

## Successful Treatment of Recalcitrant Psoriasis by Scopolamine and Propofol: A Report of Two Cases

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DOI: [10.36347/sjmcr.2020.v08i02.012](https://doi.org/10.36347/sjmcr.2020.v08i02.012)

| Received: 16.01.2020 | Accepted: 23.01.2020 | Published: 14.02.2020

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### Abstract

### Case Report

Antagonism of cholinergic neurotransmission for treating inflammatory skin disease is an underexplored area in medical dermatology. Case reports and anecdotal evidence suggests that botulinum neurotoxins (BoNTs), which inhibit acetylcholine release, may be useful for treating plaque psoriasis. The therapeutic effects of scopolamine occur through antagonism of central muscarinic acetylcholine receptors, the predominate type of cholinergic receptor in the brain. Here we present two patients had been affected by plaque psoriasis for longer than 8 years and had got no benefits from the use of conventional therapies. We describe sustained clearance of plaque psoriasis in the two patients following off-label injections of scopolamine and propofol. Scopolamine and propofol may offer a novel therapeutic approach for treating recalcitrant plaque psoriasis. In this report, we discuss about the application of this method in the treatment of psoriasis.

**Keywords:** Psoriasis; scopolamine; propofol.

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## INTRODUCTION

Psoriasis is an ancient and universal inflammatory disease that affects approximately 2 % of the general population. In the plaque stage, it is characterized by well-demarcated, scaling, erythematous plaques that can appear anywhere on the body. In the 1970s, an anesthesiologist named Liu Gang from China found that the dry flowers of *Datura metel* (Solanaceae), known as “Yangjinhua” coupled with sedation drugs, displayed a very promising effect in treatment of psoriasis [1]. Scopolamine is the predominant tropane alkaloids in *Datura metel* [2]. Recently, inhibition of cholinergic neurotransmission has been shown therapeutic activity in patients with psoriasis [3]. Here we present two patients with recalcitrant plaque psoriasis who were treated successfully with scopolamine and sedation drug propofol, suggesting a potential role for this medication in the treatment of this psoriasis subtype.

## CASE REPORT

The two patients had been affected by plaque psoriasis for longer than 8 years and had got no benefits from the use of conventional therapies. Ruijin Hospital LuWan Branch provided ethical approval for this study. We have obtained written informed consent from the

patients prior to study commencement. Treatment in this study comprised scopolamine iv infusion at a dose of 20µg/kg, as described previously [4]. Scopolamine was diluted with 50-ml sterile saline solution, iv continuously at 10ml/h. To avoid prominent adverse effects of scopolamine such as confusion, agitation, hallucinations and convulsion, sedation was induced by propofol with a continuous infusion of 4mg .kg<sup>-1</sup> .h<sup>-1</sup>. Patients were not permitted to undergo any other topical or systemic therapies during the course of the study period.

Patient 1 is a 38-year-old man with a 20 years history of severe plaque psoriasis. He was referred to our hospital in March 2018 for a flare-up of a skin lesion. On physical examination, the involved body surface area was approximately 60% with a Psoriasis Area and Severity Index (PASI) score of 19.2 (Fig. 1A). The skin lesion responded poorly to previous conventional treatments including methotrexate (10mg/week, >2 years), cyclosporine (4 mg/kg/d for 3 months), narrow-band ultraviolet B phototherapy (twice weekly for 2 months) and topical agents (>2 years). Because of the severity of the clinical features and intolerance to conventional systemic therapies, he was considered to have a high need for new therapy. Accordingly, the patient was administered with

scopolamine and propofol for five consecutive days. Laboratory values were within normal limits. After 6 hours of starving period, routine non-invasive monitoring was established, including non-invasive blood pressure, heart rate, pulse oximetry (SpO<sub>2</sub>), and electrocardiography (ECG). His baseline blood pressure and heart rate were 128/63 mmHg and 54/min, respectively. His SpO<sub>2</sub> was 99% while breathing room air and ECG results showed normal sinus rhythm and heart rate showed a maximum of 105. Sedation was maintained with scopolamine and propofol infusion for 6 h (Ramsay sedation score at 4 or 5). During the procedure, blood pressure showed a maximum of

140/80 mm Hg and a minimum of 120/65 mm Hg. The oxygen saturation did not decrease below 97%. The patient reported dry mouth and blurred vision after revival of sedation, but disappeared in 48 hours, and no increased sedation was observed. Gradual improvements were observed thereafter: his PASI scores were 6.2 and 4.6 after the second (week 4) and third (week 16) treatment session, respectively. Subjective symptoms including itching and burning sensations also disappeared. The patient has maintained clear for more than 52 weeks after the first session (Fig. 1B, PASI=1.6). No significant adverse events have been observed throughout the course of treatment.



**Fig-1: Photographs Showing Responses to Treatment. Patient 1 is shown at baseline in Panel A and at week 52 in Panel B**

Patient 2 is a 45-year-old man with an 8-year history of severe plaque psoriasis. Physical examination reveals well-demarcated, symmetric, and erythematous plaques with overlying silvery scale. Plaques are located on the scalp, trunk, buttocks, nail and extremities. Active lesions were manifested with itchy or painful sensation. His body surface area involvement was 90% with a PASI score of 51.6 (Figure 2A). He did

not respond to treatment with topical steroids (>2 year), oral prednisone (3 month), and cyclosporine (3 mg/kg/d for 6 months). The patient received scopolamine and propofol at weeks 0 and 6 and was noted a great improvement at week 12. He has remained a reduced PASI score for more than 45 weeks after the first injections (Figure 2B, PASI=7.8). No peri-sedation complications were observed.



**Fig-2: Improvements in psoriasis in patient 2 treated with scopolamine and propofol every 6 weeks for two sessions. At baseline (A), and at week 45 (B)**

## DISCUSSION

There is no cure for psoriasis; moreover, a number of treatment options are associated with significant adverse effects. Thus, there is an urgent need for

effective affordable therapies with fewer side effects that can address the causes of the disorder. Recently, antagonism of acetylcholine has shown promising effect on psoriasis [5]. The therapeutic effects of scopolamine

occur through antagonism of central muscarinic acetylcholine receptors, the predominate type of cholinergic receptor in the brain [6]. To date, there are only few published case reports of chronic psoriasis patient who was successfully treated with botulinum neurotoxins, which is best known for its inhibition of cholinergic neurotransmission at the neuromuscular junction [7]. We present two cases of recalcitrant plaque psoriasis successfully treated with scopolamine and propofol. Propofol has been widely used for procedural sedation, it is known for its rapid onset and offset of action, tolerability, and safety. The present case is the first to demonstrate scopolamine and propofol is highly effective for psoriasis and associated with an excellent safety profile. It is important to note that psoriasis is a variable pathology with several spontaneous relapses and remissions over time, which causes difficulties in evaluating the effectiveness of any therapy, and the patients involved in this study had been chronically affected for many years. However, both the two patients enrolled in this study asked to receive repeat treatment, which clearly shows evidence of efficacy and good subjective tolerability.

We acknowledge the limitations of this report, including the small sample size, lack of control group, and variable scopolamine dosing used. This was not a prospective clinical trial, and we recognize the need for further clinical and laboratory studies to help elucidate the molecular mechanisms driving the pathogenesis of plaque psoriasis. Nevertheless, the limited cases provide strong evidence for the potential benefit of scopolamine and propofol in the treatment of recalcitrant plaque psoriasis.

## CONCLUSION

These two case studies set out to assess the effect of scopolamine and propofol on treating recalcitrant plaque psoriasis. The results of these two cases indicated that scopolamine and propofol is highly effective and safe for treating psoriasis. Furthermore,

one of the strengths of this study is that it presents good subjective tolerability of this treatment.

## ACKNOWLEDGEMENT

The authors thank Dr. Haojie ZHU, Dr. Yong WANG and Dr. Yuening Guan for appreciation and encouragement of the work.

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