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A Case History of Treatment of Cutaneous Leishmaniasis by Chromotherapy

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Abstract

Cutaneous Leishmaniasis is endemic in many parts of the world. The disease in most of the cases appears in the form of the open ulcerated lesion on exposed part of the body. The pentavalent antimonial injections (20 mg/kg for 20 days) underneath the lesion for treatment are painful and most of the times unaffordable by the patients, mostly effected by this disease. As a result, most patients give-up early resulting in resistance. Due to high prevalence and the disease taking an epidemic form, there is a need to develop a new simple, cheap and yet an effective alternative treatment for cutaneous Leishmaniasis. Reported here is a case study aimed at alternative treatment regimen for cutaneous leishmaniasis. Here we present a case history of cutaneous leishmaniasis treated with chromotherapy. This seems to be an effective and new method of treatment only using visible range radiations of different wavelengths with no apparent side-effects. Six months follow up was observed and no recurrence was found.

Keywords: Cutaneous Leshmaniasis, Chromotherapy, Photostimulation

1. Introduction

Leishmania comprises a genus of flagellate protozoan parasites with a worldwide distribution and with more than 20 species that are pathogenic in humans. This parasitic disease is transmitted by the bite of the infected female phlebotomine sandflies. The trypanosomatid parasite of the genus leishmania is the etiological agent in a variety of disease manifestations, collectively known as Leishmaniasis [1].

1.1. Geography and Epidemiology

Leishmaniasis is prevalent throughout the tropical and sub-tropical regions of Africa, Asia, the Mediterranean, South Europe (old world) and South and Central America (new world). Despite enormous efforts; it has proved difficult to predict the exact scale of impact of leishmaniasis on public health, since many cases go unreported or misdiagnosed. It is estimated that approximately 12 million people are currently infected and further 367 million are at risk of acquiring Leishmaniasis in 88 countries, 72 of which are developing countries and 13 of them are among the least developed in the world. Approximately 350 million people live in these areas. The settings in which leishmaniasis is found range from rainforests in Central and South America to deserts in West Asia [2].

1.2. Signs and Symptoms

There are four main forms of leishmaniasis: 1) Visceral leishmaniasis; 2) Cutaneous leishmaniasis; 3) Diffuse cutaneous leishmaniasis; 4) Mucocutaneous leishmaniasis.

Cutaneous leishmaniasis-the most common form which causes numerous sores on the body, which heal within a few months leaving unpleasant looking scars. The cutaneous form of the disease is one of the most important causes of chronic ulcerative skin lesions. The causative agent here in urban areas of Balochistan, Pakistan is *L.tropica. L.Tropica* infections prevalent in the urban areas produce lesions which persist for a year or longer that is why they are called locally as “Kaldana”, meaning a lesion which takes one year to heal.

1.3. Conventional Treatment

There are two common drugs meglumine antimoniate (*Glucantim*®) and sodium stibogluconate (*Pentostam*®),

but is painful and expensive too. It is not completely understood how these drugs act against the parasite; they may disrupt its energy production or trypanothione metabolism.

1.4. Life cycle

Stage	Description
1	Sandflies injects promastigotes, during blood meals.
2	Promastigotes are phagocytized by macrophages.
3	Promastigotes transform into amastigotes inside macrophages.
4	Amastigotes multiply in infected cells and affect different tissues.
5	Ingests macrophages infected with amastigotes.
6	Ingestion of parasitsed cell.
7	Amastigotes differentiate into promastigotes.
8	Promastigotes multipy and migrate to the proboscis.

2. Patient's Case History

A male patient of 10 years age reported with an open ulcerated facial lesion of 2.5 cm × 2.2 cm (**Figure 1**) to the Dermatology department BMC complex Quetta (Pakistan). The patient had developed the lesion within 40 to 50 days, which initially appeared as a small nodule. After diagnoses of cutaneous leishmaniasis he was offered the conventional allopathic treatment of leishmaniasis, *i.e.*, antimonial injections (20 mg/kg for 20 days) and chromotherapy as an alternative treatment. The patient agreed to take chromotherapy due to high cost of injections. The therapy was started when the lesion had fully developed. The patient did not receive any other treatment for the lesion before this treatment (chromotherapy). The patient belongs to the urban area of Balochistan, Pakistan where *L.Tropica* is the causative agent of leishmania. *L.tropica* infections prevalent in the urban areas produce lesions which persist for a year or longer that is why they are called locally as "Kaldana", meaning a lesion which takes one year to heal [3].

3. Materials and Methods

The lesion was checked for parasites and found positive in Giemsa stained smear. F.N.A.C [3] was obtained, and cultured in P-Y culture media [4]. No secondary infections were observed. The lesion was irradiated with monochromatic light (wavelengths in visible region) for 30 days. The infected area was covered with coloured cellophane filter sheets of particular dominant wavelengths as given in **Table 1**, and irradiated with 60 watt incandescent bulb light from the distance of 0.80 m for 30 minutes daily. The lesion was treated with green colour (538 nm) for 10 days, blue colour (483.5 nm) for 5 days and red colour (644 nm) for 15 days. The temperature was also measured to take into account the heat effect.

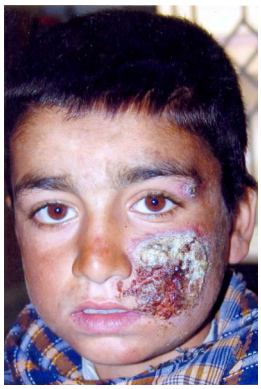

Figure 1. Lesion of cutaneous Leishmaniasis before treatment.

Table 1. List of Dominant Wavelengths.

	Color	Dominant Wavelength (nm)	Hue	Purity %	Transmission %
1	Violet	400	Violet	49%	18%
2	Blue	453.5	Blue green	52%	52%
3	Purple	464	Violet	36%	32%
4	Green	538	Greenish Yellow	15%	37%
5	Yellow	590	Reddish Yellow	40%	82%
6	Orange	610	Orange	43%	47%
7	Red	644	Red	41%	51%

4. Results

From the very first day of treatment, the watery blackish brown discharge was seen that lasted for a week. The crust of the wound peeled off rapidly (**Figure 2**). After this initial improvement the green colour stopped responding and no signs of improvement were visible for 4-5 days. The patient complained of pain in the surrounding area of the lesion. The blue colour was then used for 5 days to relieve pain. After relief from pain, red color radiations actually started to heal up the lesion and completely eradicated the visible symptom of the disease (**Figure 3**). The light intensity was 107 lux at this distance. The F.N.A.C was again taken and cultured for parasite which was found negative. After 30 days of chromotherapy, the lesion was found –ve for leishmania both in Giemsa stained smears and the culture.

5. Discussions

Chromotherapy is scientifically referred to as a narrow

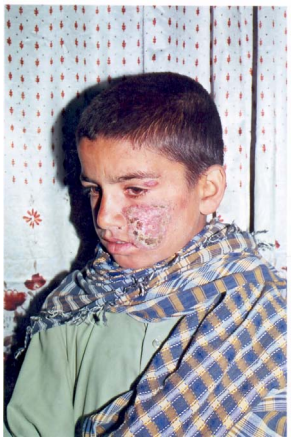

Figure 2. After getting chromotherapy for seven days.

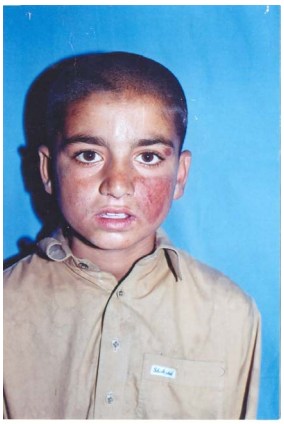

Figure 3. After 30 days of chromotherapy.

band in the cosmic electromagnetic energy spectrum, known to mankind as the visible colour spectrum. It is composed of reds, greens, blues and their combined derivatives, producing the perceivable colours that fall between the ultraviolet and the infra-red ranges of energy or vibrations. These visual colours with their unique wavelength and oscillations when combined with a light source generate electrical impulses and magnetic currents or fields of energy that are prime activators of the biochemical and hormonal processes [5]. The human body, according to the doctrine of chromotherapy, is basically composed of colors. The body comes into existence from colors, the body is stimulated by colors and colors are responsible for the correct working of various systems that function in the body. All organs and limbs of the body have their own distinct color [6]. All organs, cells and atoms exists as energy, an each form has its frequency or vibrational energy. Each of our organ and energy centres vibrates and harmonizes with the frequencies of colours. When the various parts of the body deviate from these expected normal vibrations, one can assume that the body is either diseased or at least not functioning properly. The vibratory rates inherent to Chromotherapy are such that they balance diseased energy pattern found in the body. For in every organ there is an energetic level at which the organ best functions. Any departure from that vibratory rate results in pathology, whereas restoring the appropriate energy levels to the physical organs results in a healed body [7].

There is substantial evidence in the literature on biostimulating action of low intensity monochromatic visible light and its role in photobiology and photomedicine [8,9]. It was discovered that Monochromatic Single-Wavelength Light Beams had an excellent therapeutic effect on afflicted cell tissue. This occurs through a process called “Photo-Stimulation”. A single Light Wave is essential, because the cell tissue will not respond, if more than one wavelength is present. From a nutritional point of view a lack of sunlight can cause deficiencies. Without sunlight vitamin D can not be metabolized in the human body, which can result in rickets. Most enzymes need light for proper functioning. Studies have shown that different wavelenghts affect different enzymatic reactions. The Monochromatic Light influences the DNA to use the lipoprotein in the area, so the cell has better function, as well as to produce collagen and elastin [10]. Previously cell cultures have shown that visible light penetrates into soft tissue and increases the action of adenosine triphosphate (ATP), when it is transmitted through the skin layers (the dermis, epidermis and the subcutaneous tissue). The biostimulation and therapeutic effects of low-power laser radiation of different wavelengths and light doses are well known, but the exact mechanism of action of the laser radiation with living cells is not yet understood [12].

Quantitiave studies of low power monochromatic visible laser light on various cells (E.Coli, yeasts, HeLa) were performed to find irradiation conditions conducive to vital activity stimulation [13]. Although Low Level Laser Therapy (LLLT) has been used previously in most studies, coherence is not important when photobiological effects are expected because both coherent and non- coherent light have been shown to be effective [8]. Theoretically chromotherapy suggests colors/ vibrations for different parts/organs of the body, this field of study still lacks scientific research and therefore no empirical data is available regarding inter and intra cellular effects of specific wavelengths/vibrations on particular cells.

We preferred chromotherapy due to its simplicity, cost effectiveness as it requires no special equipment or medicines, just a colour cellophane filter sheets and incandescent light. We started treatment with green colour wavelength, which is normally used for wounds and ulcers. Green colour is known as an antiseptic, germicidal and disinfectant, as it eliminates microorganisms and prevents decay [5]. According to the theory of chromo-

therapy, blue increases the elimination of the toxins through perspiration and relieves the irritation/pain from burns and itching. Red colour worked well in eliminating the parasite after 15 days of therapy. In this case it can not be attributed to effect of heat as previously [14-16] reported. The rise in temperature on the skin was only 1˚C which is negligible. Also, at this distance the heat produced was approximately equal to 1 joules/˚C.

This is a preliminary report of an original idea of public health interest tested on a single patient; a more controlled clinical trial is needed to authenticate the treatment regimen. Treatment with prevalent antimonials is not only expensive, it is painful too. Although 30 minutes for 30 days duration is hard to comply with but having advantages of no pain and almost no cost is a good enough incentive for patients to stay with this treatment regimen.

6. Conclusions

- The treatment is safe, with no apparent side effects.
- It is very cheap as compared to the treatment given to the patient in form of injections of glucantine or amphotericine B.
- It has proved to be very easily manageable by the patient, with no problems during the treatment.
- Green and red colour therapy may be used as the alternative treatment for curing the ulcers of cutaneous Leishmaniasis.

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