UV Phototherapy Has Positive Effect in Viral Treatments

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Abstract

Ultraviolet phototherapy is being widely used in clinics for many reasons; however, there is no report on its use in treatment of human viral diseases. The conventional chemotherapeutic treatments for viral diseases such as HIV, flu, Ebola and viral STDs do not address successful outcomes. Here, a new adjuvant therapy is hypothesized; Adjuvant Ultraviolet Phototherapy (AUVP), which in conjunction with conventional therapies will enhance the results of the treatments for viral diseases. AUVP therapy will elevate blood vitamin D content; in turn vitamin D promotes immune system to fight viral infections. Furthermore, UV penetrates through skin to some extent and has direct antiviral effect. Such effects in conjunction with conventional treatments have cumulative actions to suppress the viral maladies. AUVP hypothesis is proposed with supportive evidences postulated from the following scientific findings: a) there is correlation between sunlight (UV) intensity, blood content of vitamin D and flu incidence; b) flu almost disappears in the months following the summer solstice; c) influenza is more common in the tropics during diminished sunlight; d) children exposed to sunlight are less likely to get colds; e) children with vitamin D deficiency suffer from frequent respiratory viral infections. These clues indicate vitamin D increases in people exposed to UV or sunlight; making them less vulnerable to viral invasions. Implication of AUVP for its adjunct curative effect can be achieved using technician supervised tanning beds, sunbaths, tanning machines or light cabinets. AUVP suppressive action can be implemented in: immune-suppressed persons exposed to or came in contact with patients with dangerous viral infections, patients showing early stages of acute phase of viral infections, patients with long lasting chronic phase of viral infections, prophylactic treatments for people with high risk of viral infections as nurses or other hospital personnel during viral epidemics. Before it's implication on humans, AUVP treatment should be first evaluated in animal studies.

Key words: Ultraviolet, Phototherapy, Adjuvant Ultraviolet Phototherapy, Viral treatment

1. Introduction

Human viral diseases have no effective curative treatments. Anti-viral drugs and therapies only reduce acute and chronic phases of viral disease syndromes [5]. Seeking effective methods to treat viral diseases has been the aim for many researchers. Danish physician Nils Finsen is believed to be the father of modern phototherapy. He developed the first artificial light source and used his invention to treat *lupus vulgaris*. He received the Nobel Prize in Medicine in 1903 [25]. Light therapy or phototherapy (classically referred to as heliotherapy) consists of exposure to daylight or to specific wavelengths of light using lasers, light-emitting diodes, fluorescent lamps, dichroic lamps or very bright, full-spectrum light, usually controlled with various devices [3, 9]. Ultraviolet phototherapy uses UV light under medical supervision for a prescribed amount of time. Phototherapy and/or photochemotherapy is associated with treating dermatoses and maladies such as: seasonal affective disorder, sleep disorder, some psychiatric disorders, pain management, hair growth, skin treatments, accelerated wound healing, blood irradiation therapy, photodynamic therapy, treatment of acne vulgaris, neonatal jaundice, psoriasis, atopic dermatitis, vitiligo, mycosis fungoides, pityriasis rosea, pityriasis lichenoides and hand/feet eczema [1,6,8,12-14,18,20,21,26]. The types of UV lights used in the mentioned treatments include: a) Broadband UVB light therapy (280–320 nanometer wavelengths) , b) Narrow band UVB light treatments (311 nanometer wavelength only) , c) UVA light therapy (320–400 nanometer wavelengths of light) and d) PUVA (320–400 nanometer wavelengths of light) [****15].

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The aim of the hypothesis in this paper is to introduce a procedure, Adjuvant Ultraviolet Phototherapy (AUVP), in which conventional viral-disease treatments are amended with UV therapy. This combination therapy is expected to alleviate infection onset and severity of symptoms, shorten chronic and rehabilitation periods and lower person to person transmission and dissemination of viral diseases.

2. Hypothesis

As a non-invasive treatment, AUVP has not been reported in treatment of human viral diseases. This hypothesis is based on the following clues: 1) my preliminary observations indicated that flu patients taking bare-body sunbaths experience faster recovery; 2) UV light penetrates through skin [3,12,21]; 3) disinfestations action and anti-microbial properties of UV light has long been proved [27]; 4) in many geographical locations, flu infection is higher in seasons with diminished sunlight than seasons with higher sunlight intensity [17, 27]; 5) many reports have indicated that taking vitamin D beats swine flu [10]; 6) vitamin D steroid hormone system has its origins in the skin; it increases in people exposed to UV or sunlight [10]; 7) the flu predictably occurs in the months following the winter solstice, when vitamin D levels are at their lowest [23]; 8) flu almost disappears in the months following the summer solstice [22]; 9) influenza is more common in the tropics during the rainy season and diminished sunlight [23]; 10) the cold and rainy weather associated with El Nino Southern Oscillation (ENSO), which drives people indoors and lowers vitamin D blood levels, is associated with influenza [10]; 11) children exposed to sunlight are less likely to get colds [17]; 12) children with vitamin D deficiency suffer from frequent respiratory viral infections [10, 17]; 13) vitamin D supplementation reduces the incidence and severity of specific viral infections, including influenza, in the general population [10, 17]. AUVP procedure offers patients with viral infections who take their current prescription, to undertake light therapy for prescribed amount of time, sessions and exposure settings under the supervision of an experienced clinician. UV elevates blood vitamin D and penetrates through skin. Both of these effects exhibit antiviral actions.

In combination with UV therapy, the patient takes his/her routine prescription. This combination therapy would imply a cumulative therapeutic effect on viral infections. If the procedure is taken as prophylactic treatment, it will lower person to person transmission, infection onset and dissemination among populations. Obviously not all viral infections would respond similarly to this combination therapy, probably influenza infections would be easier and HIV infections harder to suppress.

3. Clinical significance

AUVP should be administered in an optimized procedure *via* well trained clinician. It is anticipated that in clinical use, in conjunction with conventional prophylactic and or/viral therapies, AUVP will: 1) elevate blood content of vitamin D, 2) enhance body resistance to prevent onset of viral infection and subsequent systemic invasion, 3) lower the inter- human spread of viruses in contaminated environments, 4) alleviate symptoms severity of viral diseases. Such effects of AUVP would enhance preventive/curative effects of conventional treatments in viral infections like HIV, flu, viral STDs, Ebola etc. Special circumstance in which AUVP can have preventive effect, is briefly discussed as follows: Inter- human spread of Ebola virus in the African epidemics has been very extensive among medical staff, often resulting in closure of hospitals and clinics. In Kikwit in 1995, up to 30% of physicians and 10% of nurses were affected, with high case-fatality rates. In addition to high viral titers in blood, the skin of patients is extensively infected. This probably accounts for the risk to those participating in traditional preparation of the cadaver and burial traditions [2,11,15,16]. Under such high dissemination rate, implementation of AUVP may be of a great help to prevent/lower infection spread in high-risk people especially medical staff.

4. Future testing

To date, there is no report on using AUVP for treating human viral diseases. AUVP procedure is not to replace any of the current viral treatments but to be applied as an adjuvant therapy. Considering the application of this treatment, appropriate animal studies are needed to confirm its effect for further clinical investigations. Animal experiments should verify: 1) the effectiveness of AUVP on blood concentration of vitamin D; 2) correlation between onset of viral infections in controls and AUVP treated; 3) average recovery period of controls and AUVP treated; 4) severity of viral symptoms in controls and AUVP treated; 5) the likelihood of AUVP negative influence on physiological behaviors; 6) appropriate intensity, duration and kind of UV (UVA or UVB) needed per session.

Since UVA penetrates deeper into the dermis than UVB [9], UVA may be more appropriate for evaluation in this hypothesis. When these concerns are clear, it is probable that AUVP could be considered as an adjuvant technique to assist improvements in human viral treatments.

5. Risks and complications

Prolonged exposure to ultraviolet light causes progressive damage to human skin. This is mediated by genetic damage, collagen damage, as well as destruction of vitamin A and vitamin C in the skin and free radical generation [7]. Light therapy is a mood altering treatment, and just as with drug treatments, there is a possibility of triggering a manic state from a depressive state, causing anxiety and other side effects [19]. There are few absolute contraindications to light therapy, although there are some circumstances in which caution is required. These include when a patient has a condition that might render his or her eyes more vulnerable to phototoxicity, has a tendency toward mania, has a photosensitive skin condition, or is taking a photosensitizing medication. Patients with porphyria should avoid most forms of light therapy. Patients on certain drugs like methotrexate or chloroquine should use caution with light therapy as there is a chance that these drugs could cause porphyria. While these side effects are usually controllable, it is recommended that patients undertake light therapy under the supervision of an experienced clinician, rather than attempting to self-medicate.

6. Conclusion

6.1. What were the clues leading to postulate the proposed hypothesis? UV penetrates through skin [3,12,21]; UV has anti-microbial effect; vitamin D increases in people exposed to UV or sunlight and makes them experience faster flu recovery [17]; taking vitamin D beats swine flu [10]; lower vitamin D level in blood is associated with higher infection rate of influenza [10]; children with vitamin D deficiency suffer from frequent respiratory viral infections[24]; flu infection is higher in seasons with diminished sunlight [19]; cod liver oil (which contains vitamin D) reduces the incidence of viral respiratory infections; African Americans, with their low vitamin D blood levels, are more likely to die from influenza and pneumonia than Whites are [4].

6.2. What does the proposed hypothesis add to the current knowledge available, and what benefits does it have? As an adjuvant, in combination with current prophylactic and or/therapeutic treatments of viral diseases, it is anticipated that AUVP will: elevate blood content of vitamin D; enhance body resistance which in turn leads to minimize viral infection and subsequent systemic invasion; lower the infection rate in highly contaminated environments and enhance preventive/curative effects of current treatments of HIV, flu, viral STDs, Ebola etc. Following positive results from animal studies, safety and efficacy studies should optimize AUVP applicability for clinical implication. In brief, it is anticipated that AUVP in adjunct current treatments will lower transmission, infection onset, dissemination and severity of symptoms in viral diseases of humans.

7. Exclamation

Although this hypothesis discusses the possibility that AUVP may be useful in treating some of the one million people who die in the world every year from influenza (causing pneumonia) [4], or 1.8 million people who die in the world every year from HIV [24] and so forth, I remind readers that it is only a theory. Like all theories, this theory must withstand attempts to be disproved with dispassionately conducted and well-controlled scientific experiments.

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