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RESEARCH ARTICLE

THE TREATMENT OF POSTINFLAMMATORY HYPERPIGMENTATION DUE TO PRURIGO PIGMENTOSA USING DR. HOON HUR'S GOLDEN PARAMETER THERAPY WITH A HIGH FLUENCE 1064nm Q-SWITCHED Nd: YAG LASER

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ABSTRACT

Prurigo pigmentosa is a rare cutaneous inflammatory disorder characterized by a sudden onset of pruritic, erythematous papules and plaques that leave a reticulated postinflammatory hyperpig mentation (PIH) when they heal. The PIH due to Prurigo pigmentosa is not successfully treated with antibiotics such as doxycycline and minocycline, and by resolution of ketosis. Generally, treating PIH due to Prurigo pigmentosa with traditional laser therapies including 532nm Nd:YAG laser, 694nm ruby laser and 755nm alexandrite laser can provoke side effects such as purpurae, crusts, PIH, mottled hypopigmentation and scarring. Unfortunately, there is no golden standard for the laser treatment of PIH due to Prurigo pigmentosa yet. Therefore, this study was performed to investigate the efficacy and safety of Dr. Hoon Hur's Golden Parameter Therapy (GPT) using a high fluence 1064nm Q-switched Nd: YAG laser (QSNL) for treating PIH due to Prurigo pigmentosa. Eleven Korean patients with PIH due to Prurigo pigmentosa were treated with a 1064nm QSNL at a one-week interval for 30 treatment sessions of Dr. Hoon Hur's GPT. The parameters were a spot size of 7 mm, a fluence of 2.4 J/cm^2 and a pulse rate of 10Hz with a slow single pass by a sliding-stacking technique over the PIH due to Prurigo pigmentosa. At the week of the final treatment, all of the 11 patient with PIH due to Prurigo pigmentosa were achieved the complete clearance of pigmented lesions without any side effects such as purpurae, crusts, PIH, mottled hypopigmentation and scarring. There were no recurrences after a follow- up of 6-12 months. We suggest that Dr. Hoon Hur's GPT using a high fluence 1064nm QSNL is a safe and effective method without side effects and recurrences for treating PIH due to Prurigo pigmentosa.

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INTRODUCTION

Prurigo pigmentosa is a rare inflammatory skin disease and clinically characterized by symmetrically distributed erythematous macules, papules and plaques with pruritus. Lesions resolve over time, leaving post-inflammatory hyperpigmentation arranged in a reticulated pattern (Beutler, 2015 and Boer, 2003).

However, PIH due to Prurigo pigmentosa is not successfully treated with antibiotics such as doxycycline and minocycline, and by resolution of ketosis (Beutler, 2015 and Boer, 2003). Unfortunately, there is no standard laser therapy for PIH due to Prurigo pigmentosa yet. Therefore, this study was performed to evaluate the efficacy and safety of Dr. Hoon Hur's Golden Parameter Therapy(GPT) using a high fluence 1064nm Q-switched Nd: YAG laser (QSNL) for treating PIH due to Prurigo pigmentosa without any side effects and recurrences.

MATERIALS AND METHODS

This study was performed on eleven Korean patients (age range: 16-38 years old, mean age: 22.6 years old) who were clinically diagnosed with PIH due to Prurigo pigmentosa (Fig.1, 3). There was no significant medical or familial history in the patients. Written informed consents were obtained from all of the 11 patients before proceeding into treatment. But topical anesthetic was not used before the laser treatment. And all of the 11 patients were received 30 treatment sessions of Dr. Hoon Hur's GPT using a high fluence 1064nm QSNL (Spectra Laser, Lutronic, South Korea) at a one-week interval with a spot size of 7mm, a fluence of 2.4J/cm^2 and a pulse rate of 10Hz using a slowly one pass by a sliding-stacking technique over the PIH due to Prurigo pigmentosa. After the laser treatment, the lesion of PIH due to Prurigo pigmentosa was cooled with ice packs but the patients did not use a broad-spectrum sunscreen and any topical agents such as steroid cream and tretinoin cream.

Standardized digital photography using a Canon Camera G11 (Japan) was used for the evaluation by comparing photos taken on the day of the treatment and those taken 4 weeks after the final treatment session. The physician's clinical assessment of the degree of improvement of the patients (mean score of two investigators who did not attend the treatment) was also carried out 4 weeks after the last treatment session and reported as percentage resolution as follows: poor (0-25% clearance), fair (26-50% clearance), good (51-75% clearance), excellent (76-95% clearance) and complete (96-100% clearance) by analyzing the clinical photographs of patients. The patients were asked to report any side effects, pain or discomfort during the treatment.

RESULTS

Eleven Korean patients with PIH due to Prurigo pigmentosa were enrolled in this study (Table 1). All of the 11 patients with PIH due to Prurigo pigmentosa were achieved complete clearance of the reticulate hyperpigmented lesions (Table 2). And there were no significant side effects including purpurae, crusts, PIH, mottled hypopigmentation and scarring except mild pain during the laser treatment (Fig. 2, 4). No recurrences have been detected after a follow-up of 6-12months (Fig. 5).

Table 1. The demographic data of 11 patients with PIH due to Prurigo Pigmentosa (PP) and the characteristics of PP

Age	
Age range	16-38 years old
Mean age	22.6 years old
Gender	
Male	1/11(9.1%)
Female	10/11(90.9%)
Family history	(-)
Location	
Neck and shoulders	2/11(18.2%)
Chest and Back	9/11(81.8%)
Characteristics of lesion	
Reticulate hyperpigmentation	11/11(100%)

Table 2. The result of treatment with Dr. Hoon Hur's GPT

Treatment response	Number of patients
Poor (0-25% clearance)	0
Fair (26-50% clearance)	0
Good (51-75% clearance)	0
Excellent (76-95% clearance)	0
Complete (96-100% clearance)	11/11(100%)

DISCUSSION

Prurigo pigmentosa is a pruritic dermatosis characterized by symmetrically recurrent erythematous papules and plaques distributed on the back, chest and neck, and converging into a reticulate pattern. In most cases the eruption resolves with reticulated and mottled hyperpigmentation (Beutler, 2015 and Boer, 2003). Although the exact cause of Prurigo pigmentosa is unknown but several exogenous factors have been proposed, including friction with clothes or contact allergy to nickel, trichlorphenol, chromium in acupuncture needles and chrome in detergent (Beutler, 2015 and Boer, 2003). It has been associated in some patients with ketotic states associated with diabetes, dieting, fasting and post-bariatric surgery (Lu, 2011). Prurigo pigmentosa has been characterized into three stages based on clinical features and histopathologic findings (Oh, 2012 and Shin, 2012). Early lesions manifest as pruritic erythematous macules and papules which are characterized histopathologically by superficial perivascular neutrophilic infiltrates in the papillary dermis. Fully developed lesions present as crusted erythematous papules, urticarial plaques with histology showing neutrophilic spongiosis, ballooning degeneration of keratinocytes, necrotic keratinocytes in the epidermis and patchy lymphocytic infiltrate in upper dermis. Late lesions resolve to leave reticular pigmented macules with histological features of lymphocytic infiltrate and melanophages in the papillary dermis (Oh, 2012 and Shin, 2012). Because the morphology of the lesions is various, differential diagnoses should include urticaria, contact dermatitis, drug eruption and erythema multiforme. Especially, PIH due to Prurigo pigmentosa should be distingushed from confluent and reticulated papillomatosis which is observed reticulated hyperpigmented patches of the neck, trunk and back. But confluent and reticulated papillomatosis is not accompanied by the intense pruritis which is characteristic of Prurigo pigmentosa (Beutler, 2015 and Boer, 2003). The inflammation of Prurigo pigmentosa is believed to be largely attributable to neutrophilic infiltrate in lesion and the disease response to dapsone and tetracycline-class antibiotics such as minocycline and doxycycline. Minocycline, doxycycline and dapsone inhibit neutrophil chemotaxis and downregulate matrix metalloprotease activity.

Also they decrease the production of proinflammatory cytokines such as tumor necrosis factor-a interleukin-1b and interleukin-8, and in hibitneutrophil myeloperoxidase, leading to anti-inflammatory effect (Lu, 2011 and Mok, 2012). Therefore minocycline, doxycline and dapsone are effective in treating Prurigo pigmentosa during the inflammatory phase of the disease. But minocycline, doxycline and dapsone are not effective for PIH due to Prurigo pigmentosa. Antihistamines and corticosteroids have consistently proved ineffective in the treatment of PIH due to Prurigo pigmentosa (Lu, 2011 and Mok, 2012). At present, there is also no effective laser therapy for PIH due to Prurigo pigmentosa. Generally, the 532 nm wavelength of the QSNL, the 694 nm wavelength of the ruby laser, the 515-755 nm wavelength of intense pulsed lights and the 755 nm wavelength of the alexandrite are absorbed by melanin much more than the 1064 nm wavelength of QSNL (Hur, 2016 and 2017). This higher absorbance to melanin produces laser energy that destroys epidermal melanocytes and simultaneously damages surrounding keratinocytes in the lesions (Hur, 2016 and 2017).

When the damaged keratinocytes secrete interleukin-1(IL-1), which stimulates keratinocytes to secrete some keratinocytic injury-induced cytokines such as endothelin-1, α-melanocyte stimulating hormone (MSH), adrenocorticotropic hormone (ACTH) and prostaglandin (PGE2, PGF2α). These melanogenic cytokines activate melanocytes, thereby increasing melanin synthesis in melanosomes. For this reason, PIH occurs and PIH due to Prurigo pigmentosa becomes worse (Hattori, 2004 and Okazaki 2003 and 2005). Therefore the authors devised a new treatment using Dr. Hoon Hur's GPT with a high fluence 1064nm QSNL (Spectra Laser, Lutronic, South Korea) at a one-week interval with a spot size of 7mm, a fluence of 2.4J/cm^2 and a pulse rate of 10Hz with slowly one pass by a sliding-stacking technique to PIH due to Prurigo pigmentosa to minimize side effects such as purpurae, crusts, PIH, mottled hypopigmentation and scarring caused by the traditional laser therapy. In previous papers, the authors also reported the therapeutic effects of Dr. Hoon Hur's GPT

using a high 1064 nm QSNL in various skin diseases such as café au lait spot, partial unilateral lentiginosis, Becker's nevus, Ota's nevus, Hori's nevus, congenital melanocytic nevus, Riehl's melanosis and erythema ab igne (Hur, 2016, 2017and 2018). The wavelength of 1064nm used in Dr. Hoon Hur's GPT would be preferable to the 532 nm wavelength of Q-Swithched Nd: YAG laser, 694 nm wavelength of ruby laser and 755 nm wavelength of alexandrite laser because the longer wavelength result in less absorbed by the epidermal melanin and deeper tissue penetration (Hur,2017 and 2016). This mechanism without epidermal damage is able to stimulate the platelets which secrete platelet –derived growth factor(PDGF), epidermal growth factor(EGF), transforming growth factor-beta1 (TGF-beta1), TGF-beta2 and TGF-beta3 to activating the macrophage. EGF can accelerate reepithelization and the recovery of damaged basement membrane in the epidermis.

The activated macrophages secrete TGF-beta1, TGF-beta2, TGF TGF-beta3 and basic fibroblast growth factor (bFGF) which stimulate the fibroblast (Shah, 1995 and Hur, 2017 and 2016). Subsequently the activated fibroblasts produce the extracellular matrix such as natural hyaluronic acid, collagen, elastin, fibronectin and glycoprotein which can recover the damaged basement membrane. The recovered basement membrane does not lead to leakage of melanin from the damaged epidermal melanocytes into the papillary dermis anymore (Shah, 1995 and Hur, 2017 and 2016). Also performed weekly, Dr. Hoon Hur's GPT with a high fluence 1064nm QSNL may provoke the photobiostimulation which activates the dermal melanophages (Hur, 2017 and 2016). The dispersed melanosomes and melanins, which are the end products of damaged epidermal melanocytes, are removed by the transepidermal elimination or are removed rapidly by the activated dermal melanophages via the lymphatic system (Hur, 2017 and 2016). In the end, it is possible to achieve complete clearance of PIH due to Prurigo pigmentosa without any side effects or recurrences. In short, the end point of Dr. Hoon Hur's GPT with a high fluence 1064 nm QSNL is not to cause petechiae or purpurae, but to induce erythema only. Dr. Hoon Hur's GPT transmits enough energy without destroying normal background tissue, and eliminates the deposition of melanin in the dermis but does not cause crusts and purpurae, and prevents PIH and scarring because it is less absorbed by epidermal melanin (Hur, 2016 and 2017).

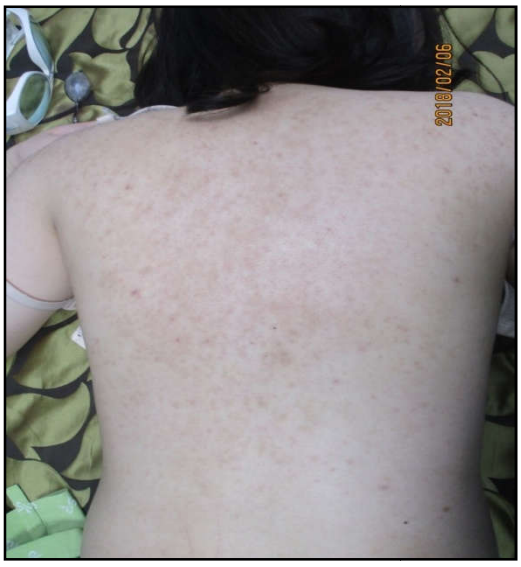

Fig.1. Reticulated brown hyperpigmentation on the upper and lower back (before treatment)

However, in order to completely remove PIH due to Prurigo pigmentosa without recurrences, this therapy requires the continous30 treatment sessions for 7.5 months. In this study, we treated all 11 patients with PIH due to Prurigo pigmentosa (Fig. 1,3) using Dr. Hoon Hur's GPT with a high fluence 1064 nm QSNL. The complete removals of the reticulate pigmented lesions were achieved without PIH and scarring in all 11patients with PIH due to Prurigo pigmentosa (Fig. 2,4). There were no recurrences after 6-12 months of follow-up (Fig. 5). All patients were satisfied with the results of Dr. HoonHur's GPT using a high fluence 1064 nm QSNL without any side effects such as PIH and scarring.

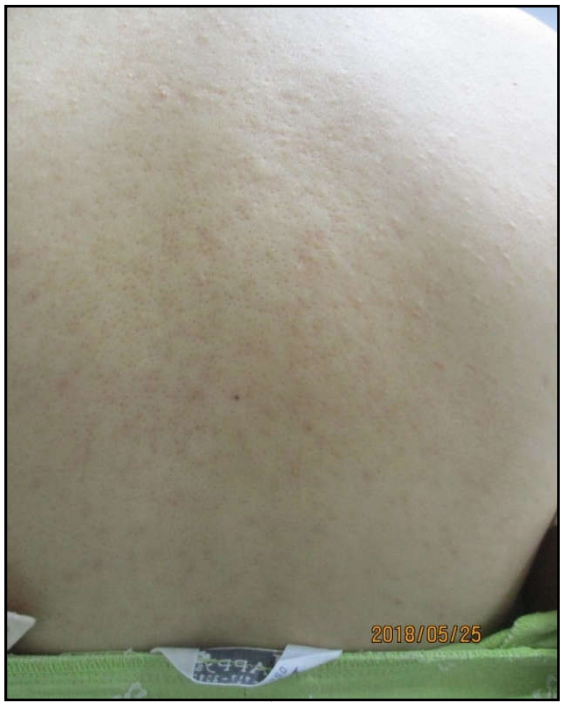

Fig. 2. A complete clearance of PIH due to Prurigo Pigmentosa (After Dr. Hoon Hur's GPT)

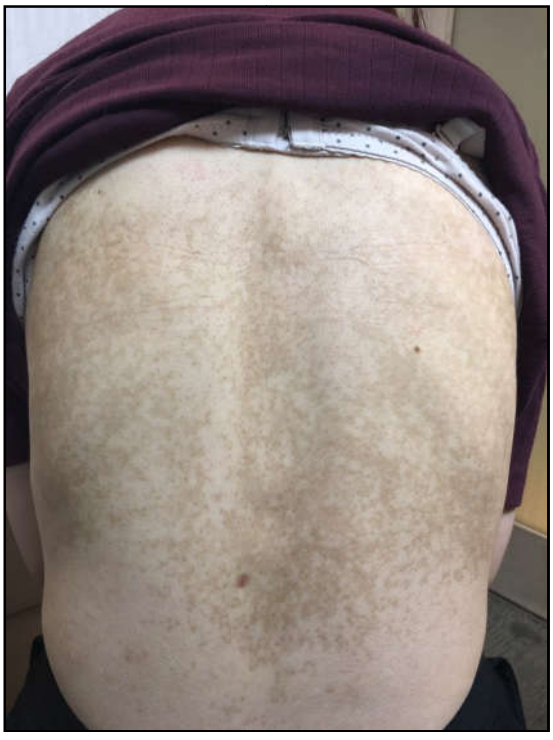

Fig. 3. Reticulated brown Hyperpigmentation on the upper and lower back (before treatment)

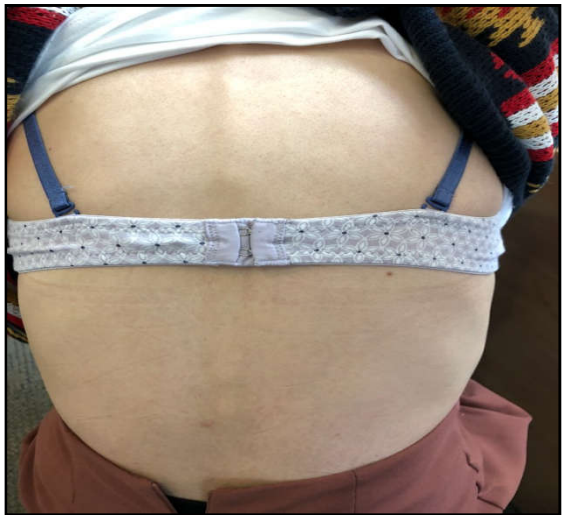

Fig. 4. A complete clearance of PIH due to Prurigo pigmentosa (After Dr. Hoon Hur's GPT)

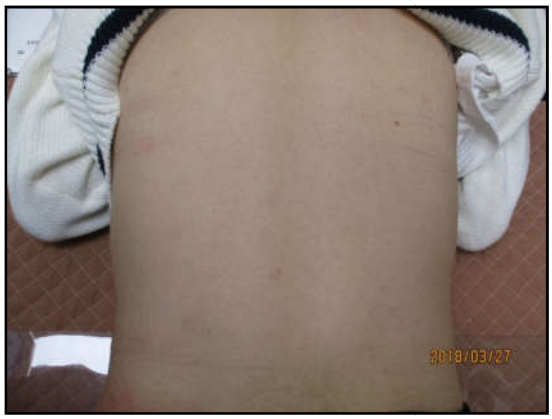

Fig. 5. There is no recurrence at 12 months' follow-up

Conclusion

In this study, PIH due to Prurigo pigmentosa were treated by Dr. Hoon Hur's GPT using a high fluence 1064 nm QSNL and were completely eliminated without side effects and recurrences. We suggest that Dr. Hoon Hur's GPT using a high fluence 1064 nm Q-switched Nd: YAG laser is a new, safe and good treatment option to expect complete clearance of PIH due to Prurigo pigmentosa.

REFERENCES

Beutler, B. D., Cohen, P.R., Lee, R.A. 2015. Prurigo Pigmentosa: Literature Review. *Am J Clin Dermatol.,* 16 (6):533–543.

Boer, A., Misago, N., Wolter, M. *et al*. 2003. Prurigo pigmentosa: A distinctive inflammatory disease of the skin. *Am J Dermatopathol.,* 25:117–129.

Hattori, H., Kawashima, M., Ichikawa, Y. and Imokawa, G. 2004. The epidermal stemcell factor is over-expressed in lentigosenilis: implication for the mechanism of hyperpigmentation. *J Invest Dermatol.,* 122: 1256-1265.

Hur, H. 2016. The Treatment of Café Au Lait Spot Using Dr. HoonHur's Golden Parameter Therapy. J *Dermatol Ther.,* 1:1-4.

Hur, H. and Kim, Y.R. 2017. The Treatment of Hori's Nevus by New Combination Treatment without Side Effects: Dr. Hoon Hur's Golden Parameter Therapy and Dr. Hoon Hur's Optimal Melanocytic Suicide-2 Parameter Therapy. *J Clin Res Dermatol.,* 4:1-5.

Hur, H., Choi, K.H., Hyun, D.N., Kim, Y.R. 2018.The Treatment of Dilated Follicular Orifices, Depressive Acne Scars and Facial Wrinkles Using a 785nm Picosecond Laser. *Int J Cur Res in Life Science,* Feb;7(2):1139-1143.

Hur, H., Choi, Y.J., Cheon, M.S. and Kim, Y.R. 2017. The New Treatment of artial Unilateral Lentiginosis Using Dr. HoonHur's Golden Parameter Therapy With a High Fluence 1064nm Q-Switched Nd:YAG Laser Without Side Effects. *Int J Cur Res.,* Decem; 9(12):63456-63460.

Hur, H., In, S.I., Cheon, M.S., Choi, Y.J., Lee, D.H. and Kim, Y.R. 2018. The Treatment of Erythema Ab IgneUsing Dr. HoonHur's Golden Parameter Therapy With a High Fluence 1064nm Q-Switched Nd:YAG Laser. *Int J Cur Res.,* Oct; 10(10):74218-74221.

Hur, H., Kim, J.H., Park, I.J., Park, C.H., Shim, D.T., In, S.I., Lee, G.H. *et al*., 2018. The New Treatment of Café Au Lait Spot Using Dr. HoonHur's Golden Parameter Therapy With a High Fluence 1064nm Q-Switched Nd:YAG Laser. *Int J Cur Res.,* April;10 (4):68082-668086.

Hur, H., Kim, Y.R. and Shim, D.T. 2017. The Treatment of Café Au Lait Spot, Partial Unilateral Lentiginosis and Becker's Nevus Using a High Fluence 1064nm Q-swithedNd:YAG Laser. *J Clin and Cosmet Dermatol*., 1:1-4.

Hur, H., Lee, G.H., Kim, P.S., Hyun D.N. and Kim, Y.R. 2018. The Treatment of Riehl's Melanosis Using Dr. HoonHur's Golden Parameter Therapy With a High Fluence 1064nm Q-Switched Nd:YAG Laser Without Side Effects. *Int J Cur Res.,* Feb;10(2):65103-65108.

Hur, H., Park, C.H., Kim, Y.R. and Hyun, D.N. 2017. Treatment of Ota's Nevus Using Dr. HoonHur's Golden Parameter with a High Fluence 1064nm Nd:YAG Laser without Side Effects. *J Dermatol Res and Ther.,* 3:1-4.

Hur, H., Park, C.H., Kim, Y.R. and Kim, P.S. 2017. Treatment of a Congenital Melanocytic Nevus by New Combination Therapy: Intense Pulse Light Therapy and Dr.HoonHur's Golden Parameter Therapy. *J Dermatol Ther.,* 1:12-16.

Lu, P.H., Hui, R.C., Yang, LC. *et al*., 2011. Prurigo pigmentosa: Aclinicopathological study and analysis of associated factors. *Int J Dermatol.,* 50:36–43

Mok, Y.J., Lim, K.S. and Tey, H.L. 2012. Doxycycline: an emerging therapy for Prurigo pigmentosa. *J Eur Acad Dermatol Venereol.,* 26:526–527.

Oh. Y.J. and Lee, M.H. 2012. Prurigo pigmentosa: a clinicopathologic study of 16 cases. *J Eur Acad Dermatol Venereol.,* 26:1149–1153.

Okazaki, M., Yoshimura, K. and Suzuki, Y. 2003. The mechanism of epidermalhyperpigmentation in cafe au lait macules of neurofibromatosis type 1 maybe associated with dermal fibroblast- derived stem cell factor and hepatocytegrowth factor. *Bri J Dermatol.* 148: 689-697.

Okazaki, M., Youshimura, K. and Uchida, G. 2005. Epidermal hyperpigmentation innon-syndromic solitary cafe au lait macules may be associated with increasedsecreation of endothelin-1 by lesional keratinocytes. *J Plastic Sur and hand Sur.,* 39: 213-217.

Shah, M., Foreman, D.M. and Ferguson, M.W. 1995. Neutralisation of TGF-beta1 and TGF-beta2 or exogenous addition of TGF-beta3 to cutaneous rat wounds reduces scarring. *J Cell Sci.,* 108 (Pt3):985-1002.

Shin, J.W., Lee, S.Y., Lee, J.S. *et al*., 2012. Prurigo pigmentosa in Korea: Clinicopathological study. *Int J Dermatol.,* 51:152–157.

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