การศึกษาเปรียบเทียบประสิทธิภาพของการใช้พัลส์ดายเลเซอร์ ร่วมกับยาฉีดสเตียรอยด์เข้ารอยโรค เทียบกับยาฉีดสเตียรอยด์อย่างเดียว ในการรักษาแผลเป็นนูนและแผลเป็นคีลอยด์

A Comparative Study on The Efficacy of Combination of Pulsed Dye Laser and Intralesional Corticosteroid Injections Versus Injections Alone for Treatment of Keloid and Hypertrophic Scars

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บทคัดย่อ

แผลเป็นนูนหรือแผลเป็นคีลอยด์เกิดขึ้นจาก การได้มีบาดแผลลึกถึงชั้นหนังแท้ชั้นลึก (deep dermis) หรือมีการทำลายชั้นผิวหนังมากกว่า 33.1% ของความหนาของชั้นผิวหนัง เกิด จากการสมานแผลที่ผิดปกติ การสร้างและสะสมของคอลลาเจนมากเกินไปทำให้เกิดรอยแผลเป็นนูนขึ้น

แผลเป็นนูน และแผลเป็นคีลอยด์จะมีลักษณะนูนค่อนข้างแข็ง ขอบชัด สีชมพูหรือม่วง ในบางรายอาจเปลี่ยนเป็นสีดำคล้ำขึ้น กดเจ็บเล็กน้อย ผิวเรียบเป็นมัน และอาจมีเส้นเลือดฝอยหนาแน่นอยู่ ที่บริเวณแผลเป็น มักเกิดในตำแหน่งที่มีแรงตึงสูง เช่น ไหล่ , คอ, หน้าอกและหัวเข่า การรักษามีได้หลายวิธี แต่ยังไม่มีวิธีการรักษาที่ได้ผลดีหายขาด และไม่กลับมาเป็นซ้ำอีก พัลส์ดายเลเซอร์และยาฉีดสเตียรอยด์ สามารถรักษาแผลเป็นได้ดี แต่ยังไม่มีการทดลองเปรียบเทียบกับการรักษาที่เป็นการรักษามาตรฐาน

วัตถุประสงค์ เพื่อเปรียบเทียบประสิทธิภาพ และอาการข้างเคียงในการใช้พัลส์ดายเลเซอร์ร่วมกับยาฉีดสเตียรอยด์ เปรียบเทียบกับยาฉีดสเตียรอยด์เพียงอย่างเดียว ในการรักษาแผลเป็นนูน และคีลอยด์

วิธีการศึกษา อาสาสมัครเพศชายและหญิง อายุ 15-55 ปี ที่มารับบริการในโรงพยาบาลแม่ฟ้าหลวง มีแผลเป็นนูน และแผลเป็นคีลอยด์บริเวณส่วนต่าง ๆของร่างกายมานานกว่า 6 เดือน จำนวน 16 คน แบ่งแผลเป็นของอาสาสมัครออกเป็น 2 ส่วนและทำการสุ่มการรักษาด้วยคอมพิวเตอร์ โดยด้านหนึ่งใช้ยาฉีดส

เตียรอยด์อย่างเดียว อีกด้านใช้ ยาฉีดสเตียรอยด์ร่วมกับเลเซอร์พัลส์ดาย ทำการรักษาทั้งหมด 3 ครั้ง แต่ละครั้งห่างกัน 4 สัปดาห์ ประเมินผลโดยวัดความกว้าง ยาว สูง ของแผลเป็น ด้วย Caliperวัดความนุ่มด้วย Cutometer MPA 580วัดความแดงด้วย Mexameter MX18วัดผลข้างเคียงและประเมินความพึงพอใจในสัปดาห์ที่ 12 โดยใช้แบบสอบถาม

ผลการทดลอง กลุ่มตัวอย่างทั้ง 2 กลุ่มมีความนูนของแผลเป็นลดลงเมื่อเทียบกับก่อนการรักษา โดยกลุ่มที่รักษาด้วยยาฉีดสเตียรอยด์ร่วมกับเลเซอร์พัลส์ดายมีความนูนลดลงมากกว่า แต่ไม่มีนัยสำคัญทางสถิติ ใ นเรื่องของความนุ่มพบว่า กลุ่มที่รักษาด้วยยาฉีดสเตียรอยด์ร่วมกับเลเซอร์พัลส์ดาย ทำให้แผลเป็นนุ่มมากกว่ากลุ่มที่รักษาด้วย ยาฉีดสเตียรอยด์อย่างเดียว อย่างมีนัยสำคัญทางสถิติ ในเรื่องของความกว้าง ยาว และความแดง พบว่าทั้ง 2 กลุ่ม ไม่มีการเปลี่ยนแปลงอย่างมีนัยสำคัญทางสถิติ ความพึงพอใจของอาสาสมัครให้กลุ่มที่รักษาด้วยยาฉีดสเตียรอยด์ร่วมกับเลเซอร์พัลส์ดายมีความพึงพอใจมากกว่า แต่ไม่มีนัยสำคัญทางสถิติ

สรุปผล การรักษาแผลเป็นนูนและคีลอยด์ โดย การใช้พัลส์ดายเลเซอร์ ร่วมกับยาฉีดสเตียรอยด์ เข้ารอยโรค เทียบกับยาฉีดสเตียรอยด์อย่างเดียว ให้ผลการรักษาไม่แตกต่างกันอย่างมีนัยสำคัญ ยกเว้นในเรื่องความนุ่มของแผลเป็น ที่ยาฉีดสเตียรอยด์ร่วมกับเลเซอร์พัลส์ดายทำให้แผลเป็นนุ่มกว่าอย่างมีนัยสำคัญ

คำสำคัญแผลเป็นนูน, คีลอยด์, ยาฉีดสเตียรอยด์, เลเซอร์พัลส์ดาย

ABSTRACT

Hypertrophic scars and keloids are common in Thai patient that mainly dermatologists and plastic surgeons encounter. Excessive scars form as a result of aberrations of physiologic wound healing and may develop following any insult to the deep dermis or following damage to more than 33.1% of the thickness of the skin. Intralesional corticosteroid injections andpulsed dye laserwhen used alone, can soften and flatten keloid and hypertrophic scar provide symptomatic relief but they cannot make these scars disappear. Theoretically, the combination therapy ofintralesional corticosteroid injections and pulsed dye laser is supposed to be of value in order to achieve better results and to minimize the associated complications.But there’s no study compare the clinical improvement and side effect of the combination of 595-nm pulsed dye laser and intralesional corticosteroid injections versus intralesional corticosteroid injections alone.

Objective : To compare the efficacy and side effect of the combination of pulsed dye laser and intralesional corticosteroid injections versus intralesional corticosteroid injections alone for treatment of keloid and hypertrophic scars.

Materials and Methods : Sixteen Thai subjects with keloid and hypertrophic scars received three split-scar monthly treatments, one side with intralesional corticosteroid injections, and the other with pulsed dye laser and intralesional corticosteroid injections. The improvement of scars of height, length, width, erythema, pliability and side effects were evaluated at every treatment sessions and four weeks after the last treatment.

Results : The study found significant improvement in keloid and hypertrophic scars flattening after treatment in both groups. Different of improvements of scar's height in both groups no statistically significant (p=0.165), the scars' pliability after 2 treatment in TAC+PDL groups were higher than TAC groups significantly (p=0.01). No significant statistical change was observed in scars' length, width and erythema after treatment in both groups. Hyperpigmentation and telangiectasia are still encountered complications.

Conclusion : Intralesional corticosteroid injections alone and its combination with pulsed dye laser are effective modalities that could be used for treatment keloid and hypertrophic scars. The adjunctive use of pulsed dye laserdid not significantly enhance clinical outcome in our study except in terms of increased scar's elasticity.

Keywords : Keloid, Hypertrophic scars, Pulsed dye laser, Intralesional corticosteroid.

Introduction

Hypertrophic scars and keloids are common in Thai patient that mainly dermatologists and plastic surgeons encounter. Excessive scars form as a result of aberrations of physiologic wound healing and may develop following any insult to the deep dermis or following damage to more than 33.1% of the thickness of the skin.Intralesional corticosteroid injections andpulsed dye laserwhen used alone, can soften and flatten keloid and hypertrophic scar provide symptomatic relief but they cannot make these scars disappear. Theoretically, the combination therapy ofintralesional corticosteroid injections and pulsed dye laser is supposed to be of value in order to achieve better results and to minimize the associated complications.But there's no study compare the clinical improvement and side effect of the combination of 595-nm pulsed dye laser and intralesional corticosteroid injections versus intralesional corticosteroid injections alone.

Material and Method

Sixteen Thai subjects both male and female ages 15-55 years with keloid and hypertrophic scarsof at least 6-month duration. The lesions had to be a minimum of 20 mm in length and no received prior treatment before.The measured area was mapped with a permanent marker on a flexible transparent sheet using natural landmarks such as lentigines or moles as referenced landmarks.Photography was obtained using digital camera.Measure and record scars' dimensions (height length width) by caliperat week 0, 4, 8, 12. Measure and record scars' erythema by mexameter MX 18 at week 0, 4, 8, 12. Measure and record scars' pliability by Cutometer MPA 580 at week 0, 4, 8, 12.The scars of each subject was divided into two segments and randomly treated with the combination of pulsed dye laser and intralesional corticosteroid injections (TAC+PDL) to half of the scars and intralesional corticosteroid injections alone (TAC) to the other half. PDL (595nm v beam; Candela,USA), at a fluence of 5-7 J/cm^2, pulse duration of 450 μsec and spot sizes of 7mm, were used. Treatment was carried out with non-overlapping laser pulses at the side of combination treatment. Epidermal cooling was achieved by means of a cryogen spray cooling (CSC) device. The CSC device was fixed to spurt duration of 30 ms with a delay of 30 ms.After PDL, concomitant triamcinolone acetonide injections(TAC) of 40mg/mL diluted with xylocain 1:1 were injected intothe body of the keloid and hypertrophic scars using a 30-gauge needle until slight blanchingwas clinically visible and not exceed 0.5 mL per 1 cm^2 of the lesion. The delivered dosewas adjusted according to the extentof the lesions but did not exceed6 mL per session.After treatment, an antibacterial ointment was applied to the treated area.The treatment was done once a month for three months consecutively. The treatment each side of the scars was the same in all the three treatment sessions.Patients were asked to evaluate the improvement of scars at week 12 using the grading scales.

Results

During a study period, a total of 16 participants were complete studied. The mean age of patients was 25.06 ± 6.98 years (range, 15-44 years). The mean duration of keloid and hypertrophic scar was 9.75 ± 5.09 years. Most of the subjects had Fitzpatrick skin type IV 10 person, the others were type IIII and V 3person,for each. Most of scars located at extremities 8 person, the others were trunk 7 person and head & neck 1 person.

Scar's height :In TAC groupsafter the second treatment (Weeks 8) : The mean scar's height at weeks 8 (2.84±1.19) was significantly lower than baseline (5.39 ± 1.52) ($p< 0.001$). In TAC+PDL groups after the second treatment (Weeks 8) : The mean scar's height at weeks 8 (2.65±1.26) was significantly lower than baseline (5.45 ± 1.57) ($p< 0.001$). After the third

treatment (Weeks 12) :The reduction of mean scar's height of TAC+PDL groups was higher than TAC groups but did not reach significance (p = 0.165).

Scar's length :In TAC groups there was no significant difference between mean scar's length at baseline (17.51±10.09) and weeks 12 (17.28±10.06) (p = 0.074). In TAC+PDL groups, there was no significant difference between mean scar's length at baseline (17.21±8.9) and weeks 12 (17.03±8.95) (p = 0.062).The improvement of mean scar's length between 2 groups of treatment did not reach significance.

Scar's width :In TAC groups, there was no significant difference between mean scar's width at baseline (14.68±9.97) and weeks 12 (14.61±9.81) (p = 0.115). InTAC+PDL groups, there was no significant difference between mean scar's width at baseline (13.9±8.54) and weeks 12 (13.82±8.51) (p = 0.103).The improvement of mean scar's width between 2 groups of treatment did not reach significance.

Scar's pliability of both groups were increased significantly over the study period. The improvement of scar elasticity was significant after three TAC treatments(0.68 ± 0.11) (p<0.001) and after two TAC+PDL treatment(0.69 ± 0.15) (p<0.001). At weeks 8 the improvement of mean scar's pliability in TAC+PDL segments was better than TAC segments significantly (p = 0.01).

Scar's erythema:In TAC groups,there was no significant difference between mean scar's erythema at baseline (392.91±91.81) and weeks 12 (430.86±106.26) (p = 0.066).InTAC+PDL groups, there was no significant difference between mean scar's erythema at baseline (411.82±91.35) and weeks 12 (408.71±115.76) (p = 0.866).The improvement of mean scar'serythema between 2groups of treatmentat weeks 12 did not reach significance (p = 0.051).

After being treated with intralesional corticosteroid injections, most of the patients rated good improvement of their scar 10 person, Moderate improvement 5 person and Excellent improvement 1 person. After being treated with intralesional corticosteroid injections and pulsed dye laser , most of the patients rated Good improvement 10 person, moderate improvement 3 person and Excellent improvement 3 person.The segments was treated with intralesional corticosteroid injections mean patient's satisfaction was 2.74±0.58, and The segment treated with intralesional corticosteroid injections and pulsed dye laser mean patient's satisfaction was 3±0.63. There was no statistical significance in the mean difference of patient's satisfaction grade between two groups (p = 0.206).

The study did not show any serious side effects. After third treatment, there were 3 subjects had telangiectasia in both groups, 2 subjects had hyperpigmentation and 3 subjects had purpura and mild edema which were the disappeared within 1 week. No other adverse effects such as crusting burn were demonstrated.

Discussion

Scar's Dimensions :Elwakil and colleagues used TAC+PDL treatment 13 hypertrophic scars. They demonstrated favorable improvements in scar height, pliability, erythema, and scar's symptom with minimal side effects and treatment discomfort. The higher rate of scar flattening was elicited after more than two PDL treatment sessions. Similarly, in our study all keloid and hypertrophic scar showed significant flattening after laser treatments at both TAC (p<0.001), and TAC+PDL (p<0.001) segments. A significant flattening, compared with baseline measurements was noted after two treatments sessions. And after the third treatment (Weeks 12), the reduction of mean scar's height in combined treatment (TAC+PDL) was higher than TAC treatment but not reach significant (p=0.165). No significant statistical change was observed in scars' length, and width same as Elwakil study **(**Elwakil, T. F., 2009).

In comparison with TAC group, it seems that TAC + PDL combination is more effective but there not reach statistical significant. Skin phototype is factor that may influence the therapeutic outcome. Although many studies have examined the roles of PDL for treatment of hypertrophic scars and keloids, most evaluated only light-skinned patients. Kono et al. reported that high melanin in dark-skinned patients is a competitive chromophore to haemoglobin during PDL treatment leading to a decreased treatment response and an increased risk of side effects (Kono et al., 2005). Chan and colleagues report that in dark-skinned individuals, the increase in nonspecific thermal injury owing to epidermal melanin absorption can result in a poorer outcome (Chan et al., 2004). In commonly among Thai people usually have high epidermal melanin. In our study most of the subjects had Fitzpatrick skin type IV 10 subjects and skin type V 3 subjects. So the result may not effective as that obtained in whiteskinned patients.

The frequency of treatment and number of sessions are the factor that may influence the therapeutic outcome. Wittenberg et al., reported that there was no clinical improvement with 4 PDL (585nm) sessions (Wittenberg et al., 1999). In contrast, Goldman and Fitzpatrick reported the reverse (Goldman and Fitzpatrick, 1995). This positive result is confirmed in our study, where flattening of the scars at both groups was observed about as early as weeks 8 (4 weeks after the

2nd treatment session). Elwakil and colleagues reported that that late treatment of bulky scars (scars duration more than 6 month) needed more frequent PDL sessions (5.15±0.8) compared with the less frequent sessions (4.46±1.13) needed for early treatment of less bulky scars (scars duration less than 6 month). Accordingly, multiple and sequential PDL treatment sessions are essential to achieve better clinical outcome.

Scar's pliability **:**In our study, scar's pliability of TAC+PDL segments increased significantly over the study period (p<0.001). The improvement of scar elasticity was significant after three TAC treatments (p<0.001) and after two TAC+PDL treatment(p<0.001). At weeks 8 the improvement of mean scar's pliability in TAC+PDL segments was better than TAC segments significantly (p = 0.01). that was similar to the study of Elwakil, they used TAC+PDL treatment 13 hypertrophic scars and they reported that scar's pliabilitywas increase from baseline significantly (p<0.01)(Elwakil, T. F.,2009).

Scar's erythema **:**Elwakil and colleagues reported that the percentages of erythema clearance after treatment were found to be 62%±12.53% at statistical significances of p<0.01. They used Adobe Photoshop 6.0 ME Software (Adobe System Incorporation, USA) for analyze the erythema of the scars. In our study the erythema of the scar, as evaluated by mexameter MX18 showed no significant difference in comparison at baseline and at every follow-up visit. As pointed out by Chan and associates, skin phototype can affect the mexameter assessment (Chan et al., 2004). This could be due to the measurement being influenced by the content of epidermal melanin, which exists in higher quantities in Asian skin.

Conclusion

Intralesional corticosteroid injections alone and its combination with pulsed dye laser are effective modalities that could be used for treatment keloid and hypertrophic scars. The adjunctive use of pulsed dye laser did not significantly enhance clinical outcome in our study except in terms of increased scar's elasticity. No significant statistical change was observed in scars' length, width and erythema after treatment in both groups. Hyperpigmentation and telangiectasia are still encountered complications.

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