

New-Onset Oral Lichen Planus after COVID-19 Vaccination and a Literature Review

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ABSTRACT:

POCHANAPAN O*; KENGTONG W**; PANJAPAKKUL W*; Chularojanamontri L*, THONGPRASOM K**. NEW-ONSET ORAL LICHEN PLANUS AFTER COVID-19 VACCINATION AND A LITERATURE REVIEW. THAI J DERMATOL 2022;38:99-106.

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Coronavirus disease 2019 (COVID-19) is a newly pandemic infectious disease and a major global public health issue leading to the urgent development of several vaccines. Various types of vaccines have been used which are aimed to prevent and decrease the severity of COVID-19 infection. Inactivated virus, protein subunit, viral vector-based and mRNA-based vaccines are available in Thailand.

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Several cutaneous side effects of COVID-19 vaccination have been reported, such as urticaria, eczema, herpes zoster and local reaction at injection site. Occurring of lichen planus after COVID-19 vaccines especially after receiving mRNA-based vaccine has been reported. We present a case who developed new-onset oral lichen planus 3 weeks after receiving COVID-19 vaccine (AZD1222) in Thailand. Both new-onset cutaneous and oral lichen planus occurring after COVID-19 vaccine are also summarized.

Key words: Astra Zeneca; COVID-19; Oral lichen planus; New onset, Vaccine

Coronavirus disease 2019 (COVID-19) is a newly emerging pandemic infectious disease leading to the development and approval of vaccines under a fast-track system. Various vaccine platforms, such as inactivated virus, protein/subunit, viral vector-based and mRNA, are available. Initially, inactivated vaccines (*Sinovac*, *Sinopharm*) and a viral vector-based vaccine [*Oxford-AstraZeneca (AZD1222)*] were used in Thailand. They were followed by mRNA vaccines (*Pfizer/BioNtec* and *Moderna*). Due to their rapid approvals, the side effects of COVID-19 vaccination have been prospectively monitored using real-world data. Data on the side effects of COVID-19 vaccination specific to oral diseases are scarce. We present a female patient who developed oral lichen planus (OLP) 3 weeks after receiving AZD1222.

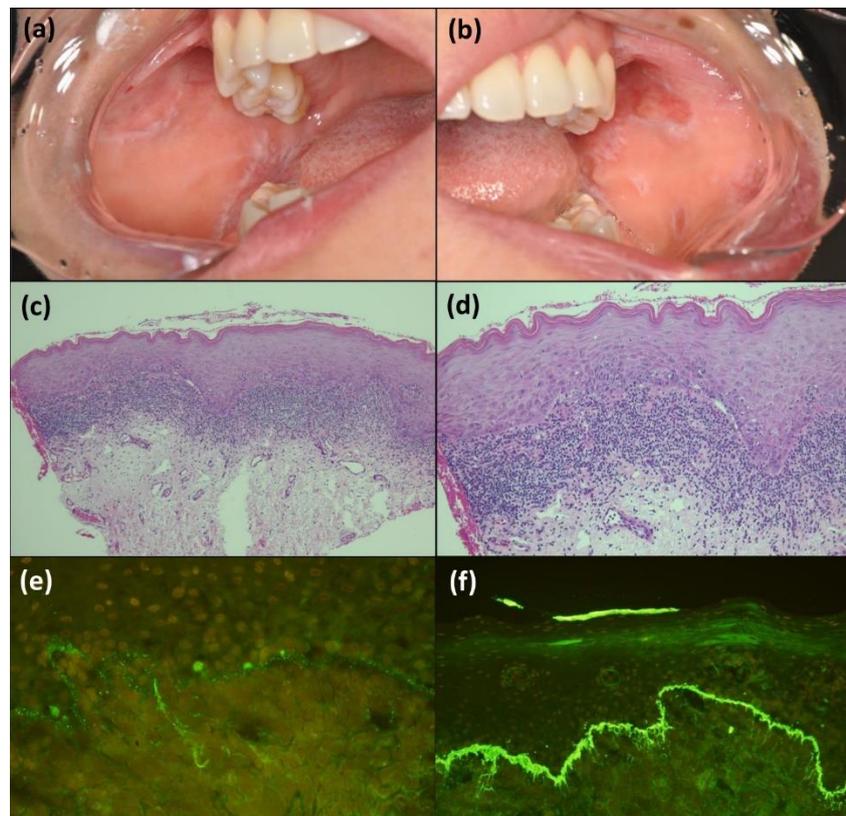
A 37-year-old woman presented with an 8-week history of whitish reticulate patches with erythematous areas and a burning sensation on the right and left buccal mucosa (Figure a–b). The lesions appeared 3 weeks after her third COVID-19 vaccine dose (AZD1222). The first 2 doses were

the *Sinovac* vaccine. There were no systemic symptoms or lesions elsewhere on her body. She had no history of smoking, dental material use, recent infections or other medications. However, she had had cutaneous vasculitis, which had been in remission for 9 years. The results of a mucosal biopsy and direct immunofluorescence were consistent with OLP (Figs c–f). Other investigations revealed no hepatitis B or C virus infections. The OLP lesions were initially treated with 0.05% dexamethasone mouthwash for 4 weeks. Subsequently, 0.1% triamcinolone acetonide mouthwash and 0.1% fluocinolone acetonide in orabase were used for another 4 weeks. The burning symptoms and lesions improved markedly. The onset after COVID-19 vaccination and course of disease may suggest that OLP in our patient was induced by the vaccine.

A systematic review,¹ a prospective cohort study² and a registry-based study³ found that cutaneous side effects from COVID-19 vaccination vary. Urticaria, eczema and local reaction at the injection site were common cutaneous reactions. However, these conditions are generally mild and

self-limiting, which should not discourage patients from receiving a vaccination.³ Cirillo reported that orofacial side effects of COVID-19 vaccines are rare. Acute peripheral facial paralysis (Bell's

palsy); facial swelling; and swelling of the lips, face or tongue associated with anaphylaxis have been reported for *Pfizer/BioNtec* and *Moderna*.⁴



Figure

(a) White striae and erythematous areas on the right buccal mucosa. (b) The left buccal mucosa. (c) and (d) Histopathologic findings revealed hyperkeratinized stratified squamous epithelium and basal cell degeneration. The submucosal connective tissue demonstrates large amount of lymphocytes aggregation in a band-like pattern. A few intermittent portions of separation between the surface epithelium and the underlying connective tissue are observed (original magnification 20x, 40x). (e) Direct immunofluorescence findings showed deposition of C3 (focal granular pattern with intensity 1+) and (f) fibrin (shaggy pattern with intensity 2+) at the dermoepidermal junction (original magnification 40x).

Table 1: Published case reports of lichen planus (LP) after COVID-19 vaccination

Authors	Vaccine types	Duration after vaccine	Type of LP	New onset or disease flare	Progression of disease	
Camela, 2021 ¹¹	Pfizer-BioNTech (mRNA)	2 weeks after 1 st dose	Cutaneous LP	New onset	Not available	
Herzum, 2021 ¹²		2 weeks after 2 nd dose	Cutaneous LP	Flare after 6 years of remission	Resolved after 21 days of topical high-potency corticosteroids	
Hiltun, 2021 ¹³		2 days after 2 nd dose	Cutaneous LP	Flare after 7 years of remission	Resolved	
Merhy, 2021 ¹⁴		1 week after 1 st dose	Cutaneous LP	New onset	Not available	
Caggiano, 2022 ¹⁵		4 weeks after 2 nd dose	Oral LP	New onset	Not available	
Kaomongkolgit, 2022 ¹⁶		1 week after 2 nd dose	Oral LP	New onset	Resolved after 2 weeks of 0.1% fluocinolone acetonide orabase paste	
Piccolo, 2022 ¹⁷		5 days after 1 st dose then regression Recurred after 24 hours of 2 nd dose	Cutaneous LP on vitiligo areas	Flare	Resolved	
Zagaria, 2022 ¹⁸		10 days after 1 st dose	Cutaneous LP	New onset	Resolved after 4 weeks of oral prednisolone	
Picone, 2022 ¹⁹		Moderna (mRNA)	7 days after 1 st dose	Oral LP	New onset	Resolved after 15 days of topical high-potency corticosteroids
Troeltzsch, 2021 ²⁰		Johnson & Johnson (Viral vectors)	6 days after vaccination	Oral LP	New onset	Improved after 4 weeks of topical clobetasol mouth solution (0.5 mg/ml)

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Authors	Vaccine types	Duration after vaccine	Type of LP	New onset or disease flare	Progression of disease
Awada, 2021 ²¹		2 weeks after 2 nd dose	Inverse LP (LP affected intertriginous zone)	New onset	Resolved after 4 weeks of betamethasone cream
Alrawashdeh, 2022 ²²		5 days after 1 st dose	Cutaneous LP	New onset	Improved after 4 weeks of 0.1% topical clobetasol propionate cream
Chun, 2022 ²³	Oxford-AstraZeneca (Viral vectors)	1 day after 1 st dose	Oral LP	Flare	Resolved after 4 weeks of 0.1% dexamethasone gargle
		1 day after 1 st dose	Oral LP	Flare	Resolved after 4 weeks of 0.1% dexamethasone gargle and 0.1% chlorhexidine
Gamonal, 2022 ²⁴		7 days after 1 st dose	Cutaneous LP	New onset	Not available
Masseran, 2022 ²⁵		10 days after 1 st dose	Cutaneous LP	New onset	Resolved with 0.05% clobetasol propionate cream
Diab, 2021 ²⁶	Oxford-AstraZeneca (Viral vectors)	2 weeks after 2 nd dose	Cutaneous LP	New onset	Resolved
	Sinopharm (Inactivated)	3 days after 1 st dose	Cutaneous LP	New onset	Resolved

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Authors	Vaccine types	Duration after vaccine	Type of LP	New onset or disease flare	Progression of disease
Babazadeh, 2021 ¹⁰	<i>Sinopharm</i> (Inactivated)	1 week after 2 nd dose (History Covid-19 infection 10 days following first dose causing 1 month delay getting second dose)	Cutaneous LP	New onset	Not available
Sat Im Kaya, 2022 ²⁷	<i>CoronaVac</i> (Inactivated)	6 days after 1 st dose	Cutaneous LP	New onset	Not available
Kulkarni, 2021 ²⁸		Immediate flare after vaccination	Oral LP	Flare	3 weeks regression to baseline symptoms
Sharda, 2021 ²⁹		2 weeks after vaccination	Oral LP	New onset	Not available
Raccampo, 2022 ³⁰	<i>Unknown</i>	10 days after 2 nd dose	Oral LP	New onset	Improved with topical corticosteroids
		1 week after 2 nd dose	Oral LP	New onset	Improved with topical corticosteroids
Our case	<i>Oxford-AstraZeneca</i> (Viral vectors)	3 weeks after vaccination	Oral LP	New onset	Resolved after 8 weeks with 0.05% dexamethasone mouthwash, 0.1% triamcinolone acetonide MW and 0.1% fluocinolone acetonide in orabase

Lichen planus (LP) is a chronic T-cell-mediated inflammatory disease of unknown origin. In LP, cytotoxic CD8+T cells induce apoptosis of the basal keratinocytes of the skin or oral mucosa. Several predisposing factors have been reported, such as smoking, drugs, stress, infections, dental materials and genetics.⁵ In addition, vaccines for tetanus-diphtheria-acellular pertussis, measles-mumps-rubella, rabies, influenza and hepatitis B have been reported to trigger LP.⁶⁻⁹ Clinical studies have revealed that COVID-19 vaccination activates the T helper type 1 (Th1) response and increases inflammatory markers such as interleukin-2, TNF- α and IFN γ . The Th1 immune response, which induces up- or down-regulation of these cytokines, may play a central role in the pathogenesis of COVID-19 vaccine-induced LP.

Various cases of cutaneous LP and OLP after COVID-19 vaccination have been summarized in this article (Table 1). All COVID vaccine platforms¹⁰ induced LP. The median duration from vaccination to the onset of LP was 7 days, ranging from 1 to 28 days. Compared with published cases, our case had by far the most extended duration (21 days). All reported LP cases showed improvement and resolution after treatment. The median duration to cure was 28 days, ranging from 14 to 28 days after receiving treatment. Our findings support the notion that cutaneous LP and OLP lesions from COVID-19 vaccination are

generally mild and usually resolve after treatment.

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