



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY



**THE VALUE OF NEUTROPHIL-TO-MONOCYTE-
PLUS-LYMPHOCYTE RATIO AS A MARKER FOR
DISCRIMINATING PULMONARY TUBERCULOSIS
FROM PNEUMONIA**

Thesis

Submitted for Partial Fulfillment of Master Degree
In Chest Diseases

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
AFB	Acid fast bacilli
APCs	Antigen-presenting cells
AUC	Area under the curve
BAL	Bronchoalveolar lavage
BCG	Bacillus Calmette-Guérin
BMJ	British medical journal
CAP	Community-acquired pneumonia
CBC	Complete blood count
CFP	Culture filtrate protein
COPD	Chronic obstructive pulmonary disease
CPD	Cigarettes per day
CRP	C-reactive protein
CT	computed tomography
DOTS	Directly observed treatment short-course
ELISA	Enzyme linked immunosorbent assay
ESAT	Early secretory antigen
ESR	Erythrocyte sedimentation rate
FNAB	Fine needle aspiration biopsy
HB	Heamoglobin
HIO	Health insurance organization
HPLC	High performance liquid chromatography
IFN	Interferon
IGRAs	Interferon- γ release assays
ILCs	Innate lymphoid cells
iNKT	Invariant natural killer T

List of Abbreviations (Continued)

Abb.	Full term
IU	International units
KO	Knockout
L.J	Lowenstein-jensen
LRTI	Lower respiratory tract infections
MAIT	Mucosa-associated invariant T
MDR	Multidrug resistant
MDR-TB	Multiple drug-resistant tuberculosis
MGIT	Mycobacteria growth indicator tube
MHC	Major histocompatibility complex
MLN	Mediastinal lymph node
MLR	Monocyte to lymphocyte ratio
MTB	Mycobacterium tuberculosis
NK	Natural killer
NLR	Neutrophil to lymphocyte ratio
NMLR	Neutrophil-to-Monocyte-Plus- Lymphocyte Ratio
NO	Nitric oxide
NPV	Negative predictive value
NTP	National tuberculosis control program
PAMPS	Pathogen-associated molecular patterns
PCT	Procalcitonin
PLR	Platelet-to-lymphocyte ratio
PLT	Platelet
PPD	Purified protein derivative
PPV	Positive predictive value

List of Abbreviations (Continued)

Abb.	Full term
PRRs	Pattern recognition receptors
QFT-Gold	Quanti FERON-TB Gold assay
RBCs	Red blood cells
RCTs	Randomized controlled trials
RLS	Restless legs syndrome
ROC-curve	Receiver operating characteristic curve
Rpf	Resuscitation-promoting factor
SD	Slandered deviation
suPAR	Soluble urokinase type plasminogen activator receptor
TA	Toxin-antitoxin
TB	Tuberculosis
TLC	Total leucocytes count
TLRs	Toll-like receptors
TST	Tuberculin skin test
WCC	White cell count
XDR-TB	Extensively drug-resistant tuberculosis
ZN	Ziehl Neelsen

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INTRODUCTION

Tuberculosis (TB) is an infectious disease usually caused by *Mycobacterium tuberculosis* (MTB) bacteria. Tuberculosis generally affects the lungs, but can also affect other parts of the body. Most infections do not have symptoms, in which case it is known as latent tuberculosis. About 10% of latent infections progress to active disease which, if left untreated, kills about half of those affected (*WHO, 2016*). The classic symptoms of active TB are a chronic cough with blood-containing mucus, fever, night sweats, and weight loss. It was historically called "consumption" due to the weight loss. Infection of other organs can cause a wide range of symptoms (*Dolin et al., 2010*).

Tuberculosis is spread through the air when people who have active TB in their lungs cough, spit, speak, or sneeze (*CDC, 2016*). People with latent TB do not spread the disease. Active infection occurs more often in people with HIV/AIDS and in those who smoke. Diagnosis of active TB is based on chest X-rays, as well as microscopic examination and culture of body fluids. Diagnosis of latent TB relies on the tuberculin skin test (TST) or blood tests (*Konstantinos, 2010*).

Prevention of TB involves screening those at high risk, early detection and treatment of cases, and vaccination with the bacillus Calmette-Guérin (BCG) vaccine (*Harris and Randol 2013; Hawn et al., 2014*). Those at high risk include household, workplace, and social contacts of

-Introduction-

people with active TB (*WHO, 2008*). Treatment requires the use of multiple antibiotics over a long period of time. Antibiotic resistance is a growing problem with increasing rates of multiple drug-resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB) (*WHO, 2016*).

Pneumonia is an inflammatory condition of the lung affecting primarily the small air sacs known as alveoli (*McLuckie, 2009; Jeffrey, 2010*). Typically symptoms include some combination of productive or dry cough, chest pain, fever, and trouble breathing. Severity is variable (*Roudsari et al., 2020*).

Pneumonia is usually caused by infection with viruses or bacteria and less commonly by other microorganisms, certain medications and conditions such as autoimmune diseases (*McLuckie, 2009; Jeffrey, 2010*). Risk factors include cystic fibrosis, chronic obstructive pulmonary disease (COPD), asthma, diabetes, heart failure, a history of smoking, a poor ability to cough such as following a stroke, and a weak immune system (*NHLBI, 2011a*). Diagnosis is often based on the symptoms and physical examination. Chest X-ray, blood tests, and culture of the sputum may help confirm the diagnosis (*NHLBI, 2011b*). The disease may be classified by where it was acquired with community, hospital, or health care associated pneumonia (*NHLBI, 2011c*).

Vaccines to prevent certain types of pneumonia are available (*NHLBI, 2011c*) other methods of prevention