شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

Role of Genexpert in Diagnosis of Tuberculous Pleural Effusion in Comparison with Thoracoscopic Pleural Biopsy

Thesis

Submitted for Partial Fulfillment of MD Degree
in Chest Diseases and tuberculosis

By

Marwa Esmail Abdel Aty Ibrahim
M.B.B.Ch. - MSc, Chest Diseases

Under Supervision of

Professor. Mona Mansour Ahmed
Professor of Chest Diseases
Faculty of Medicine- Ain Shams University

Professor. Hesham Atef AbdElhalim
Professor of Chest Diseases
Faculty of Medicine- Ain Shams University

Doctor. Amr Mounir Shoukri
Assistant Professor of Chest Diseases
Faculty of Medicine- Ain Shams University

Faculty of Medicine
Ain Shams University
2020

Acknowledgment

First and foremost, thanks to ***Allah****, the most beneficent and merciful. To whom I relate any success in achieving any work in my life.*

I would like to express my sincere thanks to **Prof. Mona Mansour Ahmed,** *Professor of Chest Diseases, Faculty of Medicine, Ain Shams University, under her supervision, I had the honor to complete this work, I am deeply grateful to him for her professional advice, guidance and support.*

My deep gratitude goes to **Prof. Hesham Atef AbdElhalim,** *Professor of Chest Diseases, Faculty of Medicine, Ain Shams University, for his kind guidance, sincere efforts and supervision throughout this work.*

Special thanks are due to **Dr. Amr Mounir Shoukri,** *Assistant Professor of Chest Diseases, for his great support, tireless guidance, fruitful encouragement, valuable instructions and generous help.*

My deep appreciation to **Dr. Sabah Ahmed Hussien,** *Associate Professor of Pulmonology Kasr Alainy School of Medicine, Cairo University for her valuable instructions, unlimited help and great deal of support, her endless patience with me and for her experienced guidance and helpful suggestions that make the completion of this work possible.*

Marwa Esmail

Contents

List of Abbreviations

Abb.	Full term
ADA	Adenosine deaminase
AFB	Acid-fast bacilli
BCG	Bacillus Calmette-Guerin
BSC	Biological safety cabinet
CDC	Center of Disease Control
CFP	Culture filtrate protein
CNS	Central nervous system
CRP	C-reactive protein
CT	Computed tomography
CXR	Chest x-ray
dAdo	Deoxyadenosine
DOTS	Directly observed therapy strategy
DST	Drug susceptibility testing
ELISA	Enzyme-linked immunosorbent assay
EPTB	Extrapulmonary tuberculosis
F	Frequency
FNAB	Fine needle aspiration biopsy
FP	False positive
GPW	General Programme of Work
HBCs	High-burden countries
HIV	Human immunodeficiency virus
HPLC	High Performance Liquid Chromatography
HP-TLC	High-Performance Thin layers chromatography
IFN	Interferon
IGRAs	Interferon-γ release assays

Abb.	Full term
IL-1	Interleukin-1
IU	International units
IWGMT	International Working Group on Mycobacterial Taxonomy
L.J	Lowenstein–Jensen
LTBI	Latent tuberculosis infection
MAPK	Mitogen-activated protein kinase
MARCO	Macrophage receptor with a collagenous structure
MDR	Multidrug-resistant
MGIT	Mycobacteria growth indicator tube
MT	Medical Thoracoscopic
MTB	Mycobacterium tuberculosis
MTBC	Mycobacterium tuberculosis complex
N_2	Nitrogen
NAAT	Nucleic acid amplification test
NLR	Negative likelihood ratio
NPV	Negative predictive value
NTM	Nontuberculous mycobacteria
O_2	Oxygen
PLR	Positive likelihood ratio
PPD	Purified protein derivative
PPV	Positive predictive value
QFT-Gold	Quanti FERON-TB Gold
RIF	Rifambicin
RNA	Ribosomal ribonucleic acid
rpoB	RNA polymerase beta
SCID	Severe combined immunodeficiency disease

Abb.	Full term
SD	Standard deviation
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
suPAR	soluble urokinase-type plasminogen activator receptor
TB	Tuberculosis
TDM	Trehalose dimycolate
TGFβ	Transforming growth factor beta
TN	True negative
TNF	Tumor necrosis factor
TNFα	Tumour necrosis factor alpha
TP	True positive
UMDNJ	University of Medicine and Dentistry of New Jersey
UN	United Nations
WHO	World Health Organization
XDR	Extremely drug resistant
ZN	Ziehl–Neelsen

List of Tables

List of Figures

Role of Genexpert in Diagnosis of Tuberculous Pleural Effusion in Comparison with Thoracoscopic Pleural Biopsy

ABSTRACT

Background: pleural effusion caused by tuberculosis is common form of extrapulmonary tuberculosis. It is usually due to delayed hypersensitivity to antigens of tubercle bacilli in pleura. It is found that it occurs more in HIV patients.

Aim: Evaluation the role of GeneXpert to diagnose tuberculous pleural effusion compared with thoracoscopic pleural biopsy.

Materials and methods: Cross sectional study, proceeded on 71 patients with undiagnosed exudative pleural effusion, highly suspected to be tuberculous (as regarding our inclusive criteria) tuberculin skin test, sputum Ziehl-Nielsen, thoracocentesis, GeneXpert examination, and pleural biopsy via thoracoscopy were done.

Results: pleural fluid in the majority of cases was rich in lymphocytes, Adenosine deaminase (ADA) (mean+SD) was 24.01±9.9. GeneX-pert of pleural fluid was negative in 77.46%. The definitive diagnosis is to isolate tubercle bacilli from biological samples; if it is not available diagnosis can be occurred by histological examination of pleural tissue. As well 88.73% of patients diagnosed by histopathology, but the sensitivity of GeneXpert is 22.2%, specificity is 75%, positive predictive value(PPV) is 87.50%, negative predictive value(NPV) is 10.90% and finally its accuracy in evaluating TB pleurisy is very weak (28.6%).

Conclusion: With high suspicion of tuberculosis, GeneXpert may be performed first, if it gives positive data it will be definite diagnosis but if it gives negative data patients should be subjected to further investigation and the most confirmatory one is pleural biopsy. GeneXpert may save time for diagnosis. However if negative other confirmatory tests are mandatory. So GeneXspert has a good rule-in test for pleural tuberculosis.

Keywords: GeneXpert, Tuberculous peural effusion, Thoracoscopic pleural biopsy

Introduction

Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis*. It typically affects the lungs (pulmonary TB) but can affect other sites as well (extra pulmonary TB). It is infection with airborne transmission. Overall, a relatively small proportion (5–15%) of the estimated 2–3 billion people infected with *M. tuberculosis* will develop TB disease during their lifetime. However, the probability of developing TB is much higher among people infected with HIV ***(WHO, Global tuberculosis report, 2015).***

In 2014, there were an estimated 9.6 million new TB cases: 5.4 million among men, 3.2 million among women and 1.0 million among children. There were also 1.5 million TB deaths (1.1 million among HIV-negative people and 0.4 million among HIV-positive people), of which approximately 890 000 were men, 480 000 were women and 140 000 were children. The number of TB deaths is unacceptably high: with a timely diagnosis and correct treatment, almost all people with TB can be cured ***(WHO, Global tuberculosis report, 2015).***

Primary TB is considered an initial infection which is usually seen in children and is starting as small