Role Of Gallium Arsenide Laser Irradiation At 890 Nm As An Adjunctive To Anti-Tuberculosis Drugs In The Treatment Of Pulmonary Tuberculosis

Puri MM, Arora VK.
Department of Tuberculosis and Chest Diseases, LRS Institute of Tuberculosis and Allied Diseases, Sri Aurobindo Marg, New Delhi, India.

BACKGROUND: Tuberculosis is a global emergency with about nine million people developing disease every year. The long duration of treatment has emerged as a major obstacle in the control of tuberculosis. There is a need for development of new drugs and or shortened therapy.

METHODS: The present study was carried out to explore whether any benefit could be achieved by the addition of low level energy laser therapy (LLLT) to the conventional anti-tubercular chemotherapy. One-hundred-thirty new sputum smear positive patients of pulmonary tuberculosis were enrolled to evaluate the bio-stimulatory effects of Gallium Arsenide laser irradiation at 890 nm, as an adjuvant therapy. These patients were randomly divided into two groups to receive either LLLT or sham irradiation (control) concomitantly with anti-tuberculosis chemotherapy.

RESULTS: The patients treated with semiconductor laser as an adjuvant therapy along with anti-tuberculosis drugs had a faster clearance of tubercle bacilli from the sputum as compared to the control group (P value at 45 days=0.1392, 60 days=0.0117, 75 days=0.00805, 90 days=0.00739).

CONCLUSIONS: These findings provide preliminary evidence that low level laser therapy with Gallium Arsenide laser may be a promising adjunctive therapy for patients with tuberculosis. Faster conversion of sputum should prevent the development of resistant mutants.

Low Level Laser Therapy For Treating Tuberculosis

Vlassov V V, Pechatnikov L M, MacLehose H G.

The authors have made a thorough literature search for studies using laser therapy as an adjunct therapeutic modality in the treatment of tuberculosis. These studies come from the former Soviet states and India. The studies in Russian language have generally only been available as Medline abstract and they have been vague on the details. Now, for the first time, Russian researchers have evaluated the original texts. Laser therapy has been used in many ways. Acupuncture points, irradiation over the organ, blood irradiation, puncture into the lungs, irradiation into the trachea and into the urinary bladder. Laser types used have also differed a lot; HeNe, nitrogen, GaAs, Nd:YVO4 and at powers ranging from 2 to 200 mW. The weak spot in previous Cochrane reviews on laser therapy has been the lack of dosage analyses. No such analysis has been made in the current study, but with the different therapeutic approaches used, such an analysis is not possible in this case. The reviewers have not found any randomised or quasi-randomised studies, but an evaluation of the quality of the studies has been performed. There is a lack of relevant information on procedures in many studies and some contradictory statements. All in all, the reviewers come to the conclusion that laser therapy is currently being used to treat tuberculosis without evidence of its benefits and harms.
Efficiency Of Supra-Venous Blood Laser Radiation Used In The Treatment Of Disseminated Pulmonary Tuberculosis In Adolescents

[Article in Russian]
Rusakova LI, Dobkin VG, Ovsiankina ES.

In 19 of 40 adolescent patients with disseminated pulmonary tuberculosis, supravenous blood laser radiation was used in the complex treatment 2-3 weeks after the initiation of chemotherapy. The use of this type of laser therapy enhanced the efficiency of the treatment, accelerated positive changes of tuberculosis by 2.5-3.5 months, as evidenced by clinical and laboratory parameters, led to a smooth course of tuberculosis to develop less pronounced residual changes in the lung.

Low Level Laser Therapy For Treating Tuberculosis

Vlassov VV, Pechatnikov LM, MacLehose HG. Russian Branch, The Cochrane Collaboration, PO Box 54, Moscow, Russia, 127238.
vlassov@cochrane.ru

BACKGROUND: The main treatment for tuberculosis is antituberculous drugs. Low energy laser therapy is used as an adjunct to antituberculous drugs, predominantly in the former Soviet Union and India.

OBJECTIVES: To assess the benefits and harms of low level laser therapy for treating tuberculosis in randomized and quasi-randomized controlled trials. To seek information about potential benefits or harms from observational studies.

SEARCH STRATEGY: We searched the Cochrane Infectious Diseases Group specialized trials register (up to June 2001), the Cochrane Controlled Trials Register (Issue 1, 2001), MEDLINE (1966 to December 2001), EMBASE (1988 to December 2001), CINAHL (up to November 2001), PEDro (up to November 2001), the Science Citation Index (up to December 2001), National Centre for Science Information at the Indian Institute of Science (15 April 2002), electronic catalogue of the Central Medical Library (Moscow; 1988 to January 2002), the internet using ‘Google’ (21 January 2002), and reference lists of articles. We contacted relevant organizations and researchers.

SELECTION CRITERIA: (1) Randomized and quasi-randomized controlled trials comparing low level laser therapy with no low level laser therapy in people with tuberculosis. We also conducted a subsidiary analysis of the potential benefits and harms from observational studies.

DATA COLLECTION AND ANALYSIS: Two reviewers independently assessed trial quality and extracted data. We contacted study authors for additional information. Adverse event information was collected from the studies.

MAIN RESULTS: No randomized or quasi-randomized controlled trials met the inclusion criteria for the review. The potential benefits and harms from 29 observational studies involving over 3500 people are described.

REVIEWER'S CONCLUSIONS: We have not identified any well designed trials using low level laser therapy (LLLT) to treat tuberculosis. Therefore, the use of LLLT to treat tuberculosis is not supported by reliable evidence.
Intravenous Laser Radiation Treatment Of Acute And Progressive Forms Of Tuberculosis In Teenagers
[Article in Russian]
Ovsiankina ES, Firsova VA, Dobkin VG, Rusakova LI.

In 25 of 44 teenagers suffering from acute and progressive tuberculosis, intravenous blood laser radiation was included into its multimodality treatment following 2-4 weeks of the initiation of chemotherapy. The use of laser enhanced the efficiency of treatment, accelerated positive changes by 1.5-2 months by major clinical and laboratory indices, made the disease run smoothly and caused less pronounced residual changes in the lung.

Combined Low-Intensity Laser Radiation In Renal Tuberculosis
[Article in Russian]
Parmon EM, Borshchevskii VV, Kamyshnikov VS, Bortkevich LG.

Combined external radiation in the projection of the kidneys and intravascular laser blood radiation by applying an AZOR-2K apparatus were used in the combined treatment of 54 patients with tuberculosis of the urinary system. Analysis of the biochemical and immunological parameters of the patients’ peripheral blood before and 3 weeks and 3 months after the combined treatment provided evidence suggesting a decrease in the magnitude of lipid peroxidation, an increase in the antioxidative status, and a reduction in the level of metabolites that affect on the development of the intoxication syndrome. The clinical findings suggest that the combined treatment has a beneficial impact on the course of renal tuberculosis, as appeared as better functional indices of urinary organs.

Low-Intensity Laser Irradiation In Patients With Urinary Tuberculosis
[Article in Russian]
Parmon EM, Borshchevskii VV, Bortkevich LG.

Combined surface radiation of renal projection area and intravascular laser radiation of blood (AZOR-2K unit) were used in combined treatment of 54 patients with urinary tuberculosis. Analysis of immunological and hematological indices of peripheral blood of patients before and after the combined treatment showed that low-intensity laser radiation activates local system of T-helpers which after specific antigenic impact differentiate into T-helpers-1. The latter synthesize in loco gamma-interferon, TNF-alpha and beta and IL-2 stimulating bactericidal mechanisms directed at destruction of M. tuberculosis and resolution of the infection focus.

Efficiency Of Supra-Venous Blood Laser Radiation Used In The Treatment Of Disseminated Pulmonary Tuberculosis In Adolescents
[Article in Russian]
Rusakova LI, Dobkin VG, Ovsiankina ES.

In 19 of 40 adolescent patients with disseminated pulmonary tuberculosis, supravenous blood laser radiation was used in the complex treatment 2-3 weeks after the initiation of chemotherapy. The use of this type of laser therapy enhanced the efficiency of the treatment, accelerated positive changes of tuberculosis by 2.5-3.5 months, as evidenced by clinical and laboratory
parameters, led to a smooth course of tuberculosis to develop less pronounced residual changes in the lung.

Comparative Effectiveness Detoxication Transfusion Of Therapy (Tt) And Intravenous Of A Laser Irradiation Blood (IIlb) In Complex Treatment Of Patients By A Pulmonary Tuberculosis

P.I.Pitcyco, E.I.Krivoshapova Kharkov Institute of Physicians Advanced Training, Kharkov, Ukraine

Two groups of the patients infiltrative by a pulmonary tuberculosis in a phase of decay, MBT+, (discovered Koch's bacillus), comparable on a floor, age, pronounced intoxication and syndrome, extent of process in lungs and regime of chemotherapy. I groups 45 patients receiving TT (albumen 5%- 100 ml alternated with hacmodesum 200 ml, daily ?10), II groups - 68 patients, which was carried out ILIB(wavclength 0,63 um, capacity of radiation on an output flexible monofibcr conductor of light 2 mW, duration of a procedure 15 minutes, course 10 sessions). The efficiency of thera-apy was estimated on a reduction intoxication, which degree was defined on a level and structure middle molecules (MM) (presence of pathological fractions and dis-polypeptidcmy) in whey of blood. MM were studied prior to the beginning and after realisation of rates TT and ILIB by a method hlclium-chromatography on hcle "Toyop-carl HW-40F" (Japan). A normal level and structure MM (361 ± 14 cond l. unit) was established with inspection 40 healthy donors. Is established, that at the patients from I groups after realisation of a course TT the general level MM on the average has de-creased from 858 ± 29 unit till 769 ± 31 unit (p<0,05), the frequency dispolypeptid-cmy (from 75 ± 7,3 % till 33 ± 6,7 % has decreased; p<0,001) and pathological fractions (from 60 ± 7,2 % to 40 ± 7,2 %; p>0,05). After a course ILIB investigated parameters also have decreased: a level MM from 920 ± 36 unit to 584 ± 23 unit (p<0,001), frequency dispolypeptidcmy from 78 ± .6,2% to 31 ± 6,8% (p<0,001) and pathological fractions from 67 ± 6,7% till 24 ± 6,4 % (p<0,001). From the given data it is visible, that the course ILIB in comparison with TT allows more and level of pathological fractions (24 ± 6,4 % against 40 ± 7,2 %).