



ORIGINAL ARTICLE

Pedicle screw sublaminary wiring (PSSW) combined with anti-tuberculosis chemotherapy for treating spinal tuberculosis in adults: A cohort study



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Abstract

Background: Operative procedures and anti-tuberculosis combinations are controversial for tuberculous spondylitis (TS) management in cases with risk of deformity, fragments, instability, and neurological disorders.

Purpose: To assess the effectiveness of a combination of anti-tuberculosis and pedicle screw sublaminary wiring (PSSW) for treating TS.

Method: This study was a cohort study with a pre-test/post-test control design. This study was conducted at the Dr. Zainoel Abidin Hospital (Banda Aceh) from March 2005 to March 2007. Sampling technique was judgement sampling. Neurological data deficit (Frankel classification) was analyzed before and after treatment using the Spearman test. Kyphosis angles were analyzed before and after treatment using the regression correlation test.

Results: A total of 18 patients (61.1% male and 38.9% female) participated in this study. The spinal column involved in this study was 55.6% thoracic, 27.8% thoraco-lumbar, and 16.7% lumbar. Neurological status before the treatment was 11.1% Frankel C, 72.2% Frankel D, and 16.7% Frankel E. Neurological status after the treatment was 5.55% Frankel C and 94.4% Frankel E. It showed that there was no significant association between a combination of anti-tuberculosis and PSSW for neurological deficit improvement ($P=0.212$). The mean angle of kyphosis before

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the treatment was 23.05 ± 11.9 while after the treatment it was 10.5 ± 5.9 . It showed that there was a significant association between a combination of anti-tuberculosis and PSSW for kyphosis degree improvement ($P=0.000$).

Conclusions: A combination of anti-tuberculosis and PSSW for six months provided significant results if assessed from degree of kyphosis, but did not provide significant results if assessed from Frankel classification.

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Introduction

Tuberculosis spondylitis (TS) is one of the oldest known human diseases. This disease was first described in 1779 by Percival Pott, therefore this disease is also known as Pott's disease.¹ The average number of extra-pulmonary tuberculosis (TB) in the world has remained stable. TS is most commonly musculoskeletal TB, the prevalence of which is about 40–50% of all cases of musculoskeletal TB² and an estimated 1–2% of all cases of TB.³ TS incidence is 1.17 per 100,000 in females and 0.916 per 100,000 in males.⁴ Furthermore, the incidence of neurological complications of TB is about 10–43%.⁵

TS is the most dangerous musculoskeletal TB. It can cause damage due to bone deformity, serious morbidity, bone disorders, and severe neurological deficits.⁶ The regions of the spine that were most often affected by TS were 35% lumbar, 31% thoracic, 15% thoraco-lumbar, 13% cervical, and 6% cervico-thoracic,⁷ but this percentage was varied in several other publications. Garg and Somvanshi⁸ revealed that the thoracic region of the vertebral column was most frequently affected. Godlwana et al.⁴ found that the spinal region affected was 42% thoracic, 30% lumbar, 11% cervical, 10% thoraco-lumbar, 5% lumbosacral, and 2% sacral. Turgut³ found that the spinal region affected was 55.8% thoracic, 22.8% lumbar, 16.9% thoracolumbar, and 4.2% cervical. Kotil et al.⁹ found that the most common region of Pott's disease was the thoracolumbar junction (41%), followed by the thoracic (36%), and lumbar (23%) regions.

Until now, the management of TS is still controversial due to the high variation in clinical TS. The Medical Research Council of the United Kingdom (MRC, London) suggested the use of an isoniazid and rifampicin regimen for six months as standard therapy for TS, but it did not include TS with damage to three or more areas of the spine.¹⁰ Other studies revealed that the risk of deformity, instability, and progressive neurological deficits were related to the number of spinal areas damaged and indicated that operative management should maintain spinal stability.^{6,11} Therefore, although the MRC¹⁰ suggested that drug therapy is a standard treatment for TS, it is not applicable to all cases of TS.

One of the operative procedures for TS is pedicle screw sublaminar wiring (PSSW). PSSW, besides correcting kyphosis degrees, is also expected to improve neurological deficits.¹² A study conducted by Jutte and Van Loenhout-Rooyackers¹³ and Issack and Boachie-Adjei¹⁴ revealed

that surgical management could improve the degree of kyphosis.

In this study, we conducted the observation of kyphosis improvement after PSSW combined with anti-tuberculosis drugs, as associated with neurological status.

Material and method

Research design

This was an observational analytical study. The design of this study is a cohort study with a pretest/posttest control design.

Research schedule and location

The study was conducted at the Orthopaedic Department of the Centre of Surgery Installation and the Radiology Installation at the Dr. Zainoel Abidin Teaching Hospital, from March 2005 to March 2007.

Research population and sample

The samples in this study were TS patients who agreed to receive a combination of anti-tuberculosis therapy with PSSW based on clinical indications. The sampling technique used in this study was judgement sampling. The inclusion criteria of this study were (1) patient age >18 years, (2) diagnosed clinically, microbiologically, and radiologically as TS, (3) the lesion's regions were found in the thoracic, thoracolumbar, and/or lumbar regions. Exclusion criteria of this study were (1) patients with other spine disorders and (2) patients with severe systemic disorders.

Research procedures

The procedure of this study was (1) provision of explanations and recording of baseline data, including personal, demographic, and clinical information, consisting of neurological deficits according to the Frankel classification and the kyphosis angle. (2) Examination of radiographs of the spine using a CT Scan or MRI. (3) Anti-tuberculosis treatment with isoniazid at 7.5 mg/kg BW/day, rifampicin at 10 mg/kg BW/day, and ethambutol at 20 mg/kg BW/day,

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