Acquired Cutis Laxa Type I: Laxity Treatment Efficacy by Non-Ablative Radiofrequency Monitoring by Cutometer

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ABSTRACT

Objective: To demonstrate the treatment efficicacy of tripolar radiofrequency (RF) in a Thai middle-aged female with generalized acquired CL.

Case presentation: The patient was treated by tripolar RF device at face and forehead at weeks 0, 2, and 3. The gross elasticity of the skin was measured pre and post treatment by cutometer and physician assessment. After two treatment sessions, the skin elasticity at the treatment area evaluated both by physician assessment and cutometer did not reveal significant improvement. The patient was lost to follow up after the third treatment session.

Conclusion: Tripolar RF did not improve skin elasticity at week 3. Future studies are required to determine the physiological effect of RF in CL, appropriate tripolar RF parameters, timing, as well as developing the suitable method of measurement of the skin elasticity in CL.

Keywords: Acquired cutis laxa; tripolar radiofrequency; laxity; elasticity (Siriraj Med J 2017;69: 395-397)

BACKGROUND

Cutis laxa (CL) is a rare inherited or acquired elastic tissue disorder characterized by premature aging, lax and pendulous skin. CL results from defects in synthesis or destruction of elastic fibers throughout the dermis. Symptoms in the rarer form, acquired CL usually appear in early adulthood, and can be preceded by inflammatory dermatoses. In rare cases, CL has been associated with multiple myelomas and lymphomas. Systemic manifestation may be observed, including pulmonary, cardiovascular, gastrointestinal, and urogenital systems.[1,2]

CASE PRESENTATION

A 39-year-old Thai female presented to our center with complaints of premature aging appearance that had gradually extended over a period of two years from her face to her neck, abdomen, and proximal extremities. She had no internal organ symptoms and reported no known underlying disease. She was born of non-consanguineous parents and no known family members are affected with this disorder. Our patient is a school teacher with normal psychomotor development and no history of regular medication intake.

Physical examination revealed wrinkles and pendular skin on her face, neck, abdomen, and proximal extremities. Physical examination was otherwise unremarkable, including normal extensibility of the joints. Laboratory tests and results were, as follows: complete blood count, routine blood chemistry, urinalysis, and VDRL were normal; antinuclear antibody was borderline; and, rheumatoid factor was negative. Echocardiogram and chest x-ray were unremarkable. Gastrointestinal follow-through did not show diverticula. Bone age, as evaluated by dual-energy x-ray absorptiometry (DEXA scan) showed no aging. Incisional skin biopsy from her abdomen revealed diminished dermal elastic fiber throughout the dermis. Based on clinical features and positive Verhoeff-Van Gieson stain, a diagnosis of acquired CL type I was made.

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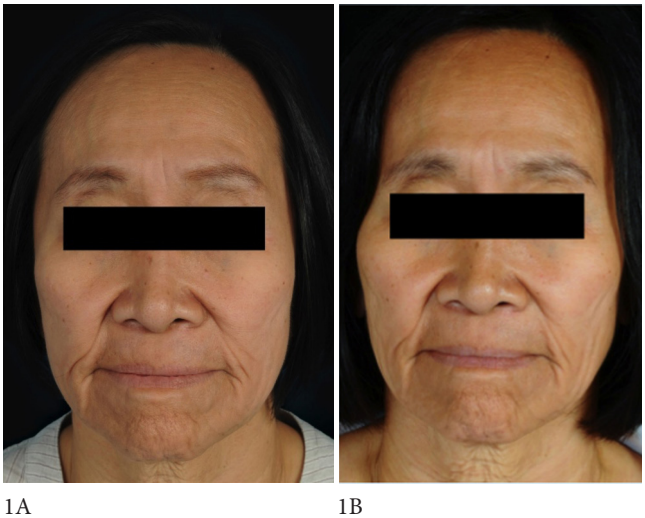
Our patient refused rhytidectomy as a treatment option. However, she agreed, to be experimentally treated by non-ablative tripolar radiofrequency (TriPollar® Apollo™, Pollogen Ltd., Tel Aviv, Israel) at face and forehead at weeks 0, 2, and 3. Treatment parameters were, as follows: forehead: 20 J/cm^3 at 40°c for 5 minutes at a frequency range of 1 MHz; and, other areas of the face: 30 J/cm^3 at 40°c for 20 minutes at a frequency range of 1 MHz.

To evaluate skin elasticity before and after each treatment session, a Cutometer® MPA 580 (Courage + Khazaka Electronic GmbH, Cologne, Germany) with a 2 mm aperture probe was used. Measurement was performed three times at each area, including right cheek, left cheek, neck, and midchest. The average of each of the 3 measurements was then used for evaluation. The main parameter used in this study was gross elasticity, which was defined as the portion between the maximum amplitude and the ability of redeformation of the skin (Ua/Uf (%) in skin deformation vs. time curve). The closer the value is to 1 (100%), the higher the level of skin elasticity. Gross skin elasticity was measured at each area at weeks 0, 2 and 3. Patient's photographs before and after treatment were evaluated by two dermatologists.

After two tripolar radiofrequency treatment sessions, skin elasticity at the treated areas, as evaluated by cutometer and by physician assessment, did not reveal any observable improvement (Fig 1). Moreover, when compared with measured mean values arranged by age group and localization from 120 healthy women, the skin elasticity of our patient in all evaluated areas exceeded the values of healthy women in the maximum age group of 50-65 years.[3] Our patient was lost to follow-up after the third treatment session.



1A 1B

Fig 1. (A,B) Photographs before and 1 month after treatment with tripolar radiofrequency.

DISCUSSION

Acquired CL is a rare dermatosis that can be classified as either generalized (type I) or localized (type II). Acquired CL type I is normally preceded by either inflammatory dermatoses (e.g., urticaria, angioedema, collagen vascular diseases, erythema multiforme, or eczema) or by drug intake (e.g., penicillin or isoniazid). Acquired CL type II, the rarer of the two classifications, is mostly preceded by inflammatory conditions or malignancies.[2] The pathogenesis of acquired CL is poorly understood. Many hypotheses have been proposed, including excessive elastase activity, dysfunction of elastase inhibitors, and immune-mediated mechanism resulting in loss of elasticity.[2]

To diagnose this condition, histological examination is necessary to differentiate CL from other elastic disorders. Microscopic examination in CL reveals fragmentation or a reduction in elastic fibers, which can be identified by Verhoeff-Van Gieson staining.[2] Our case was diagnosed as generalized acquired CL (type I) by clinical presentation and histological confirmation.

Treatment of CL is of great concern, because laxity of the skin has great impact on patient function and quality of life. In CL, reconstructive surgical treatment provides satisfactory response in some cases, but the outcome is uncertain and surgical results are often not long-lasting.[3] To date, there have been no reports in the use of an energy-based device in the treatment of CL. A previous study reported evidence that a radiofrequency (RF) device can induce histologically confirmed neoelastogenesis, which may reduce skin laxity and rhytids in combination with a neocollagenesis effect.[5] However, based on our review of the literature, there has been no report of non-ablative RF being used in the treatment of CL. Tripolar RF was selected to treat this patient, because it is non-ablative, non-invasive, and affordable.

The unsatisfactory treatment outcome experienced by our patient in this study may be explained by many possible causes. First, neoelastogenesis in our patient may not have been high enough to be detected by cutometer. Second, the elasticity reference values used in our study were derived from a Caucasian population, so these values may not be generalizable to our patient and/or to all CL patients. Third, the complete or partial loss of elastic fibers in CL directly influences the elastic properties of the skin. This may cause variability in skin elasticity measurement values at each time point without any predictable pattern. Fourth, treatment parameters and intervals are difficult to determine due to the lack of homogeneity between studies. Finally, the last time for evaluation maybe too early to detect any improvement, and the patient was lost to follow-up. Indeed, most previous

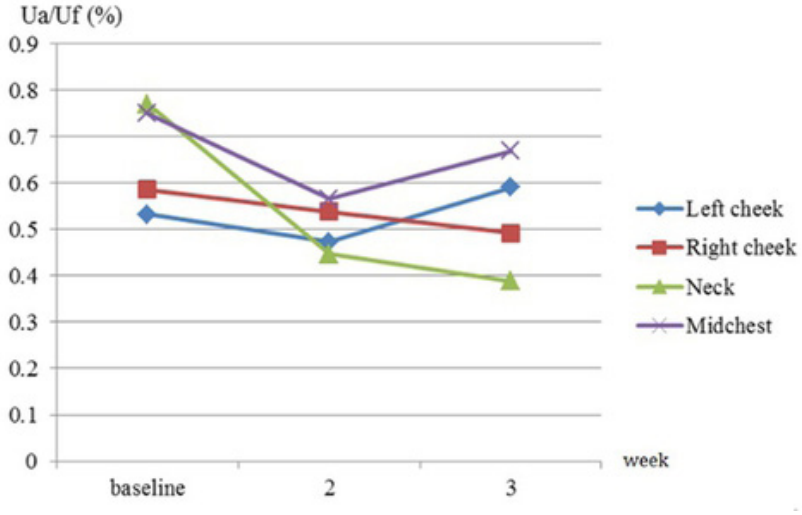


Fig 1. Mean skin elasticity values on each location at week 0, 2, and 3.

studies used RF to treat normal aging, not CL. Future studies are necessary to evaluate the physiological effects of RF and the appropriate parameters of this device in the treatment of CL with longer term of follow up.

CONCLUSION

Based on our review of the literature, this is the first case study to report on treatment of acquired CL type I by tripolar RF with skin elasticity measurement and monitoring by cutometer. Future studies regarding determination of appropriate power setting parameters, treatment scheduling, and suitable method of measurement with longer term of follow up may provide the non-invasive treatment approach to improve skin laxity in CL.

Conflict of interest declaration: The authors hereby declare no personal or professional conflicts of interest regarding any aspect of this study.

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