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CO2 Laser Treatment of Xanthelasma Palpebrarum in skin, Aden, Yemen

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A B S T R A C T

Background: Xanthelasma palpebrarum clinically presents as yellowish plaques on the upper and/or lower eyelids. CO2 laser is considered the gold-standard for its treatment. Objectives: To evaluate the effectiveness of CO2 laser in the treatment of patients with xanthelasma palpebrarum. Patients and methods: Fifty eight patients were presented to our clinics in Almansoora and Khormakser in Aden, during the period January 2020 to December 2020 with xanthelasma palpebrarum and treated with CO2 Laser. Results: The study patients were 58 included in the study, the females were (81%) and the males were (19%). The mean age of all patients was 49.2 ± 9.4 years and their age ranged between 32 – 68 years ($p \leq 0.05$). The age group 50 years old and less represent (53.4%). We treated the patients with CO2 laser and the results were excellent among (75.9%) patients and good results among (17.2%) patients. More excellent results were among patients aged ≤ 50 years old, good results were predominant among patients aged more than 50 years old. The difference between values was statistically significant ($p = 0.005$). We observed the side effect as follows: hypopigmentation in (10.3%) patients, hyperpigmentation in (3.4%) patients and erythema in (5.2%). Three patients (5.2%) developed a recurrence of xanthelasma. In our study cholesterol level was found high in (17.2%) distributed among patients of age group ≤ 50 years old with (5.2%) and among age group > 50 years old with (12.1%) patients. Conclusion: In our study, excellent results were predominant followed by few numbers of good results. Further studies needed for more patients...

1.0 Inroduction

The term "xanthelasma" is derived from the Greek word xanthos (yellow) and elasma (beaten metal plate) (Segal *et al*., 1986). Xanthelasma palpebrarum (XP) clinically presents as yellowish plaques on the upper and/or lower eyelids (Bergman, 1994). XP presents as yellowish papules, plaques, or nodules, and is soft in consistency, but can be semisolid or hard. Lesions are usually symmetrically distributed on the medial side of the upper eyelids, but can also involve the lower eyelids (Nair *et al*., 2016). The histologic features of XP mainly consist of foamy histiocytes containing cholesterol crystals, lipid vacuoles, and lysosomes in the perivascular area of superficial and mid-dermis (Bergman, 1994). XP is rare in the general population (Rohrich, Janis & Pownell, 2002). XP is more common in women – 32%, versus 17.4% in men (Pathania & Chatterjee, 2015). The age of onset ranges from 15 to 73 years, with a peak incidence between 30 and 50 years. Hyperlipidemia, thyroid dysfunction, and diabetes mellitus are possible pathogenic triggers (Gangopadhyay *et al*. 1998). Moreover, XP has been reported following erythroderma, inflammatory skin disorders, and allergic contact dermatitis despite normal lipid profiles (Raulin *et al*., 1999). XP can be easily diagnosed on the basis of clinical background (Nair *et al*., 2016).

To date, several studies have reported on the therapeutic efficacies of ablative and nonablative lasers for XP, including carbon dioxide (CO2) lasers (Raulin *et al*., 1999, Katz *et al*. 2009, Schoenermark & Raulin, 1996, Park *et al*., 2011). Methods to remove xanthelasma include surgical excision; various laser ablations, such as carbon dioxide (CO_2), argon, erbium-doped yttrium-aluminum-garnet

(Er:YAG), and pulsed-dye lasers (Alster & Hirsch, 2003, Alstar & Garg, 1996).
Among these various laser treatments, CO_2 laser ablation is considered the gold standard treatment for xanthelasma (Alster & Hirsch, 2003). Various studies have been conducted on scarring, recurrence, and hypopigmentation that occurred after the removal of xanthelasma using a CO_2 laser (Alster & Hirsch, 2003, Alster & Lupton, 2002). The objective of this study was to evaluate the effectiveness of CO2 laser in the treatment of patients with xanthelasma palpebrarum

2.0 Patients and methods

Fifty eight patients were presented to our clinics in Almansoora and Khormakser in Aden, Yemen during the period January 2020 to December 2020 with xanthelasma palpebrarum and treated with CO2 Laser. Data including sex, age, results, side effects, recurrences and cholesterol levels were collected. SPSS Statistics software version 17 was used to perform all statistical analyses. Data are presented as mean values with the standard deviation (SD). The statistical significance of differences between data was evaluated using an Fisher test. A level of significance of $p \leq 0.05$ was used

3.0 Results

For the 58 patients with xanthelasma palpebrarum disease included in the study, the females were 47 (81%) and the males were 11 (19%) (Table 1 & Figure 1). The mean age of all patients was 49.2 ± 9.4 years and their age ranged between 32 – 68 years. The mean age of females was 49.1 ± 9.6 years and their age ranged between 32 – 68 years. The mean age of males was 49.2 ± 8.6 years and the age ranged between 37 to 65 years. The difference between means was statistically significant ($p < 0.05$). The age groups of these patients, 31 (53.4%) were of age 50 years and less. The age group over 50 years old were 27 (46.6%). As shown in Table 1.

Table 1: Xanthelasma Palpebrarum patients related to demographic variable (n=58)

Variables	Mean & range	No	%
Sex:			
Males		11	19
Females		47	81
Age (years):			
Mean age of all patients ± SD*	49.2 ± 9.4		
Range of age of all patients	32 – 68		
Females mean age ± SD	49.1 ± 9.6		
Males mean age ± SD	49.2 ± 8.6		
Females age range	32 - 68		
Males age range	37 – 65		
P-value between groups	< 0.05		
Age groups (years):			
≤ 50		31	53.4
> 50		27	46.6

SD* = Standard deviation

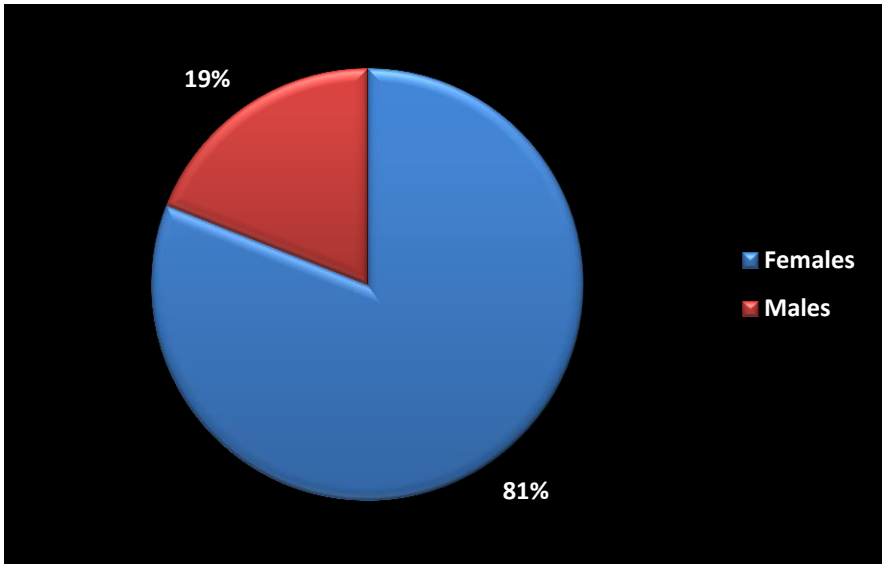

Figure 1: Distribution of study patients related to sex

Table 2 & Figure 2 reveal the distribution of variables related to age groups. Twenty seven (46.6%) of patients aged 50 years and less got excellent results and patients aged more than 50 years 17 (29.3%) of them got excellent results. Good results were found more 9 (15.5%) in patients aged more than 50 years old. Satisfy results were more 3 (5.2%) in patients aged 50 years and less. The difference between values was statistically significant (p = 0.005). In the age group ≤ 50 years old we found 1 (1.7%) hyperpigmentation followed by hypopigmentation 4 (6.9%). In the age group, more than 50 years old we found erythema 3 (5.2%), followed by 1 (1.7%) hyperpigmentation and 2 (3.4%) hypopigmentation. There are no significant differences were found between the side effects and the age groups (p > 0.05). Recurrences were 2 (3.4%) in patients aged 50 years and less and 1 (1.7%) in patients aged more than 50 years old. No statistical significant different between values (p > 0.05). Cholesterol level was found high in 10 (17.2%) distributed among patients of age group ≤ 50 years old with 3 (5.2%) and among age group > 50 years old with 7 (12.1%) patients.

Table 2: Distribution of variables as total and related to age groups (n=58)

Associated diseases	**Age (years)**				**Total**		**p-value**
	≤ 50 (n=31)		**> 50 (n=27)**				
	No	**(%)**	**No**	**(%)**	**No**	**(%)**	
Results:							
Excellent	27	(46.6)	17	(29.3)	44	(75.9)	P = 0.005
Good	1	(1.7)	9	(15.5)	10	(17.2)	
Satisfy	3	(5.2)	1	(1.7)	4	(6.9)	
Side effect:							
Erythema	0	(0.0)	3	(5.2)	3	(5.2)	
Hyperpigmentation	1	(1.7)	1	(1.7)	2	(3.4)	P = 0.285
Hypopigmentation	4	(6.9)	2	(3.4)	6	(10.4)	
None	26	(44.8)	21	(36.2)	47	(81)	
Recurrence:							
Recurrence	2	(3.4)	1	(1.7)	3	(5.2)	P = 0.553
None	29	(50.0)	26	(44.8)	55	(94.8)	
Cholesterol level:							
High	3	(5.2)	7	(12.1)	10	(17.2)	P = 0.099
Normal	28	(48.3)	20	(34.5)	48	(82.8)	

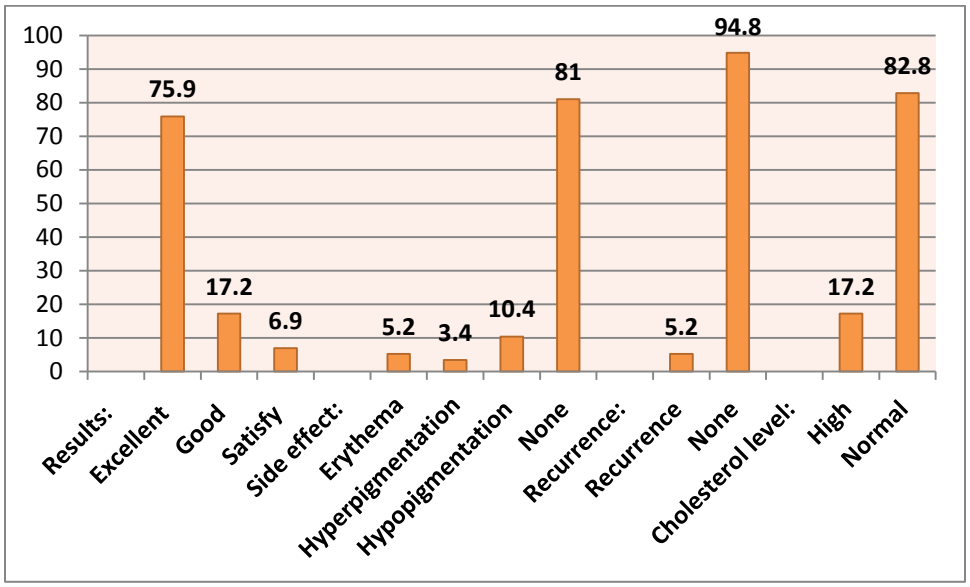

Figure 2: Distribution of percentage among variables of results, side effect, recurrence and cholesterol levels

Xanthelasmas are yellowish papules and plaques caused by localized accumulation of lipid deposits commonly seen on the eyelids. The histologic features of XP mainly consist of foamy histiocytes containing cholesterol crystals, lipid vacuoles, and lysosomes in the perivascular area of superficial and mid-dermis (Bergman, 1994). The prevalence is estimated at 4%, (Zak et al., 2014) with an incidence of 1.1% in women and 0.3% in men (Bergman, 1994). The most common cutaneous presentation is xanthelasma palpebrarum (Bergman, 1994). They present as soft symmetrical, bilateral, yellow, thin polygonal papules and plaques typically in the periorbital area. Other sites that may be affected include the neck, trunk, shoulders, and axillae (Bergman, 1994). In the current study we observed that the number of females was almost more than two third 47 (81%) of the total number of patients. Majority of studies have reported that the occurrence of xanthelasma palpebtarum is more in females (Bergman, 1994, Zak et al., 2014, Pragya, & Rochit 2018, Pandhi et al., 2012, Sarkany et al., 2010, James et al., 2011, Jain et al., 2007, Sharma et al., 2013, Ozdoel et al., 2008, Rubinstein et al., 2014). The predominance of females may be linked to the hormonal factor in the ethiopathogenesis of xanthelasma palpebtarum and their higher sensitivity to cosmetic problems (Jain et al., 2007, Sharma et al., 2013). In our study, the mean age of all patients was 49.2 ± 9.4 years and their age ranged between 32 – 68 years. The age groups of these patients, 31 (53.4%) were of age 50 years and less. The age groups over 50 years old were 27 (46.6%). We observed in our present study significant association between age means of females and males ($p < 0.05$). Published studies reported that the age of onset of xanthelasma palpebtarum ranges from 20 to 70 years, but it is most commonly seen between the age of 35 and 55 years (Zak et al., 2014, Pandhi et al., 2012). Cruz et al. reported in their study that the age of onset of xanthelasma palpebtarum can range from 15 to 73 years, although typical peaks are seen in the fourth and fifth decades (Cruz et al., 1988). In our study, we treated our patients with carbon dioxide laser and the results were excellent among 44 (75.9%) patients, good results among 10 (17.2%) patients and satisfy results among 4 (6.9%) patients. More excellent results were among patients aged ≤ 50 years old, good results were predominant among patients aged more than 50 years old. The difference between values was statistically significant ($p = 0.005$). Regarding the side effects, we found hypopigmentation in 6 (10.3%) patients, hyperpigmentation in 2 (3.4%) patients and erythema in 3 (5.2%). Three patients (5.2%) developed a recurrence of xanthelasma. Esmat et al. in their prospective randomized comparative clinical study reported that xanthelasma palpebrarum lesions on both sides were successfully removed with significant improvement in size, color, and thickness. Their patients included 20 adult patients with bilateral and symmetrical xanthelasma palpebrarum treated by either single session of ablative super pulsed CO2 laser or 3 to 5 sessions of ablative fractional CO2 laser with monthly intervals. Although they observed that lesions treated by SP CO2 laser showed significantly better improvement regarding color and thickness of the lesions, downtime and patient satisfaction were significantly better for lesions treated with fractional CO2 laser. Scarring and recurrence were significantly higher in lesions treated by SP CO2 laser (Esmat et al., 2014). Nouri in his study mentioned that CO2 is considered the gold-standard ablative laser. The vaporization of water within cells results in the ablation of skin layer by layer (Nouri, 2012). A number of studies using CO2 laser to treat patients with XP

have been reported. The overall outcome was excellent, and complete initial resolution was achieved in the majority of cases (Laftah et al., 2018). Raulin et al. published a large case series of 23 patients receiving high-energy ultrapulsed CO2 laser therapy. The ultrapulsed variation enables vaporization of a thin layer of tissue whereas the pulses allow time for thermal relaxation of surrounding tissue (Raulin et al., 1999). All lesions were successfully removed, with no scarring associated and a recurrence rate of 13% at 10 months (Pathania & Chatterjee, 2015). In our present study cholesterol level was found high in 10 (17.2%) distributed among patients of age group ≤ 50 years old with 3 (5.2%) and among age group > 50 years old with 7 (12.1%) patients. Kavoussi et al. mentioned that the mean serum levels of cholesterol (221.51±60.4 mg/dl) in the XP patient group were statistically higher than in the control group (Kavoussi et al., 2016). In a published study observed significantly high mean serum values for cholesterol in xanthelasma palpebrarum (Pandhi et al., 2012, Sharma et al., 2013). Kavoussi et al. reported in their published study that normal serum values for cholesterol was found in 54.8% of xanthelasma palpebrarum patients (Kavoussi et al., 2016).

5.0 Conclusion:

The CO2 laser represents an effective means for treating xanthelasma palpebrarum. In our study excellent results were predominant followed by few numbers of good results. Further studies needed for more patients and to include more variables.

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