

OXALATE CRYSTALS IN SEGMENTAL BRONCHIAL WASH

IN DIFFERENT BRONCHO-PULMONARY DISEASES

THESIS

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CONTENTS

	<u>Page</u>
* INTRODUCTION AND AIM OF THE WORK	1
* REVIEW OF LITERATURE:	
- CHEMISTRY OF CALCIUM OXALATE CRYSTALS	2
- BRONCHOALVEOLAR LAVAGE IN NORMAL LUNG	4
- BRONCHOALVEOLAR LAVAGE IN CHEST DISEASES	11
- THE PROCEDURE OF BRONCHOALVEOLAR LAVAGE ..	15
* MATERIALS AND METHODS	30
* RESULTS	33
* DISCUSSION	44
* SUMMARY	48
* REFERENCES	50
* ARABIC SUMMARY	57

LIST OF TABLES

	<u>Page</u>
Table I Age, Sex. diagnosis and No. of oxalate crystals per high power field in BAL and sputum obtained from the examined patients	33
Table II No. of patients and percentage in the group of non infectious chest diseases as regards absence or presence of oxalate crystals in BAL.	35
Table III No. of patients and percentage in the group of infectious chest diseases as regards absence or presence of oxalate crystals in BAL	36
Table IV The presence or absence of oxalate crystals in BAL obtained from the two groups of patients. Group one patients with infectious chest diseases Group two patients with non infectious chest diseases	39
Table V The presence or absence of oxalate crystals in BAL. obtained from patients with infectious chest diseases according to their age.....	40

Table VI	The presence or absence of oxalate crystals in BAL obtained from Patients with non infectious chest diseases (group 2) according to their age	41
Table VII	The presence or absence of oxalate crystals in the sputum obtained from: Group One: Patients with infectious chest diseases. Group Two: Patients with non infectious chest diseases	42
Table VIII	Comparative study between the presence or absence of oxalate crystals in BAL and sputum in patients with: Group 1: Patient with infectious chest diseases. Group 2: Patients with non infectious chest diseases	43

ABBREVIATIONS

AMS.	Alveolar Macrophages
BAL.	Bronchoalveolar lavage
C.M.V.	Cytomegalovirus
FEV.	Forced expiratory volume
FOB.	Fiberoptic bronchoscopy
H. Influenzae.	Hemophilus influenzae
MPS.	Mononuclear phagocyte system
PNL.	Polymophonuclear leucocytes

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I N T R O D U C T I O N

AND AIM OF THE WORK

INTRODUCTION AND AIM OF THE WORK

Bronchoalveolar Lavage examination is one of the most valuable investigation as regards chest diseases. It is observed that examiner of BAL concentrate on the presence of cellular component of lavage.

However Benoit G. et al., 1985, found high correlation between the presence of oxalate crystals in BAL and invasive pulmonary aspergillosis.

Abou Gam ra et al., 1986, found that oxalate crystals are present in the sputum in most of the diseases involving bronchial tree.

In our work we try to find the diagnostic value of the presence of oxalate crystals in BAL and its relation to different bronchopulmonary diseases.

REVIEW OF LITERATURE

4

CHAPTER I

CHEMISTRY OF CALCIUM OXALATE CRYSTALS

Oxalic acid is a relatively strong dicarboxylic acid. It is moderately soluble in water (8.7 gm per 100 gm water at 20°C). The neutral salts of the acid are more soluble than the acidic salts. It forms moderately soluble salts with other substances as silver, strontium, cobalt, Zinc and Copper. The salts of calcium and lead have a very low solubility. Calcium salts have a very low solubility at neutral or alkaline pH (0.67 mg/100 gm water at pH .7 at 13°C). The solubility increase with decreasing pH but the required acidity is more than the physiological benefit. (Halger and Herman, 1973).

Oxalate salts crystallise as mono, di-or tri-hydrate, of which the first two are common in biological material. The monohydrate crystal is called "Whewellite" which is the common form found in stones, the dihydrate crystal is called "Weddellite" which forms the typical ditetragonal pyramid crystals "envelope crystals".

In tissue calcium oxalate crystals are easily seen by simple light microscopy and are very clearly defined by simple polarization microscopy. The crystals are often arranged in radiating clusters.

- Oxalic acid has a toxic effect on tissues and the marked necrosis may be ascribed to its action.

- Normal adult excrete between 20 mg to 44 mg of (anhydrous) oxalic acid daily, and the value is slightly lower in women than

men. There is diurnal variation in urinary oxalate with higher excretion during the day than at night, and there is also seasonal variations with higher excretion rates during the summer compared with winter (Hargreave 1977, Halson *et al*, 1977)

There is about 15% of urinary oxalate is derived from diet, and 85% is formed as the result of endogenous production (Menon 1982).

CHAPTER II

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BRONCHOALVEOLAR LAVAGE IN NORMAL LUNG

Bronchoalveolar lavage of a normal non-smoking adult human with 100 ml saline yields 40-60 ml of fluid containing:

I- Cellular components: $5-10 \times 10^6$ cells of:

A) Alveolar macrophages: $93 \pm 5\%$

B) Alveolar lymphocytes : $7 \pm 1\%$

i) T-lymphocytes $73 \pm 4\%$

ii) B-lymphocytes $8 \pm 3\%$

iii) Null cells 19%

C) Polymorphonuclear leucocytes: 1%

i) Neutrophils $< 1\%$

ii) Basophils $< 1\%$

iii) Eosinophils $< 1\%$

The viability of these cells is greater than 95%

II- Soluble components: Proteins 1-10 mg.

(Hunninghake et al., 1979a)

It is not known how many alveoli are washed out during this process, but since normal lung contains a small number of inflammatory and immune effector cells per alveolus, a significant number of alveoli are necessary to yield $5-10 \times 10^6$ cells per 100 ml lavage (Hunninghake et al., 1979a).