Radiation induced dermatitis following infrared radiation (IR) therapy in a diagnosed case of systemic lupus erythematosus (SLE): a case report

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ABSTRACT

Infrared radiation is increasingly being used for cosmetic and wellness purposes. Repeated exposure to source of Infrared radiation results in a skin lesion described as erythema ab igne. Instead patients land up with life threatening complication like our case. In this article we present to you a 39-year-old female who presented with skin lesions after she underwent radiation therapy. We have included clinical findings of the case with review of the literature

Keywords: infrared radiation, erythema ab igne, elastosis, heat radiation dermatitis

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INTRODUCTION

Artificial solar irradiation devices emit large quantities of IR radiation.[1] Infrared radiation is increasingly and uncritically used for cosmetic and wellness purposes, despite the poorly understood biologic effects of such treatments on humans.[2] Repeated exposure to sources of heat and IR such as fires and stoves results in a skin lesion described as erythema *ab igne*.[1]IR irradiation causes skin changes that are similar to those found in solar UV radiation-induced elastosis.[1] In this article we present to you a 39 year old female who presented with skin lesions after she underwent radiation therapy.

CASE REPORT

A 39-year-old female presented in emergency department with chief complain of rashes all over body especially in the face; chest and limbs (Figure 1). Rashes were red in color. It was acute on onset, progressive, initially smaller later increased in size. Rashes later transformed into blisters in the lower limb. It was associated with itching and burning sensation. Rashes appeared following sessions of Red- ray radiation therapy done 3 days ago at a local Korean hospital for her Joint pain.

Patient was known case of systemic lupus erythematosus (SLE) diagnosed one and half years back. Back then she just presented with facial pigment and joint pain. Patient had no other features or lesion during the course of disease till date. She was also a known case of hypertension. Later patient developed lupus nephritis (biopsy proven) been under treatment with euro-lupus regimen and had received 5 doses of Injection cyclophosphamide 500mg.Patient was under tab Cotrimoxazole 80/400 PO X OD, Tab atorvastatin 10 mg PO X HS, Tab losartan 50 mg PO X BD, Tab Vitamin D once a month, Tab calcium 500 mg PO X OD and Tab prednisolone 20 mg PO X OD since 3 months. Patient had no any adverse side effects to any of above mentioned drugs since the start. She gave no history of any allergic reaction during the use of those drugs. Above lesion started soon after the exposure to the radiation therapy. No significant Family history.

On examination, Blood pressure: - 120/80 mm of Hg; Pulse: - 70 bpm regular; Respiratory rate: - 22 per minute; Temperature: - 98°F; Spo2: - 97% at room air. There was generalized purpuric lesion with scales and diffuse erythema on face. Oral ulcers also present. On second day of admission her lesion on face were improving but she developed large bulla over legs.

A final diagnosis of heat radiation induced dermatitis with SLE with Grade IV Lupus nephritis with hypertension.

On investigations: - Haemoglobin: - 10 gm/dl, Hematocrit: - 36%, Total count: - 3300 (N80L14M05), Platelet: - 110000, urea/creatinine: - 26/0.6, Na/K: - 137/4.3,bilirubin (T/D): - 0.3/0.1, AST/ALT: - 60/80, ALP: - 132, CRP: - 11, ESR – 46mm/hr and Albumin 4+, Pus cells: – 4-6/HPF with Nil RBC in Urine RME. Urine Protein: Creatinine: - 4.4:1.

We put her on ointment Momentasone 0.1% LA X BD; Tab Cetrizine 10mg PO HS for 1 month, Liquid Parffin LA BD. We asked her to follow up after 3 days or SOS but she did not show up.

Figure 1. Distribution of lesion/rash in the patient

DISCUSSION

IR radiation consists of wavelength ranging from 0.75 to 1000 µm (0.75 µm = 750 nm)and can be subdivided into near (0.75 to 3 µm), middle (3 to 30 µm), and far (30 to 1000 µm).[2] Several studies have reported that IR can improve the healing of skin wounds, photo prevention, relieve pain, stiffness, fatigue of rheumatoid arthritis, ankylosing spondylitis, potentiate photodynamic therapy, treat ophthalmic, neurological, and psychiatric disorders, and stimulate the proliferation of mesenchymal and cardiac stem cells.[3] As a novel trend, IR irradiation devices are employed for wellness purposes, including anti-aging therapies and other lifestyle-driven, scientifically unjustified and unproven modalities as well.[1] Epidemiological data and clinical observations, however, indicate that IR radiation cannot be considered as totally innocuous to human skin. In particular, IR radiation, similar to ultraviolet radiation, seems to be involved in photo-aging and also in photo-carcinogenesis.

Similar to UVB and UVA, exposure of dermal fibroblasts to IR-A leads to a rapid activation of ERK1/2 and p38-MAPK signaling cascades. Thus induces the expression of several target genes, among them matrix metalloproteinases (MMPs). The MMPs are zinc-dependent endopeptidases responsible for the degradation of extracellular matrix components such as collagen and elastin. This previously unrecognized molecular 'IR response' shows that IR radiation is capable of specifically interfering with cellular functions and provides a molecular basis for biological effects of IR on human skin.[1]

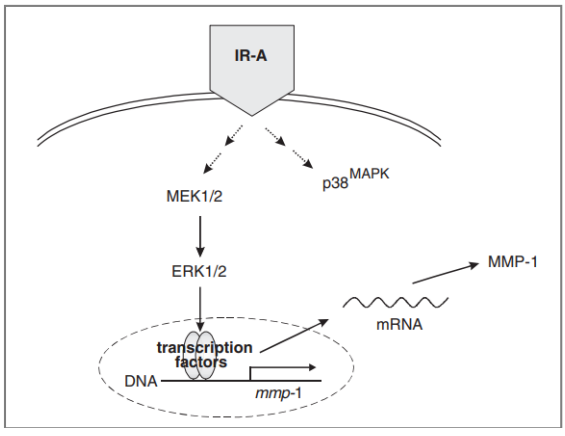

Figure 1. Upregulation of MMP-1 in response to IR-A exposure[1]

The factors that determine the specific biological outcome elicited by IR exposure remain uncharacterized. No data as such have been published regarding the risk factor or any predisposing factor that would lead to serious adverse effects as seen in our patient. Further no such relationship with any disease process has been established so far. As of in our case the patient had already undergone 5 cycles of chemotherapy with cyclosporine. If the culprit had been the chemo the reactions would have occurred from the 1st cycle. Also other regular medication that she been under since 1 and half months cannot cause such an acute presentation of adverse effects.

Keeping all these in mind infrared radiation must have something to do with the rashes and lesion. No any literature was found regarding this issue. This can be an index case as such. Further discussion and new approach is required to establish the interaction of IR with other disease condition and its adverse effect per se. We had presented this case with a view that it will help to start further research regarding this issue.

Ethics

Informed consent was taken from the patient regarding the information shared and the photographs.

CONCLUSION

Infrared radiation has been useful for many purposes. Its mechanism of action has been explored to some extent. However, its side effects and interaction with other disease process and drugs are yet to be explored

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