is dialysis center in our hospital.

Other less common causes found in this study include:

COPD found in one case (4%), old age female with bilateral exudative effusion.

Bronchiectasis found in one case (4%),old age female with right sided exudative effusion.

Myocardial infarction found in one case (4%), middle age female with left sided transudative effusion.

Tuberculosis found in one case (4%), young age female with right sided exudative effusion

Conclusion:

In this study of 25 patients with pleural effusion, admitted to the medical ward, showed that the causes of pleural effusion mainly is due to Heart failure , less frequently Pneumonia and Renal failure, COPD.

Recommendation:

- Further studies with larger sample size including large number of patients to find out more accurate results about the causes of pleural effusion in the medical ward.
- Thorough evaluation of patients with suspected pleural effusion with complete investigation including pleural fluid analysis to reach accurate diagnosis regarding the cause of pleural effusion.
- Further studies concerning specific causes of pleural effusion and their association with certain variables like age, sex...etc. to obtain more detailed information about each specific cause.

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