THE OPTIMAL TISSUE THICKNESS FOR HISTOLOGICAL DIAGNOSIS OF TUBERCULOSIS

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TABLE OF CONTENT

MANUSCRIPT: The Optimal Tissue Thickness for Histological Diagnosis of Tuberculosis Using Kinyoun Stain

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ABSTRACT

Introduction. Tuberculosis is an important infectious disease caused by the bacillus *Mycobacterium tuberculosis*. It can cause pulmonary and extrapulmonary tuberculosis. There are several acid-fast bacilli (AFB) stains available for the formalin fixed paraffin embedded specimens. These include Kinyoun stain, a faster and cheaper option for diagnosing tuberculosis on tissue specimens. There is no available published study on the optimal tissue thickness for AFB staining; hence this study was conducted to find the best thickness in facilitating AFB detection. **Materials and methods.** This is a retrospective study. A total of 84 granuloma cases were included, of which 29 cases were positive for Mycobacterium Tuberculosis culture and another 55 cases were negative. All cases were subjected to Kinyoun stain at 3 microns, 5 microns and 7 microns thick sections for AFB detection. The AFB detection was done by the researcher and followed by 10% random screening by two pathologists. The sensitivity, specificity, positive predictive value and negative predictive value of each thickness were calculated and compared. **Results.** In this study, 7 microns thickness shows the highest sensitivity (48.26%) compared to the 3 microns (31.03%) and 5 microns thickness (37.93%). 7 microns thickness also shows higher specificity than 5 microns thickness (92.73%) and this result is similar to 3 microns thickness. **Conclusion.** The 7 microns thick section yielded the highest sensitivity in detecting AFB using Kinyoun stain.

Keywords: Acid-fast bacilli, Tuberculosis, Kinyoun stain

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis* (MTB). It typically affects the lungs (pulmonary TB) but can also affect other sites (extrapulmonary TB). The disease will spread when people who are sick with pulmonary TB expel bacteria into the air, for example, by coughing. Overall, a relatively small proportion (5-15%) of the estimated 1.7 billion people infected with MTB will develop TB during their lifetime. However, the probability of developing TB is much higher among people infected with *Human Immunodeficiency Virus* (HIV) and higher among people with underlying risk factors such as undernutrition, diabetes, smoking and alcoholism.

TB is a disease of public health importance in Malaysia, with 25 173 cases of the disease recorded nationally in 2018, and an estimated incidence rate of 92 cases per 100 000 population. Although the prevalence of TB in Malaysia has decreased significantly compared to the early 1990s, Malaysia was still ranked as an intermediate burden country by the World Health Organization (WHO) in 2018, with an incidence rate of 92/100,000 and an estimated mortality rate of 4.9/100,000 population.

TB cases can be defined as bacteriologically confirmed and clinically diagnosed TB cases. Bacteriologically confirmed TB cases refer to cases in which its biological specimen is positive by microscopic examination, culture or WHO-recommended rapid diagnostic (WRD); such as Xperia's MTB/RIF. On the other hand, clinically diagnosed TB cases refer to the cases diagnosed as active TB on clinical grounds alone; but do not fulfil the criteria for bacteriological confirmation.