

DISCUSSION

For centuries, people have been searching for methods to improve their facial skin appearance which may undergo undesirable changes due to aging, hyperpigmentary problems, pitted scars and acne vulgaris (Βαλκρισηναν ετ αλ., 2005).

Chemical peeling, laser resurfacing, cryopeeling, microdermabrasion, dermabrasion, and jet peel all are resurfacing techniques that have been grown in response to these overgrowing demands (Καριμπουρ ετ αλ., 2005& Ροψ,2005).

In the present study, a trial to evaluate three therapeutic lines of superficial chemical peeling [15%: 35%TCA, 20%:70% GA, and AFAs] was done regarding their efficacy and safety in the treatment of melasma, acne vulgaris, and fine wrinkles .

This study included ninety patients; 80 female and 10 male (8:1) their ages ranged from 12 to 72 years. This wide range of age with old patients presenting in this study gives an idea about the importance of the research in the field of cosmetic dermatology,as patients continue to complain about their aesthetic appearance irrespective to their ages.The number of included female patients was about eight folds that of the male patients' number his may be due to that females are usually more aware about their images , so they complain more and earlier . In addition, hormonal factors and cosmetic use play a role in the etiopathogenesis of the targeted diseases like Melasma, where all the presenting patients in this study were females. This is in accordance with ζασθυεζ ετ αλ., (1988) who reported that melasma is most

commonly observed in women while men represented only 10% of cases.

There were no significant difference between the three studied groups regarding age, sex, skin type and degree of adherence to the present study program and this made the comparison more logic. The importance of degree of patients' adherence to the treatment program was in agreement with Κακιτα ανδ πετρατος (1996), who stated that how well the patient adheres to the program will determine the success of the treatment.

Regarding the efficacy in **melasma** treatment there were significant difference between the three studied therapeutic lines with the most significant results recorded in AFAs and GA treated patients but TCA treated patients didn't give satisfactory results in most of cases as only 2(20%) cases out of ten cases showed excellent results, moreover 2 (20%) cases showed worsening.

The results of this study about effect of TCA in treating melasma patients was supported with Ροενιγκ ετ αλ., 1996 who stated that pigmentary problems such as melasma or postinflammatory hyperpigmentation may respond to TCA peel but results were highly variable and condition may be worsened. This result was also in agreement with Ψανγ ανδ Λι, (1999) who preferred laser resurfacing over TCA peeling in the treatment of melasma and with Χοτελλεσσα ετ αλ., (1999) who stated that the dermal component of melasma seemed to be resistant to 25% TCA peel, in these cases a deeper type of peeling with higher TCA concentrations should be considered. In spite that

higher concentration (35% TCA) was used in this study the results were compatible with their results.

On the contrary, Χηυν ετ αλ., (2004) reported that the TCA peel method is a safe and effective modality for the treatment of benign pigmented lesions including melasma.

Regarding the skin type of included melasma patients, there were not any preferences towards any one of the both included skin types. This was in accordance with Ροβερτσ, (2004) who reported that different ethnicities may respond unpredictably to chemical peeling regardless of skin phenotype. On the other hand, Γλογαυ ανδ Ματαρασσο, (1995) who reported that the implication of skin type difference doesn't affect only responses to sun light but also to peeling agents as well.

In accordance with the present study satisfactory results obtained from GA peel in the treatment of melasma was Πετρατοσ,(1996)who stated that serial GA peels are effective in the treatment of melasma; by this method skin tends to be less reactive as it builds up tolerance to glycolic acid increasing concentration. This result was in a great accordance with Περεζ –Βερναλ ετ αλ., (2000), Τυγγ ετ αλ., (2000), θασσηρι ετ αλ., (2001) & Σαρκαρ ετ αλ., (2002) as they reported that GA facial peel is an effective treatment of melasma which has been considered a difficult condition to treat. This was supported by Υσυκι ετ αλ., (2003) who stated that GA has been reported to be effective in treating pigmentary lesions such as melasma not only by accelerating the turnover of the epidermis but also by direct inhibition of melanin formation in melanocytes. This was in agreement with Στρατιγος ανδ Κατσαμβασ, (2004) & Κηυνγερ ετ αλ., (2004) who reported that GA

is well tolerated and effective therapy in the treatment of melasma but larger trials over longer periods may be needed.

In contrast to the previous opinion were ζαν Σχοττ ετ αλ., (1996) & Ηυρλψ ετ αλ., (2002) as they reported that the use of GA in the treatment of melasma doesn't add any thing to the use of previous depigmenting agents. This was supported by Φυνγ ετ αλ., (2000), Παρκ ετ αλ., (2002) & Καιδβεψ ετ αλ., (2003) as they stated that GA application caused enhanced sensitivity to UVA and UVB light even in absence of irritation assigned by increased sun burn cells (SBCs)and decreasing minimal erythema dose(MED).

In the present study, the superiority of AFAs on other modalities in the treatment of melasma was in accordance with Κλειν,(2000) who stated that the effective defoliant AFAs reduces photopigmentation with less irritation and hyperpigmentation often associated with other products with the same effect on dark complexions as well as fair ones.

The mainly included types of melasma in this study were epidermal type with non significant difference between the three included subgroups of melasma .This was in agreement with Κοκιτα, (1995) & Γαρχια, Φυλτον, (1996) as they stated that 70% of all Melasma cases are epidermal which usually respond well to bleaching products and superficial resurfacing techniques, but dermal melasma doesn't generally respond to any of these treatment lines while mixed melasma may respond.

Regarding acne patients, the effect of the three therapeutic lines of treatment used in the present study was mainly dependant on the predominant type of acne lesions among the studied patients.

In TCA peels, the results were generally variable according to the targeted lesion among the studied patients, as it showed significant improvement in patients with predominant comedonic lesions while no improvement was observed in patients with papulopustular lesions or postinflammatory hyperpigmentation, moreover pigmentations were aggravated. This was in accordance with Χολλινς, (1989) who reported that application of 35:50% TCA directly to comedones will cause comedolysis with no recurrence at six month follow up in almost all patients. This was supported by ΑΛ-Σηαρθι ανδ ΑΛ- Ωαιζ, (2002) who reported that TCA peels doesn't improve postinflammatory hyperpigmentation but it may aggravate it. This was also in agreement with Χαλλενδερ, (2004) who stated that single treating agent can't improve inflammatory acne lesion but it may trigger postinflammatory hyperpigmentation so, a combination therapy should be used.

In contrary to the previous opinion concerning the present study results of TCA effect on acne were Φυλτον, (1994) & Μονηιερ, (2004) who stated that TCA facial peels is not effective in treating acne lesions alone so, it should be combined with other adjunctive modalities such as ultrapulse CO₂ laser, or pre conditioning with either 70% glycolic acid, Jessner solution or by freezing skin immediately before or after TCA peel by hard block CO₂ or by liquid nitrogen.

In the present study, glycolic acid facial peels showed significant improvement in patients with polymorphic acne including comedones, papulopustular acne, postinflammatory hyperpigmentation and pitted scars and its effect on comedones runs faster but the others need more repetitive peels. This was in accordance with ζαν Σχοττ ανδ Ψυ, (1989)

& Βριδεν ετ αλ., (1996) who found that GA facial peel seemed to add distinct benefit to standard acne treatment regimens in all types of acne as it diminishes corneocyte cohesion with subcorneal epidermolysis leading to normalization of follicular keratinisation and opening of comedones , and lead to unroofing of pustules which is seen clinically as blanching but its effect is slow so, combination treatment may be added in order to achieve more rapid and enhanced results. This was supported

by Δι Ναρδο, (1995); Ωανγ ετ αλ.,(1997); Ατζορι ετ αλ.,(1999)&

Κηαρφι ετ αλ.,(2001) as they reported that GA peels was effective topical treatment in both inflammatory and noninflammatory acne but its effect on comedonal acne was more rapid than its effect on papulopustular acne which need an average of six applications to improve. This result was in accordance with Βορδατ ανδ χηεσονψ, (2005) who stated that GA was found to be effective in topical acne treatment particularly papulopustular type by its effect on propinibacterium acnes.

In contrary, Δρενο ετ αλ., (2005) stated that GA has mild effect on retentional lesions so it can be combined with other regimens to amplify its efficacy with minimizing side effects.

In the present study, AFAs exfoliants appeared effective in the treatment of polymorphic acne showing faster improvement in comedonal acne and postinflammatory hyperpigmentation but papulopustular lesions and pitted scars may need longer time to improve. This was supported by Κλειν,(2000) who stated that AFAs can improve acne and rosacea patients as some of the acidic amino acids that was

used in AFAs synthesis which are found in the seeds and buds of immature sugarcane and other fruits are carboxylated amino acids that are described as "Tri Carboxylic Acid" or as an alpha, di-carboxyl, alpha amino acetic acid. AFAs are proved to be effective because they chemically have three potential hydrogen ion denoting carboxyl moieties. These positively charged hydrogen ions are mostly responsible for its dramatically enhanced antioxidant action if compared to other antioxidant formulations e.g. Alpha Hydroxy Acids (AHAs) that have one polar carboxyl radical.

According to the results of the present study, the difference between the effect of the three therapeutic lines on pitted scars was not significant with the tendency of TCA to appear better in treating mild post acne pitted scars and flattening of deeper ones. This was supported by Λεε ετ αλ., (2002) who recorded that chemical reconstruction of skin scars (CROSS) by TCA is a safe and very effective single modality for the treatment of atrophic acne scars. This was in accordance with ΑΛ- Σηαρθι ανδ ΑΛ- Ωαιζ, (2002) who reported that TCA peels could improve acne scars even in patients with dark complexion.

In the present study, the satisfactory effect of GA in the treatment of acne scars was supported by Ωανγ ετ αλ., (1997); Ατζορι ετ αλ., (1999) & Κηαρφι ετ αλ., (2001) as they reported that GA facial peels can flatten pitted scars but it needs an average of six applications to improve. This was in accordance with Μχ Χολλουγη ετ αλ., (1996) & Ροενιγκ ετ αλ., (1996) who stated that superficial acne scarring can be improved somewhat with peeling but deep types are best treated with dermabrasion, staged punch grafts or scar revision combined with

dermabrasion. These results were in agreement with Ερβαγγι ανδ Ακχαλι, (2000) who stated that GA could improve acne scars but with 70% GA concentration.

This was in contrast to opinion of Ωηονγ ανδ Λεε, (1999) who recorded that acne scars cannot be effectively corrected by a single treatment modality because of their widely varied depth and width so staged combinations of several surgical modalities is more effective. This was supported by Χαρνιολ ετ αλ., 2005 who reported that laser treatment of acne scars appeared more efficacious than TCA peels but greater improvement may be obtained after additional chemical peels.

In the present study, **periorbital fine wrinkles** were improved with significant difference between the three therapeutic lines as AFAs and GA peels appeared to be more significant than TCA, while they showed minimal improvement on the forehead type of wrinkles with no significant difference between the three therapeutic lines.

In accordance with results of the present study about the partially satisfactory effect of TCA peels in the treatment of periorbital fine wrinkles was Δινγμων ετ αλ., (1994) who reported that 35% trichloroacetic acid was determined to be a safe agent for use on facial fine wrinkles either alone or in combination with other modalities like soft tissue augmentation or face lift. This result was in agreement with θηονσον, (1995) who had claimed that fine wrinkles are improved by almost superficial depth peels, but coarse rhytides are not removed but only softened. That was supported by Βυτλερ ετ αλ., (2001), Ελ-Δομψατι ετ αλ., (2004) as they stated that higher concentration TCA peels (35:50%) showed beneficial effects in

reversing the visible stigmata of photoaging in human skin by combination of two findings; reorganization in dermal structural elements and an increase in dermal volume which were accomplished primarily by increasing the amounts of collagen I and collagen III and improving the morphologic appearance of collagen and elastic fibers.

In agreement with the present study significant effect of GA peels on fine wrinkles was Παχθουιαδιο *ετ αλ.*, (1996) who stated that GA improves photodamaged skin only when used regularly at short intervals. This was also supported by Δι Ναρδο *ετ αλ.*, (1995); ζαν Σχοττ *ετ αλ.*, (1996); Τηβλυτ *ετ αλ.*, (1998); Φυκκσ *ετ αλ.*, (2003) & Εδισον *ετ αλ.*, (2004) who emphasized that GA is an agent capable to alleviate signs of photoaging. This was in agreement with Διτρε *ετ αλ.*, (1996); Νεωμαν *ετ αλ.*, (1996); Βερν Στιεν *ετ αλ.*, (2001) & Οκανο *ετ αλ.*, (2003) who stated that GA contributes to recovery of photodamaged skin by significant increase in epidermal thickness with reversal of basal cell atypia, dispersion of melanin pigmentation and return to more normal rete pattern.

This result was in contrary with Πιραρδ *ετ αλ.*, (1999) who stated that GA acid appeared completely inactive in treatment of photoaging if compared with effect of retinoic acid and beta lipohydroxy acid.

In the present study the significant effect of AFAs peels on fine wrinkles was in accordance with Κλειν, (2000), Ηαρδινγ ανδ Ραωνγ (2004) who stated that AFAs significantly improve the appearance of fine lines, and skin texture. This is due to its structure which is based on the same amino acids that are recognized as an integral part of the natural moisture system of human skin; as AFAs and mineral cofactors

integrated in this product make a good antioxidant which sends out protons to help clean up of negative oxides that accumulate in all tissues of our body from sun and environmental exposures.

There was no significant difference between the three studied subgroups of fine wrinkles patients regarding their skin phototype (Glogau classification) as most of them are either type II or III. This was in accordance with the good results recorded in the treatment of fine wrinkles patients in this study and more supported by Γλογαν, (1994) who stated that only skin phototypes II and III could give good results in the treatment with superficial resurfacing techniques while patients with skin phototype IV need combined modalities to improve.

As regard the incidence of frosting as a clinical response of studied patients to treating agent there were significant difference between the three therapeutic lines with TCA treated patients appeared to have the highest incidence 24 cases out of 30 (80%), that can occur at different concentrations as some patients recorded frosting at 15% concentration while others didn't record it till reaching 35% concentration. But in patients treated with GA 18 cases out of 30 (60%) were recorded mainly at 50:70% while patients treated with AFAs showed no frosting. This was supported by Ρυβιν, (1995) who reported that white frost from TCA application appeared complete on the treated area within 30 seconds to 2 minutes, which takes longer time to frost than Bakers formula or straight phenol but a shorter period of time than the other superficial peeling agents do. This was in agreement with Οβαγι,(1996) who stated that superficial peel should achieve light pink

frost with epidermal sliding ,defrosting time ten to twenty minutes and healing period five to ten days.

In the present study the reported **side effects** of the three studied therapeutic lines were erythema, discomfort including (itching and burning sensation), visible exfoliation, hyperpigmentation, and bacterial infection.

As regards **erythema** there was significant difference between the three therapeutic lines as both GA and TCA facial peels appeared to show significant erythema in most of cases that was noticed to appear immediately after the procedure and persisted for a period ranged from 1 to 6 days, while AFAs peels encountered only three cases (10%) with minimal erythema which appeared only at 60 antioxidant peels and didn't persist more than couple of hours. This was supported by Δινγμων ετ αλ.,(1994) & Μονηιετ.,(2004) who stated that TCA peeling agent alone is not safe and is accompanied with many hazardous complications so combination peels may be needed to maximize efficacy and minimize side effects.

In contrary to the previous opinion about the erythematous and hazardous effect of TCA and GA on the skin were the opinion of Λεε ετ αλ., (2002); Χηυν ετ αλ.,(2004)& Χαρνιολ ετ αλ.,(2005) who stated that GA and TCA chemical peel are effective procedure in the treatment of many skin diseases as acne vulgaris, pigmentary problems and photoaging with minimal side effects.

In accordance with the erythematous effect of GA facial peels Φυνγ ετ αλ., (2000) ; Παρκ ετ αλ., (2002); Καιδβεψ ετ αλ., (2003) & Σονγ ετ αλ., (2004) reported that GA application caused enhanced sensitivity

to UVA and UVB light even in absence of irritation assigned by increased sun burn cells (SBCs) and decreasing minimal erythema dose (MED).

In contrary to that, Τονγρετ αλ., (2000) & Αλαμ ετ αλ., (2002) proved that AHAs peels have proven level of efficacy and safety in a variety of skin types without serious side effects and even mild effects were seldom reported.

As regards the results of this study, the non significant erythematous effect of AFAs which was supported by the opinion of Κλειν, 2000 who reported that the minimal irritating effect of the AFAs may be due to the antioxidant effect of this product which minimizes its photosensitization and irritation.

In the present study the patients feeling of **discomfort** after the peeling procedure was significantly different according to the used therapeutic line of treatment as it appeared to be more intense after GA26(86.67%) and TCA28(93.33%) facial peels while it was not marked after AFAs peels as only 6 (20%) cases encountered minimal burning sensation which disappears when cold compresses were applied. This was supported by Φυλτον, 1994 who stated that TCA facial peels is not safe as accompanied by irregular penetration which may produce severe irritation and even deep burns leading to skin atrophy and hypertrophic scarring. On the other hand, Κυρτεζωειλ, (1998) & Εδισον ετ αλ., (2004) stated that stinging, burning and itching are among the most common complications of AHAs. This was supported by Γυεωαρα ανδ Πανδψα, (2003) who reported that GA peels have

irritating effect on skin when added to hydroquinone formulations to enhance their depigmenting effect.

In contrary Κηουνγερ ετ αλ.,(2004) stated that GA peels are well tolerated, safe and effective therapy in treatment of many types of skin lesions even in dark- skinned individuals.

Regarding another point of view, the results of the present study showed that AFAs had non irritating effect on the skin and this was supported by Κλειν, (2000) who proved that AFAs have no or minimal irritating effect if compared with other chemical peeling agents as they can be used in high concentration ranging from 20 percent to 60 percent without any irritation but if irritation occurs it lasts maximally two hours.

Another annoying side effect of chemical peeling encountered in this study was visible exfoliation which appeared to be significant in patients treated with TCA and GA facial peels but not encountered in those treated with AFAs . This was expected as one of the encountered mechanisms of chemical peeling action which is considered as one of the ablative resurfacing techniques by its exfoliating effect which differs according to depth of peel that may be superficial including only the epidermis or medium depth including epidermis and papillary dermis or deep including epidermis extending to reticular dermis as proved by Ωιεστ, (2004) & Ροψ, (2005). But GA peels showed lesser degree of exfoliation if compared with TCA as proved by Κιμ ετ αλ.,(1999).On the other hand the non or minimal exfoliating effect of AFAs as proved by Κλειν,(2000) & Χηοι ετ αλ.,(2005) was explained by the nature of the AFAs structure as AFAs are a totally new rapidly effective antioxidant created by the dissolution and acidification of natural acidic amino acids

that occur in stratum corneum as the result of the proteolysis of filaggrin which is the main moisture retention factor of the skin so, patients experiences fearless dryness with more healthy skin.

According to results of the present study, hyperpigmentation was encountered only between patients treated with TCA and GA peels, where the hyperpigmentary effect of TCA, was the most common and most annoying complication. This was supported by Φυλτων, (1994) who stated that TCA peels were not safe and could cause blotchy hyperpigmentation. This also was found by Μοσταφα ετ αλ., (1999) who stated that this complication was expected for many reasons, first the Egyptian patients had darker complexion if compared with the fair patients in other studies, moreover the climate in Egypt is sunny almost all the year with the unavailability of photoprotective sunscreens.

As regard the hyperpigmentary effect of GA facial peels, Φυλτων, (1994) & Κακοιτα ανδ Πετρατος, (1996) stated that in treating skin types III to VI with GA peels risks include a greater degree of reactivity with a greater chance of postinflammatory hyperpigmentation. This was supported by Φανγ ετ αλ., (2000) who reported that hyperpigmentation which may result after GA facial peeling was due to its photosensitizing effect on the skin. This was in accordance with Γυεπαρα ανδ Πανδψα, 2003 who reported that GA when combined with hydroquinone to enhance its depigmenting effect in melasma treatment was shown to cause irritation leading to postinflammatory hyperpigmentation.

In

contrary Ωανγ ετ αλ., (1997) ;Τυνγ ετ αλ.,(2000) ; θαπαηερι ετ αλ., (2001); Αλαμ ετ αλ., (2002) ; Βριδεν,(2004) & Κηυνγερ ετ αλ.,(200)

stated that GA and TCA peels as types of superficial chemical peels offered great flexibility over a range of skin types and conditions so they can be used on most regions of the body with minimal to no complications.

Another complication that was recorded in the present study was bacterial **infection**, which occurred only in one patient out of thirty (3.33) patients after TCA peeling, that was improved on topical and systemic antibiotics after ten days without scarring or hyperpigmentation. This was in accordance with Βροδψ, (1989) & Ροενιγκ ανδ Βροαδλανδ, (1993) who reported that post peel infections were rare and superficial bacterial infection didn't cause scarring. This was supported by Δεχηαρδ ανδ Χαληαυν, (2000) who stated that post superficial chemical peeling infection was rare due to the nature of peeling agent which is bactericidal and the treating program nature that included frequent face washing which is encountered as prophylactic measure from infection.

About the incidence of **recurrence** in the studied patients during time of follow up, there was no significant difference between the three therapeutic lines but also it showed great dependence on the nature of the targeted lesion .As regards recurrence of melasma, TCA showed higher incidence, about 8 out of ten patients (80%) recorded recurrence. This may be due to its hyperpigmentary effect after peeling as proved by Φυλτον, (1994).

But Melasma recurrence after GA peeling was explained by Κακιτα ανδ Πετρατοσ, (1996) & Στρατιγοσ ανδ Κατσαμβασ, (2004) who stated that melasma patients that were treated by GA had high rate

of recurrence due to its photosensitizing effect on skin. On the other hand, AFAs treated patients didn't show any case of recurrence during period of follow up, this was due to its antioxidant and moisturizing effect which which protected patients from the photosensitizing effect of the other two peeling modalities as proved by Κλειν,2000.

Concerning the recurrence in acne patients there was no difference between the encountered lines of treatment in this aspect but it differs according to the targeted lesion where comedones and papulopustular lesions encountered fast and high rate of recurrence while improved post acne scars showed no recurrence.