Serum Surfactant Protein D as a Prognostic Factor in Idiopathic Pulmonary Fibrosis Patients

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By

Haidi Abdallah Abu-Hussein

(M.B.B.Ch)

Supervised by

Prof. Dr. Dawlat El-Miligy

Professor of Medical Biochemistry

Faculty of Medicine, Cairo University

Dr. Laila Ahmed Rashed

Assistant Professor of Medical Biochemistry
Faculty of Medicine, Cairo University

Dr. Mohamed Wafai Zakaria

Assistant Professor of Chest-Diseases
Faculty of Medicine, Cairo University

Faculty of Medicine

Cairo University

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Abstract

Pulmonary fibrosis (PF) is defined as a specific form of chronic fibrosing interstitial pneumonia that is limited to the lung and associated with the histological appearance of UIP on a surgical lung biopsy. The diagnosis of IPF can only be made after the exclusion of other known causes of interstitial lung disease such as drug toxicities, environmental exposures, and collagen vascular diseases.

ILD is a collection of non-neoplastic lung disorders, both acute and chronic, that present with variable degrees of inflammation and fibrosis. ILD is also termed diffuse parenchymal lung diseases (DPLD).

The IIPs are defined by the ATS/ERS consensus classification as seven distinct disease entities. IPF is the most common IIP and its diagnosis is reserved for patients whose biopsy reveals the UIP pathology or in whom the clinical presentation and high-resolution computed tomography (HRCT) reveal a characteristic pattern.

Key Words:

Pulmonary Fibrosis, Idiopathic Pulmonary Fibrosis, Pulmonary Surfactant.

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List of Abbreviations

(in alphabetical order)

A-A Gradient	Alveolar-to-Arterial Oxygen Gradient
AIP	Acute Interstitial Pneumonia
ARDS	Adult Respiratory Distress Syndrome
ATS	American Thoracic Society
BAL	Bronchoalveolar Lavage
cAMP	Cyclic Adenosine Monophosphate
CFA	Cryptogenic Fibrosing Alveolitis
COP	Cryptogenic Organizing Pneumonia
DAD	Diffuse Alveolar Damage
DIP	Desquamative Interstitial Pneumonia
DPLD	Diffuse Parenchymal Lung Diseases
EGF	Epidermal Growth Factor
ERS	European Respiratory Society
FRC	Functional Residual Capacity
FVC	Forced Vital Capacity
GM-CSF	Granulocyte-macrophage colony-stimulating factor
HRCT	High-Resolution Computed Tomography
HSV	Herpes Simplex Virus
IIP	Idiopathic Interstitial Pneumonias
ILD	Interstitial Lung Disease
IPF	Idiopathic pulmonary fibrosis

IRDS	Infantile Respiratory Distress Syndrome
LIP	Lymphocytic Interstitial Pneumonia
mRNA	Messenger Ribonucleic Acid
NHLBI	National Heart, Lung and Blood Institute
NSIP	Non-Specific Interstitial Pneumonia
PDGF	Platelet-Derived Growth Factors
PF	Pulmonary fibrosis
RB-ILD	Respiratory Bronchiolitis–Associated Interstitial Lung Disease
RV	Residual Volume
SP-A	Surfactant Protein – A
SP-D	Surfactant Protein – D
SP	Surfactant Protein
TGF-β	Transforming Growth Factor-Beta
TLC	Total Lung Capacity
TNF-α	Tumor Necrosis Factor-Alpha
UIP	Usual Interstitial Pneumonia
VATS	Video-Assisted Thoracoscopy

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Introduction

and Aim of Work

Introduction and Aim of Work

Idiopathic pulmonary fibrosis (IPF) carries a 50% 5-years survival rate ***(Day; 1994)***. Current therapies are only marginally effective in improving pulmonary function or survival time. The pathogenesis of IPF is characterized by excessive wound healing with chronic inflammation, fibroblast proliferation and extracellular matrix production with chronic scarring and honeycomb formation. This fibroproliferative response is uniformly accompanied by type II cell hyperplasia ***(Walker; et al., 1986)***. The hydrophilic surfactant proteins (SP)-A and SP-D belong to the collection subgroup of the C-type lectin superfamily, along with mannose-binding glycoproteins and collectin CL43 ***(Voorhout; et al., 1992)***. Two types of nonciliated epithelial cells, in the peripheral airways, Clara cells and alveolar type II cells produce these lung collectins ***(Jeffrey and Ann; 2008)***.

Surfactant proteins –D (SP-D), produced and secreted by type II cells, can be detected in serum and are elevated in patients with certain inflammatory lung diseases, including IPF ***(Voorhout, et al.; 1992; Sinclair, et al.; 2003; Shulenin, et al.; 2004; and Jeffrey and Ann; 2008)***. Although the exact mechanism for the increase in SP-D in the circulation is not known, it is probably a combination of a loss of epithelial integrity due to injury and an increased mass of type II cells due to hyperplasia. Because the concentrations of serum SP-D probably vary with disease and lung inflammation, measurement of these two proteins might prove to be useful markers for the pathogenesis and detection of IPF ***(Wert, et al.; 2000; Whitsett and Weaver, 2002; Ikegami, et al.; 2005)***.

The aim of the present study is to investigate the possible role of SP-D in the pathogenesis and prognosis of idiopathic pulmonary fibrosis patients.

Review of Literature

Chapter One

Pulmonary Fibrosis