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The efficacy and safety of autologous activated platelet-rich plasma therapy as adjuvant treatment of atopic dermatitis in pregnant woman

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ABSTRACT

Introduction: Atopic dermatitis (AD) is a chronic relapsing inflammatory skin disorder which involves skin barrier and immune dysregulation. The management of AD involves the use of moisturizers and immunosuppressant which are only used for temporary symptom relief and may potentially harm the fetal growth. Autologous activated platelet-rich plasma (aaPRP) is a potential adjuvant treatment for symptom control in pregnant AD patient. This report examines a case of a pregnant patient with AD treated with aaPRP and the monitoring of fetal growth until birth.

Case Report: A 37-year-old pregnant patient with a history of AD when in contact with latex or consumption of dairy products came to Hayandra Clinic. As she had been working as anesthesiologist continuously in contact with latex gloves, she underwent routine aaPRP therapy for 3 years and had 15 aaPRP treatments over the course of her pregnancy. The patient had lesser lesions when AD was induced, no exacerbation of symptoms during pregnancy, and the baby was healthy during pregnancy to birth.

Conclusion: The use of aaPRP therapy for the management of AD may be indicated as it controls the symptoms yet is safe for the patient during pregnancy. There was also no harm effect showing on the fetal development. A larger study such as randomized controlled trial is required to evaluate our findings.

Keywords: Atopic dermatitis; platelet-rich plasma; treatment

INTRODUCTION

Atopic dermatitis (AD) is a chronic relapsing skin inflammatory disease that affects young children but may also be found in many adults. Around 25% of the cases which were found in adults were mostly relapse of symptoms from childhood. Moreover, pregnant woman is likely to experience AD *de novo* or those with chronic AD are more likely to experience recurrence and exacerbation of symptoms. The management of patients with AD mostly requires the use of moisturizers and immunosuppressants to reduce symptoms. However, these treatments were mostly inadequate to control the disease and may have the potential to cause fetal growth restriction (1-4).

Thus, the need of a safer control agent for AD in pregnant woman is required to prevent relapses and reduce the symptoms of the disease. Autologous-activated platelet-rich plasma (aaPRP) is known for its content of various bioactive factors and safety which can induce anti-inflammatory mechanisms and tissue regeneration that promotes skin health (5,6). In this report, we observed the use of aaPRP therapy on a patient with AD where the patient achieved an extended control of skin symptoms.

CASE REPORT

A 37-year-old female patient G2P1A0 who works as an anesthesiologist came to Hayandra Clinic with a chief complaint of itch on the palm of hands and fingers for 5 years after giving birth to her first child. The trigger of the itch was when

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she wears latex gloves or when she consumes dairy products. She also complained of being unable to sleep when the lesions appear. Upon inspection, the patient was found to have multiple reddish papules with lenticular to nummular sizes on the palm and fingers of both hands. It will resolve by being dry skin (Figure 1). The patient had gone to dermatologist and was prescribed ointment consisting of 15 g of inerson (desoximetasone) and 3% salicylic acid. The patient also consumed cetirizine when the lesions appear. The patient had undergone allergic test and was found reactive towards dairy products. Regarding disease history, the patient had atopy since birth on the cheeks and skin folds. The patient also had asthma which was resolved at the age of 8. The patient was advised to undergo intravenous (IV) aaPRP therapy (Figure 2) and have been on routine aaPRP therapy for 3 years.

The patient showed significant improvements on the lesions with routine IV aaPRP therapy. The papules resolved faster which reduced the itch the patient suffered when the lesions appear. Lesser appearance of the lesions on the palm was also reported. She also had a medical history of secondary infertility and polycystic ovarian syndrome. Upon the course of the therapy, she was found to be pregnant. She underwent routine ultrasound examination for fetal growth and screenings. During her pregnancy, the symptoms did not exacerbate and rarely recur. On pregnancy examination and USG, the aaPRP did not harm the patient's fetal growth and was found to be safe (Table 1). From pregnancy to birth, the patient had undergone 15 aaPRP therapy in 2-3-week interval. The patient gave birth vaginally to a healthy baby with weight of 3220 g and length of 49 cm with spontaneous cry and no complications.

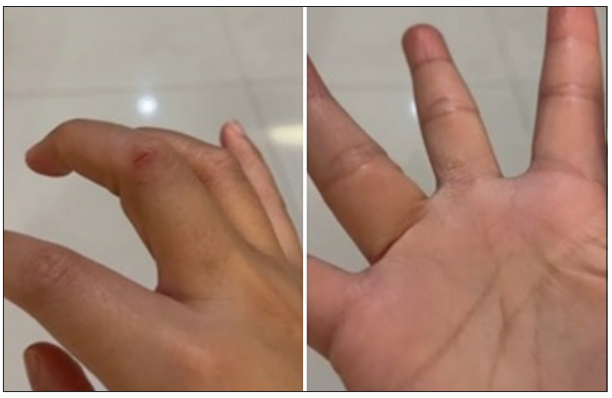

FIGURE 1. Patient's atopic dermatitis excoriated papule on the middle finger (left) and dry skin lesion between the 3rd and 4th finger (right).

FIGURE 2. Autologous activated platelet-rich plasma kit by Hayandra laboratory, Hayandra Peduli foundation.

Ethical approval for this case report was obtained from the Hayandra Clinic Ethics Committee. In addition, the patient signed consent for this case report.

DISCUSSION

AD is a chronic inflammatory skin disorder that can only be relieved by skin moisturizers and immunosuppressants. Moreover, pregnant patients are more likely to experience recurrence and exacerbation of symptoms. Up to this writing, no exact cure of AD is available. Pathophysiology of AD involves many factors such as environmental and genetic factors and the involvement of epidermal disruption and immune dysregulation. To this date, the use of moisturizers and topical corticosteroids as treatment of AD only provides temporary relief of symptoms which results in prolonged use of corticosteroids (2,7). Furthermore, the use of topical corticosteroids has the potential to cause fetal growth restriction in pregnant patients (8,9). Therefore, a safer option for the management of AD in pregnant patients is required.

Intravenous aaPRP is a potential option for the management of AD in pregnant patients due to its known safety. It is a highly concentrated platelet extract from processing of autologous whole blood plasma through double centrifugation. The blood tubes were centrifuged firstly with 188 G speed for 10 minutes. The separated plasma layer was then aspirated and further centrifuged at 1690 G for 10 minutes. The platelet pellets were further suspended in the remaining plasma and considered as inactivated PRP. Activation of PRP requires the use of calcium activator and photoactivation. Calcium activator degranulates PRP granules contained in the platelets which releases over 1100 bioactive factors. These granules (alpha, delta, lambda) contain enzymes, growth factors, and immune messengers, with alpha granules being the most abundant. These bioactive factors take part in biological processes including cellular proliferation and differentiation, matrix remodeling, and angiogenesis which result in enhanced wound healing and tissue regeneration. Moreover, photoactivation reduces leukocyte count to nearly zero which is safe from immunogenic reactions. Therefore, the use of aaPRP can stimulate natural healing processes which promote skin regeneration and rejuvenation (5,6,10).

In this report, we found that the patient had less symptoms recurrence and improvement of symptoms when it recurred over the course of therapy. Upon her pregnancy, the patient did not experience exacerbation of symptoms and less symptoms recurrence. The fetal growth was not affected despite all the therapy that the patient had. Our report on the use of aaPRP in pregnant patient with AD adds up to the current available reports regarding the efficacy of aaPRP in non-pregnant AD patients (5,6). Moreover, the patient gave birth to a healthy baby even after undergoing 15 aaPRP treatments which suggests the safety of aaPRP in pregnant patients. This further adds up to the current available data regarding the safety of aaPRP in pregnant patients (10).

The use of aaPRP in dermatologic conditions has been used widely. Its use in AD has been reported in various studies and has been proven to ameliorate and long-term control of symptoms (5,6). Our report further supported these findings where patient had lesser appearing lesions upon contact with inducing

TABLE 1. Ultrasound fetal growth

Fetal biometric profile	14 wga	19 wga	23 wga	26 wga	31 wga	33 wga	37 wga
BPD (cm)	2.42	4.46	5.97	6.68	8.61	8.79	9.52
HC (cm)	8.60	15.90	20.17	24.29	28.74	29.81	31.02
AC (cm)	8.68	14.28	19.38	20.53	27.45	27.85	33.62
FL (cm)	1.18	2.80	4.61	5.25	6.15	6.45	7.27
EFW (g)	91.43±13.71	274.63±41.19	688.79±103.32	926.13±138.92	1863±279.45	2039±305.78	3167±475.00

AC: Abdominal circumference growth, BPD: Biparietal diameter growth, EFW: Estimated fetal weight growth, FL: Femur length growth, HC: Head circumference growth, wga: Weeks of gestational age

factor after the treatment with aaPRP therapy. Moreover, the patient underwent 15 aaPRP therapy during pregnancy and had no complications until the birth of the baby.

CONCLUSION

According to our report, management of pregnant AD patients with aaPRP therapy may be indicated and found to be safe for the fetal growth and pregnancy outcome. The patient had lesser lesions after therapy with aaPRP and did not experience exacerbation of symptoms during the course of pregnancy. However, our report is only a case of one patient. Thus, further studies such as randomized controlled trials with larger number of participants are needed to evaluate the positive effects of aaPRP in the treatment of AD. Future studies may shed light on the therapeutic effects and pathway aaPRP exerts its effects on AD pathophysiology.

DECLARATION OF INTEREST

Authors declare no conflict of interest.

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