بسم الله الرحمن الرحيم

Sudan University of Science and Technology
College of Graduate Studies

Reliability of Mycolic Acid IgG Antibodies in the Diagnosis of Pulmonary Tuberclosis

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A dissertation submitted in partial fulfillment for the requirements of M.Sc degree in Medical Laboratory Science (Microbiology)

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بِسْمِ اللّهِ الرَّحْمَنِ الرَّحِيمِ

قال الله تعالى

صدق الله العظيم

سورة العلق الآيات 1-5

Dedication

I dedicate this research to
My father…..
My mother…..

Whom taught me how I could be human being
My brothers and sisters….

My friends and my colleagues……..

The persons whom I love, respect and appreciate…..

&

Every one from whom I learned…

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First of all, thanks for Almighty Allah who gave me the power for preparation and completion of this study.

Our Creator who has guided me on the way and for leading me to the people mentioned above.

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ABSTRACT

This study aimed to test the reliability of mycolic acid IgG antibodies compared to PCR among patients suspected to have pulmonary tuberculosis in Khartoum State.

Sputum and blood specimens were collected from patients attended to Alsha'ab Teaching Hospital, Tuberculosis Reference Laboratory, Ibrahim Malik Hospital and Abu Anga Hospital. All patients were priorly informed.

Smear from direct sputum specimens (90) showed that 17 (18.9%) were ZN positive, while 73 (81.1%) were negative. The 90 sputum specimens were cultivated on LJ medium and incubated at 37°C, 15 (16%) showed typical characteristics of *M. tuberculosis*, the morphological features were dry, tough and pale color colonies, while 75 (84%) showed no obvious growth or contaminated.

The biochemical tests showed sensitivity for para nitro benzoic acid test, negative for thiophin-2- carboxylic acid hydrazide, positive for nitrates oxidation and negative for catalase test at 68°C.

The ninety sputum specimens were subjected to PCR to ampilify IS6110 segment. The result showed that 79 (87.8%) were positive for IS6110 while 11 (12.2%) were negative.

Eighty Serum samples were analysed by ELISA, 16 (20%) gave positive result for antimycolic acid IgG while 64 (80%) were negative.

This study suggested that detection of antimycolic acid antibodies is a promising rapid and reliable technique in the diagnosis of pulmonary tuberculosis.

هدفت هذه الدراسة لمعرفة جدوى الكشف عن أجسام الغلوبيولين(ج) الخاصة بحمض المايكوليك لدى المرضى الذين يعتقد إصابتهم بمـرض السـل الرئوي مقارنة مع تفاعل البلمرة التسلسلي بولاية الخرطوم.

جمعت عينات الدم و البلغم (القشع) من مستشفى الشـعب التعليمـي ومعمل الدرن المرجعي، ومستشـفى أبـو عنجـة ومستشـفى ابراهيـم مالـك. المرضى تم إعلامهم بهـذه الدراسـة. المسـحات الـتي أخـذت مـن 90 عينـة بلغم(القشع) تم صبغها بالذيهل نيلسن وأظهرت نتائج الاختبار 17 (18.9%) موجبة و 73 (81.1%) سالبة.

من جملـة 90 عينـة بلغـم تـم عـزل 15 (16%) للبكتيريـا المتفطـرة السلية على وسط ليوستين جنسن عند درجة حرارة 37 درجة مئوية أظهرت خصائص البكتيريا المتفطرة السلية البشرية (جافة ، خشـنة وبلـون شـاحب) كما أنها عند إجراء الاختبارات الحيوكيميائية لها كانت حساسة لاختبـار حمـض البارابنزويك ومقاومة لاختبار الثيوفين-2- كاربوكسيلك أسيد هيدرازيد وكـانت موجبة لاختبار اختزال النترات وسالبة لاختبار الكاتـاليز. بينمـا 75(84%) لـم يحصل لها نمو واضح أو كانت ملوثة.

كما وجـد أن مـن جملـة 90 عينـة بلغـم تـم اختبارهـا بواسـطة تفاعـل البلمـرة التسلسـلي ، 79(87,8) كـانت موجبـة و 11(12.2%) عينـة كـانت سالبة.

أما اختبارات الجاما قلوبيولين (ج) على العينات فقد أظهرت أن 16 (20%) كانت موجبة و 64 (80%) كانت سالبة.

هذه الدراسة كشفت بوضوح أهميـة أجسـام الغلوبيـولين المنـاعي (ج) المضادة لحمض المايكوليك في دقته وسرعته فى تشخيص السل الرئوي.

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LIST OF ABBREVIATIONS

AFB	Acid Fast Bacilli
AIDS	Aquired Immuno Dificiency Syndrome
AMA	Anti Mycolic Acid Antibodies

BC	Before Century
BCG	Bacillus Calmette-Guérin
CDC	Center for Disease Control
CF	Cord-Factor
CR1	Complement Receptors1
CR3	Complement Receptors3
DAT	Diactyltrehalose
DNA	Deoxyribonucliec Acid
ELISA	Enzyme Linked Immuno-Sorbent Assay
G+C	Guanosine plus Cytosine
HIV	Human Immunodeficiency Virus
IgG	Immunoglobulin Gamma
IUATLD	International Union Against Tuberculosis and Lung Disease
KDa	kiloDalton
LAM	lipoarabinomannan
LJ	Löwenstein-Jensen
M.tb	*Mycobacterium tuberculosis*
MA	Mycolic Acids
MDR-TB	Multidrug-resistant TB
NTMs	Non-Tuberculous Mycobacteria
PCR	Polymerase Chain Reaction
PGL	Phenol glycol Lipids
PPDs	Purified Protein Derivatives
RNA	Ribonucleic Acid
TB	Tuberculosis
TDM	Trehalose dimycolates
TMM	Trehalose monomycolates
TST	Tuberculin Skin Test
WHO	World Health Organization
XDR-TB	Extensively drug-resistant