Chlamydia trachomatis Infection and Photosensitive Dermatoses

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Abstract

Background: Photosensitivity to *Chlamydia trachomatis* has been described in almost 50% of chronic cases of lymphogranuloma venereum (LGV) caused by L1, L2 or L3 serovars. Photosensitivity in non LGV strains of *C. trachomatis* has not been studied. We studied the association of various photosensitive dermatoses with *C. trachomatis* infection in non LGV cases.

Methods: Sera of all the cases of photosensitivity, melasma, chronic actinic dermatitis (CAD), polymorphic light eruption (PLE), actinic prurigo (AP) and rosacea were tested for the presence of IgM, IgG and IgA antibodies to *C. trachomatis* by ELISA method. The results were compared with 30 healthy controls.

Result: Seventeen (25.53%) of 57 cases of photosensitivity as against two (6.67%) controls were seropositive for IgM/IgG/IgA antibodies, a statistically significant difference (χ^2 6.18, p 0.013). Similarly, significantly higher seropositivity was observed in 12 (25.53%) of 47 cases of melasma (χ^2 4.38, p 0.0363) and six (46.15%) of 13 cases with CAD (χ^2 6.91, p 0.0086). Although higher proportion of patients of rosacea [five (31.25%) of 16 cases] and PLE [four (25.0%) of 16 cases] were seropositive, the difference was not statistically significant (χ^2 3.23, p >0.05, OR 6.36, CI 95% 0 to 48 and χ^2 3.09, p 0.078, OR 4.67, CI 95% 5 to 41 respectively). There was no association of AP.

Conclusion: The observations suggest that *C. trachomatis* infection in non LGV cases is an important cause of PS, melasma and CAD. It appears to be an important cause of rosacea and PLE. We recommend that all cases of photosensitivity, melasma, CAD, PMLE and rosacea and their spouses/sexual contacts be investigated for *C. trachomatis* infection.

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Key Words : Photosensitivity; Melasma; Chronic actinic dermatitis; Polymorphic light eruptions; Rosacea; Actinic prurigo; *Chlamydia trachomatis*

Introduction

Melasma is an acquired hypermelanosis, which occurs in sun-exposed areas and is exacerbated by light. Women are usually affected, but it may be occasionally seen in men. The exact cause of this disorder was not known. Melasma was earlier associated with pregnancy [1] or consumption of oral contraceptives [2]. Photosensitivity to *C. trachomatis* has been described in almost 50% of chronic cases of lymphogranuloma venereum (LGV) caused by L1, L2 or L3 serovars [3]. We found chronic pelvic inflammatory disease in almost 60% of cases of melasma [4], suggesting that melasma may be due to photosensitivity to *C. trachomatis* in clinical or sub clinical chronic genitourinary infection in a large proportion of cases. This was later confirmed by the presence of antichlamydia IgM antibodies in significant number of patients of melasma [5]. Photosensitivity (PS), polymorphic light eruptions (PLE), rosacea, chronic actinic dermatitis (CAD), actinic prurigo (AP) like photosensitive skin diseases, the exact cause for which is not known, may be precipitated by *C.*

trachomatis infection and hence this study was done.

Material and Methods

All the patients of PS and photosensitive disorders like melasma, CAD, PLE, AP and rosacea reporting to out patient department were included, while those of known cause of photosensitivity like DNA repair defective disorders and cases of porphyrias were excluded.

Patients were diagnosed as cases of photosensitivity, if they complained of discomfort, burning and/or erythema in the exposed areas on sun exposure without any other skin lesion. PLE was diagnosed clinically in cases with papular, papulovesicular, vesicobullous or plaque lesions in the sun exposed areas, which are transient in nature and appear during spring or summer season. CAD was diagnosed clinically in cases with persistent eczematous lesions in photo distribution without history of use of any topical photosensitizing agent. AP was again diagnosed clinically in cases with erythematous itchy papules and nodules on exposed parts in the absence of antinuclear antibodies. Skin biopsy was performed in doubtful cases, which could support the clinical diagnosis. Diagnosis of melasma and rosacea was again clinical. Informed consent was obtained and sera of all

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the patients were tested for the presence of IgM, IgG & IgA antibodies to *Chlamydia trachomatis* by enzyme-linked immunosorbent assay (ELISA) method using the kits supplied by Vircell S I, Granada, Spain. The test had sensitivity of 96% for IgG, 90% for IgM and 95% for IgA with a specificity of 100% for IgM, IgG and 98% for IgA.

Thirty healthy age and sex matched controls were also tested. The study was cleared by the hospital Ethics Committee. χ^2 test was used as a test of significance.

Results

There were 47 cases with melasma, of which 44 (93.62%) were females and three (6.38%) males, with an average age of 40.0 years (SD $\pm$ 8.26). The average duration of melasma was 5.36 years (Range 8 months to 24 years, SD $\pm$ 4.41). The control group had an average age of 41.20 years (SD $\pm$ 2.95), of which 29 were females and one male (Table 1). The difference in mean age of the patients and controls was not significant (SE 1.32). The difference in positivity for *C trachomatis* between cases and controls was found statistically significant (χ^2 4.38, p 0.0363).

There were 57 cases of PS, with an average age of 45.27 years (SD $\pm$ 11.48). Seventeen (29.82%) were males and 40 (70.18%) females. Average duration of photosensitivity was 5.20 years (SD $\pm$ 4.37). The difference in positivity for *C trachomatis* between cases and controls was statistically significant (χ^2 6.18, p 0.013).

There were 13 cases of CAD, with an average age of 48.68 years (SD $\pm$ 10.21 years), of which five (38.46%) were males and eight (61.54%) females. Average duration of disease was 6.36 (SD $\pm$ 9.89) years. The difference in positivity for *C trachomatis* between cases and controls was statistically significant (χ^2 6.91, p 0.0086).

There were 16 cases of PLE, with an average age of 38.38 years (SD $\pm$ 12.20 years). Eight (50%) cases each were males and females. Average duration of disease was 3.18 (SD $\pm$ 4.05) years. Although higher percentage of patients of PLE had antibodies to *C trachomatis*, the difference was not statistically significant [χ^2 3.09, p 0.078, OR 4.67, Confidence Interval (CI) 95% -5 to 41], possibly due to small sample size.

There were 16 cases of rosacea, with an average age of 50.06 years (SD $\pm$ 13.43 years). Ten (62.5%) of them were males and six (37.5%) were females. Average duration of

disease was 4.12 years (SD $\pm$ 3.62). Although higher percentage of patients of rosacea had antibodies for *C trachomatis*, the difference in positivity was not statistically significant (χ^2 3.23, p >0.05), possibly because of small sample size. Odds Ratio (OR) was 6.36 and CI 95% was 0 to 48.

There were 11 cases of AP, with an average age of 38.91 years (SD $\pm$ 15.51). Two (18.18%) of them were males and nine (81.82%) females. Average duration of the disease was 2.56 years (SD $\pm$ 3.25). The difference in positivity for *C trachomatis* between the cases and controls was not statistically significant (p > 0.05).

Discussion

Photosensitivity to *C trachomatis* has been described in almost 50% of chronic cases of lymphogranuloma venereum [3]. We found that even in non-LGV cases of photosensitivity, there was significantly higher percentage of seropositivity to *C trachomatis*, thereby suggesting that even non-LGV strains of *C trachomatis* cause photosensitivity. Majority of our patients with photosensitivity were females. This suggests that deep seated pelvic infection with *C trachomatis* may be an important cause of photosensitivity in women. Melasma has been associated with chronic pelvic inflammatory disease (PID) due to *C trachomatis* [4,5], which is in agreement with this study.

The mechanism underlying the transition from photoallergy to CAD, in cases where this is a precursor, remains unclear. Norris et al [6], felt that in the initial phases of photoallergy, local reaction begins with UVA-dependant covalent photochemical binding of hapten to endogenous protein, followed by an eczematous delayed-type hypersensitivity (DTH) response. With progression to CAD, UVA+/-UVB irradiation alone may trigger the immune response at any site, possibly by the continuing formation of antigenic photo products from the ubiquitous endogenous carrier protein alone. In cases where there is no preceding history of photoallergy, CAD may represent an end stage of a number of predisposing conditions like allergic contact dermatitis to substances with phototoxic potential, endogenous eczema [7], photosensitivity from oral medication, possibly PLE and human immunodeficiency virus infection [8]. Finally

Table 1
Chlamydia trachomatis antibodies in photosensitive disorders

Group	Number	Positive (%)	IgM positive (%)	IgG positive (%)	IgA positive (%)	χ^2	p
Melasma	47	12 (25.53)	3 (6.38)	4 (8.51)	5 (10.64)	4.38	0.0363
Photosensitivity	57	17 (29.82)	7 (12.28)	8 (14.04)	5 (8.77)	6.18	0.013
Chronic actinic dermatitis	13	6 (46.15)	3 (23.08)	3 (23.08)	3 (23.08)	6.91	0.0086
PLE	16	4 (25.0)	2 (12.5)	1 (6.25)	1 (6.25)	3.09	0.078
Rosacea	16	5 (31.25)	0	3 (18.75)	2 (12.5)	3.23	>0.05
Actinic prurigo	11	1 (9.01)	0	1 (9.01)	0	-	>0.05
Controls	30	2 (6.67)	2 (6.67)	0	1 (3.33)		

PLE = Polymorphic light eruptions

CAD also appears to arise de novo in normal subjects [9]. A significant association was found between chronic actinic dermatitis and *C trachomatis* seropositivity, suggesting that some product of metabolism of *C trachomatis* may be acting as a hapten for inducing DTH response in CAD.

PLE has been postulated to be a delayed type hypersensitivity reaction to ultraviolet radiation [10]. Attempted isolation of the inducing antigen in PLE has been unsuccessful but precipitation of the condition following allergic contact dermatitis to Fentichlor suggests an endogenous Fentichlor-like antigen as one possibility [11]. Recently heat-shock protein 65 has been isolated from the lesions of PLE [12]. Much of the chlamydial disease is due to delayed hypersensitivity reaction to specific heat shock proteins [13].

Some reports suggested that patients with rosacea have increased incidence of *Helicobacter pylori* infection, although other have failed to confirm this association [14]. Role of infestation of skin with tiny mite *Demodex folliculorum*, has also received little support [15]. However there is no disagreement on improvement in rosacea with tetracycline, erythromycin or metronidazole, which suggests a bacterial aetiology. A high Odds Ratio in rosacea suggests that *C trachomatis* induced photosensitivity may have a role in this dermatoses. Actinic prurigo did not have any association suggestive of *C trachomatis* infection.

We recommend further studies in a larger group of patients to establish the aetiology of rosacea and PLE. In the meantime all cases of PS, melasma, CAD, PLE, rosacea and their spouses/sexual contacts should be investigated and treated for *C trachomatis* infection.

Conflicts of Interest

None identified

Intellectual Contribution of Authors

Study Concept : Col MPS Sawhney, Wg Cdr S Arora, Col A Khetarpal

Drafting & Manuscript Revision : Col MPS Sawhney,

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Statistical Analysis : Col MPS Sawhney

Study Supervision : Col MPS Sawhney

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