Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Ortho & Spine Surgery

Efficacy of Short Term Intermittent Chemotherapy in DOTS Regimen in Extra Spinal Tuberculosis

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DOI: 10.36347/sjams.2021.v09i12.007 | **Received:** 04.11.2021 | **Accepted:** 08.12.2021 | **Published:** 14.12.2021

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Abstract **Original Research Article**

Noncompliance is one of the major issues with the treatment of tuberculosis (TB), which can lead to treatment failure. A short-course of chemotherapy as recommended by World Health Organization under the umbrella term of Directly Observed Treatment Short Course (DOTS) therapy seems to be effective. The main aim in present study was done to evaluate the efficacy of short term intermittent chemotherapy in DOTS regimen in patients with extra spinal osteoarticular TB. The present prospective study was conducted in the Department of Ortho & Spine Surgery, National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh over a period of one year between January 2018 to February 2019. 21 patients included in our Study. All the patients were given the DOTS regime as recommended by WHO and followed up at intervals of one month during the treatment for assessing the clinical improvement and compliance of the patient. The results in present study, there were 85.71% males and 14.29% were females. 42.86% were students followed by the labourer (28.57%). Hip (47.62%) was the most commonly involved joint followed by short bones of hand and foot (19.5%). All (100%) patients had an elevated ESR at the time of presentation. Eighty percent patients had shown increase in weight at the end of 6 month of treatment. All patients of extra spinal osteoarticular TB showed improvement. Treatment was found sufficient for 80% of the patients. In 20% cases treatment duration was extended. In discussion the Short term intermittent chemotherapy in DOTS regimen was optimum for the treatment of extra spinal osteoarticular TB and was associated with good compliance.

Keywords: Short Term Intermittent Chemotherapy, Extra Spinal Tuberculosis, DOTS Regimen.

INTRODUCTION

Tuberculosis (TB) is a major global public health threat. In 2017, about 10 million men, women and children developed TB disease, and 1.3 million died of TB [1]. Three countries in Asia: the Philippines, Indonesia, and Bangladesh account for 18% of the estimated TB incidence (1.787 m) and 15% of TB related deaths (192,000) globally. In 2017 alone, approximately 785,000 of the incident TB cases in these countries, approximately 21% of the global incidence cases, remained missing including diagnosed but not reported. According to World Health Organization (WHO), every year approximately 8.4 million people develop tuberculosis and more than 3 million patients die due to it each year [1]. Young adults in developing countries are mostly affected. India accounts for about one third of the total tuberculosis population of the world [2]. Tuberculosis involving joint other than spine is a form of disease usually secondary to a concomitant or old pulmonary Koch's. An early diagnosis along with proper chemotherapy is the key for excellent outcome [3]. The WHO has recommended category based treatment regimens of various forms of tuberculosis also known as short course chemotherapy (SCC) [2]. According to WHO, spinal tuberculosis is a serious form of tuberculosis and hence enclosed with category-l whereas extra spinal tuberculosis is less severe and is therefore included in category-III [3]. The present study was done to evaluate the efficacy of short term intermittent chemotherapy in DOTS regimen in extra spinal tuberculosis.

MATERIALS AND METHODS

The present prospective study was conducted in the Department of Ortho & Spine Surgery, National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh over a period of one year between January 2018 to February 2019. 21 patients of extra spinal osteoarticular TB selected based on inclusion criteria. During the course of study 4 patients were lost to follow-up. A Written informed consent from all the included patients and Ethical Committee approval was obtained before starting the study. Patients with extra spinal osteoarticular TB with immuno-compromised status such as HIV, cancer, severe, protein energy malnutrition diabetes or renal failure, age group of more than 70 years, defaulter and treatment failure cases, tuberculosis patients taking immunosuppressive drugs and cases of osteoarticular tuberculosis during pregnancy were excluded from the present study.

Laboratory investigation such as hemoglobin, chest X- ray PA view and C-reactive protein was performed. MRI of affected part was done in selective patients where above investigations were failed to diagnose the disease. In case, patient's condition was not improved by intensive treatment, suspicion of multiple drug resistance (MDR) was made and then additional culture and sensitive of aspirate was done for diagnosis and exclusion. The DOTS regime recommended by WHO for extra spinal tuberculosis category III patients was followed i.e. 2(HRZE) 3+4 (HR) 3. Extension of the intensive phase was done for one month depending upon the response of clinical condition. Surgery of the affected part was considered if a lesion was not responding favorably to the ATT or as advocated in the "Middle Path Regime" or if there was any doubt in diagnosis. The surgical intervention was done as per the conventional indications.

Regular follow up was done at intervals of one month during the treatment for assessing the clinical improvement and compliance of the patient. The improvement was assessed with radiographs and haemogram with ESR and C-reactive protein at the interval of one month till the treatment was completed. The other clinical parameters such as weight gain, absence of other constitutional symptoms was also taken into account. After completion of treatment patients were called at interval of every three month and assessed to find local recurrence of osteoartcular tuberculosis.

Data Analysis

All the data were analyzed using IBM SPSS-version 20 software. Analysis was performed using chi-square test and independent sample student t test. P values <0.05 was considered to be significant.

RESULTS

In present study, median age was 24 years. Thirty percent of the patients belong to age group of 11-20 years. Students were mostly affected [9 (42.86%)] of total extra spinal cases followed by the labourer. At the time of presentation, all 21 (100%) patients had an elevated ESR, median value being 61. Skiagram of the affected part and MRI was done in 19 (90.48%) and 2 (9.52%) patients respectively and showed positive results. Histopathologic results showed that, 2 (9.52%) were FNAC positive for AFB bacilli. Out of 7 patients who went for diagnostic biopsy, all have shown positive pathological picture of necrotizing granulomatous inflammation with Langhans giant cells. One patient had an active pulmonary disease. Among the patients of extra spinal osteoarticular TB hip (47.62%) was the most commonly involved joint. Short bones of hand and foot were involved in 19.5% cases. Other involved joints were knee (20%), shoulder (5%), ankle (5%) and elbow (5%). Long bone was involved in 5% cases. Out of total 21 patients of EST, 17(80.95%) were given 6 months treatment of antitubercular drugs (ATT), 3 (14.29%) cases were given 7 months of ATT and 1 (5%) patients received 8 month treatment of ATT. At initial stage, 10 (47.62%) of extra spinal osteoarticular TB patients were CRP positive. Out of 21 extra spinal osteoarticular TB patients, 17 (80.95%) patients had shown increase in weight at the end of 6 month treatment. Patients' body weight improved with duration and good response seen in first 2 month of treatment. No relapse was observed during the course of study.

Table 1: Distribution of patients according to different parameters (N=21)

Parameters		EST	%
Age	<40	18	85.71
	≥40	3	14.29
Gender	Male	18	85.71
	Female	3	14.29
Occupation	Students	9	42.86
	Housewife	2	9.52
	Manual Worker	6	28.57
	Service	2	9.52
	Pre-School	2	9.52

Parameters		EST	%
Clinical Feature	Pain	20	95.24
	Constitutional Symptoms	18	85.71
	Palpable Abscess	14	66.67
	Neurological Deficit	0	0.0

Data is expressed as no of patients (%), ST; spinal tuberculosis, EST; extra spinal tuberculosis.

Table 2: Trend of ESR, CRP and weight gain in extra spinal Osteoarticular TB.

Month			0	1	2	3	4	5	6	T-3	T-6	T-9	T-12
EST (n=21)	ESR*	M	64.5	53.8	34	32.9	27.5	12.9	20.5	15.9	14.9	14.9	14.5
	CRP	+ ve	10	0	0	0	0	1	0	0	0	0	0
	WG	M	45.8	46.2	47.7	46.4	46.1	47.2	46.5	47.6	47.7	49.5	50.5

*6 month of ATT, M; mean, N; no of patients, +ve; positive cases, ESR; erythrocyte sedimentation rate, CRP; C-reactive protein, WG; weight gain, EST; extra spinal tuberculosis, ST; spinal tuberculosis.

DISCUSSION

WHO has also recommended the use of SCC in patients with EST in developing countries [2], Bhardwaj *et al.*, did a study of 25 newly diagnosed cases of EST and reported that all patients had pain and tenderness at the time of presentation [4].Similar to Bhardwaj *et al.*, in present study too, almost all patients (95.24%) were presented with pain as a clinical symptom [4]. Hosalkar *et al.*, also reported almost similar findings [5]. In present study, 80.95% of patients had shown increase (mean change of 4.7 kg) in weight at the end of treatment. Almost similar to Bhardwaj et al, they reported that all patients in their study gained weight from 40.3 Kg to 42.80 after three months and 45.50 kg after 6 months of therapy [4]. A study done by Wang et al also reported that during the course of therapy, mean values of ESR decreased from 52.03 to 11.33 mm in the first hour, hence indicating that there was a consistent betterment in ESR values [6]. In present study also all patients were found with elevated level of ESR. Wang *et al.*, did a similar study on 185 patients and reported that patients with EST needed chemotherapy for longer period of time [6]. Effective use of DOTS therapy as recommended by WHO in patients with EST, assure the success of chemotherapy treatment, also it is the most cost effective treatment available [7, 8]. Effectiveness of DOTS therapy in pulmonary tuberculosis is established [9] but present study we found that regime was also effective for EST but the treatment required extended duration of chemotherapy. Similar findings were reported by Wang *et al.*, [6]. Hosalkar *et al.*, performed a retrospective review on EST cases and reported that lesions were distributed to different parts including ulna, scapula, distal humerus, distal tibia, proximal tibia and acetabulum [5]. But in present study most of the patients were having hip joint involvement along with short bones of hand and foot as reported by Hosalkar et al., [5]. Short term intermittent chemotherapy was sufficient for 80.95% of extra spinal osteoarticular TB patients. Duration of treatment was extended in 19.5% cases for complete cure. From the present study data it is evident that short term intermittent chemotherapy (STIC) i.e. DOTS category-lll efficacy was found sufficient in (80.95%) EST, Parthasarathy *et al.*, in their study also recommended the use of short-course chemotherapy for the patients with EST [10]. The present study had few limitations like small sample size. Follow-up period was short. A prolonged follow-up of 5-10 years is essential to ascertain the actual rate of relapse.

CONCLUSION

DOTS treatment needs to be titrated depending on the clinical, lab finding and radiological evidence. As per our observation extra spinal tuberculosis patient should be given at least 8 months of DOTS.

REFERENCES

1. Kak, N., Chakraborty, K., Sadaphal, S., AlMossawi, H. J., Calnan, M., & Vikarunnessa, B. (2020). Strategic priorities for TB control in Bangladesh, Indonesia, and the Philippines–comparative analysis of national TB prevalence surveys. *BMC public health*, *20*(1), 1-7.
2. Treatment of tuberculosis. (2003). Guidelines for National Programme, 3rd ed. 35 WHO.
3. Vaughan, K. D. (2005). Extraspinal osteoarticular tuberculosis: a forgotten entity?. *The West Indian Medical Journal*, *54*(3), 202-206.
4. Bhardwaj, V., Agrawal, M., Suri, T., Sural, S., Kashyap, R., & Dhal, A. (2011). Evaluation of adequacy of short-course chemotherapy for extraspinal osteoarticular tuberculosis using 99m Tc ciprofloxacin scan. *International orthopaedics*, *35*(12), 1869-1874.
5. Hosalkar, H. S., Agrawal, N., Reddy, S., Sehgal, K., Fox, E. J., & Hill, R. A. (2009). Skeletal tuberculosis in children in the Western world: 18 new cases with a review of the literature. *Journal of children's orthopaedics*, *3*(4), 319-324.
6. Wang, Z., Shi, J., Geng, G., & Qiu, H. (2013). Ultra-short-course chemotherapy for spinal tuberculosis: five years of observation. *European*

Spine Journal, *22*(2), 274-281.

7. Hazra, A., & Laha, B. (2005). Chemotherapy of osteoarticular tuberculosis. *Indian Journal of Pharmacology*, *37*(1), 5-12.
8. Teklali, Y., El Alami, Z. F., El Madhi, T., Gourinda, H., & Miri, A. (2003). Peripheral osteoarticular tuberculosis in children: 106 case-reports. *Joint Bone Spine*, *70*(4), 282-286.
9. Steffen, R., Menzies, D., Oxlade, O., Pinto, M., de Castro, A. Z., Monteiro, P., & Trajman, A. (2010). Patients' costs and cost-effectiveness of tuberculosis treatment in DOTS and non-DOTS facilities in Rio de Janeiro, Brazil. *PloS one*, *5*(11), e14014.
10. Parthasarathy, R., Sriram, K., Santha, T., Prabhakar, R., Somasundaram, P. R., & Sivasubramanian, S. (1999). Short-course chemotherapy for tuberculosis of the spine: a comparison between ambulant treatment and radical surgery–ten-year report. *The Journal of bone and joint surgery. British volume*, *81*(3), 464-471.