A REVIEW OF TUBERCULOUS CASES ADMITTED AT GIZA CHEST HOSPITAL DURING THE PERIOD 2005-2009

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by

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LIST OF ABBREVIATIONS

ADA: Adenosine Deaminase.
AFB: Acid-Fast Bacilli.
AIDS: Acquired Immune Deficiency Syndrome.
Am: Amikacin.
Amx/Clv: Amoxicillin/Clavulanate.
ARI: Annual Risk of Infection
ATP: Adenosine Tri-Phosphate
ATS: American Thoracic Society
BC: Before Christ
Bactec:Becton Automated Culture Technology
BCG: Bacille Calmette-Guerin.
CD: Cluster of Differentiation
CDC: Centers for Disease Control & Prevention.
CDR: Case Detection Rate
CFT: Complement Fixation Tests.
Cfx: Ciprofloxacin.
CFU: Colony Forming Unit.
CFP-10: Culture Filtrate Protein-10
Cfz: Clofazimine.
Clr: Clarithromycin.
Cm: Capreomycin.
CPT: chest physiotherapy
CR: Complement Receptor
Cs: Cycloserine.
CT: Computed Tomography
DARQs: Diarylquinolines
DOTS: Direct Observed Therapy Strategy.
DRS: Drug Resistance Surveillance
DST: Drug Susceptibility Testing.
E: Ethambutol.
EF: Efficiency.
ELISA: Enzyme-Linked Immuno-Sorbent Assay.
ELISPOT: Enzyme-Linked Immunospot.
EMB: Ethambutol.
ESAT-6: Early Secretory Antigenic Target-6
Eto: Ethionamide.
Ex-PTB: Extra-Pulmonary Tuberculosis
FOB: Fiber-Optic Bronchoscopy
Gfx: Gatifloxacin
HIO: Health Insurance Organization
HIV: Human Immunodeficiency Virus.
IgA: Immunoglobulin A
IM: Intramuscular.
iNOS: iducible Nitric Oxide Synthase
IL: Interleukin
INF γ: Interferon gamma.
INH: Isonicottinic acid hydrazide
Km: Kanamycin.
LAM: Lipoarabinomannan

LCR: Ligase chain reaction.
Lfx: Levofloxacin.
LI: Lytic Index
LiPA: Line Probe assay.
LJ: Lowenstein-Jensen.
LTBI: Latent Tuberculosis Infection
Lzd: Linezolid.
M: Mycobacterium.
MAC: Mycobacteria avium-intracellulare complex.
MDR-TB: Multi-Drug-Resistant Tuberculosis.
Mfx: Moxifloxacin.
MGIT: Mycobacterial Growth Indicator Tube.
MIC: Minimal Inhibitory Concentration.
MOHP: Ministry of health and population.
MOTT: Mycobacteria Other Than Tubercle bacilli.
MTB: Mycobacterium Tuberculosis
NAAT: Nucleic Acid Amplification Tests.
NO: Nitric Oxide
NTM: Non Tuberculous Mycobacteria.
NTP: National Tuberculosis Programme
Ofx: Ofloxacin.
P: Pyrazinamide.
P-A: Postero-anterior.
PAS: Para-AminoSalicylic acid.
PBS: Phosphate Buffer Saline
PCR: Polymerase Chain Reaction.
PI: Phagocytic Index
PM: Proportion Method.
PPD: Purified Protein Derivative.
PTB: Pulmonary Tuberculosis
Pto: Protionamide.
PZA: Pyrazinamide.
QFT: QuantiFERON-TB test
RIF: Rifampicin.
RMP: Rifampicin.
RNA: Ribonucleic acid.
S: Streptomycin.
SCC: Short Course Chemotherapy.
SD: Standard Deviation.
SM: Streptomycin.
TACO: Tryptophan Aspartate Coat Protein
TB: Tuberculosis.
Th: Thioacetazone.
Th1: T-helper 1 lymphocyte
Th2: T-helper 2 lymphocyte
TLR: Toll-Like Receptor
TNFα: Tumour Necrosis Factor alpha.
TST: Tuberculin Skin Test
TTD: time to detection
XDR-TB: Extensively-Drug-Resistant Tuberculosis
WHO: World Health Organization

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Introduction

Tuberculosis (TB) is a bacterial disease spreads by infectious air borne droplets containing Mycobacterium tuberculosis (occasionally Mycobacterium bovis or africanum) ***(Koch, 1932)***. Once the organism is inhaled, it travels via the airways to the pulmonary parenchyma where it is deposited. Although the organism may be deposited in any lobe, a predilection for the lower lobes exists ***(Tara, 2005)***.

The organism is ingested by alveolar macrophages, which then attempt to phagocytoze the bacilli. As a result of the natural defenses of the tubercle bacillus, alveolar macrophages may be unsuccessful in attempting to completely destroy the bacilli, which then lie dormant within the macrophage. As a consequence, bacilli often remain viable within the macrophages in immunocompetent individuals. Subsequently, bacilli may travel via the pulmonary lymphatics, or they may enter the vascular system and seed distant sites such as the liver, spleen, or bone marrow ***(Tara, 2005)***.

In most immunocompetent individuals, macrophages are successful in containing the bacilli, and the infection is self-limited and often subclinical. The contained infection in immunocompetent hosts is called primary tuberculosis In some patients, pulmonary macrophages are unable to contain the bacilli and are overwhelmed, leading to a clinically apparent infection. This is more common in patients who are immunocompromised, notably the population with HIV/AIDS. This form of tuberculosis is called progressive primary tuberculosis. Patients with progressive primary tuberculosis may present with pulmonary manifestations (often with miliary tuberculosis) or with manifestations of systemic or disseminated disease ***(Tara, 2005)***.

Patients who are exposed to T.B bacilli for the first time have pathologic, roentgenologic, and clinical features different from those who have reactivation of previous disease. As a consequence, it is logical to consider the disease processes under the separate headings of primary and post-primary tuberculosis ***(Fraser et al., 1994)***

Approximately 80% of tuberculosis patients have pulmonary disease and the remainder have extrapulmonary disease with or without pulmonary component. Among HIV-coinfected persons, this association is drastically altered and may even be reversed. The sites where extrapulmonary tuberculosis is most commonly seen, in declining order of frequency, are the lymph nodes, pleura, genito-urinary tract, and the bones and joints. Meningeal tuberculosis accounts for approximately 1% of cases ***(Niederman et al., 2001)***

Postprimary (reactivation) tuberculosis is seen in patients in whom the initial infection was contained successfully by the pulmonary macrophages, with bacilli remaining viable within the macrophages. Infection results when the host's immune status (T cells) is compromised. This form may appear in the elderly population, for example ***(Tara, 2005)***.

Multi-drug-resistant tuberculosis (MDR-TB) is an increasing global problem, the extent & burden of which varies significantly from country to country & region to region ***(Ormerod, 2005)***.

The prevalence rate of new cases of multi-drug-resistant tuberculosis (MDR-TB) was 2.2% while that of the previously treated tuberculous cases, which were discovered to be multi-drug-resistant, was 38%. ***(WHO, 2004)***

A patient is determined to have a MDR-TB only through laboratory confirmation of in vitro resistance to at least Isoniazid & Rifampicin ***(WHO TB report 2005)***.

More than eight million people develop active TB annually, and approximately two million die from the disease each year. The WHO estimate that there are more than 15 million people living with TB. In 2003, out of estimation 8.8 million new TB cases worldwide, 3.9 million were diagnosed by laboratory testing and 674,000 also were HIV+ve. An estimated 1.7 million people died of TB in 2003, 22 % of whom were co-infected with HIV. Those with active TB who receive no treatment can infect an average of 10 to 15 people annually. Although TB is curable, it kills 5000 people every day, 98% of deaths are in developing world affecting mostly young adults in their most productive years. ***(WHO TB report, 2005) .***

Aim of the Work

The aim of this study is to review the tuberculosis cases admitted to Giza chest hospital during the last five years (2005-2009) in order to evaluate the National Tuberculosis Program application in Egypt.

Tuberculosis

History of Tuberculosis

It is presumed that the genus Mycobacterium originated more than 150 million years ago ***(Daniel 2006)***. An early progenitor of M. tuberculosis was probably contemporaneous and co-evolved with early hominids in East Africa, three million years ago. The modern members of M. tuberculosis complex seem to have originated from a common progenitor about 15,000 - 35,000 years ago ***(Gutierrez et al. 2005).***

Figure (1): A vertebral Bone Affected by Tuberculosis

The term phthisis/consumption appeared first in Greek literature. Around 460 BCE, Hippocrates identified phthisis as the most widespread disease of the times, and noted that it was almost always fatal. Due to common phthisis-related fatalities, he wrote something no doctor would dare write today: he warned his colleagues against visiting TB patients in late stages of the disease, because their inevitable deaths might damage the reputations of the attending physicians ***(Palomino et al. 2007)***.