Dermatology Practical & Conceptual

Immunohistochemical Markers in Molluscum Contagiosum Virus-Infected Keratinocytes Before and After Autoinoculation Therapy: A Prospective Study

Rahul Singrodia[1], Nripen Kachhawa[2], Yamini Lalwani[3], Chinmai Yadav[4], Dilip Kachhawa[1]

1 Department of Dermatology, Dr. Sampurnanand Medical college, Jodhpur, India
2 Department of Dermatology, Pacific Medical College, Udaipur, India
3 Department of Pathology, Dr Sampurnanand medical college, Jodhpur, India
4 Department of Dermatology, Government medical college, Sawai Madhopur, India

Key words: Autoinoculation, Molluscum contagiosum, Clinical research

Citation: Singrodia R, Kachhawa N, Lalwani Y, Yadav C, Kachhawa D. Immunohistochemical Markers in Molluscum Contagiosum Virus-Infected Keratinocytes Before and After Autoinoculation Therapy: A Prospective Study. *Dermatol Pract Concept*. 2026;16(1):6270. DOI: https://doi.org/10.5826/dpc.1601a6270

Accepted: July 1, 2025; **Published:** January 2026

Funding: None.

Competing Interests: None.

Authorship: All authors have contributed significantly to this publication.

Corresponding Author: Dilip Kachhawa, MBBS, MD, Bungalow 1/3, outside MDM gate no.1, Jodhpur, India. 342003. E-mail: drdilipkachhawa@hotmail.com

Introduction

Molluscum is a common self-limiting viral infection clinically presenting as itchy, discrete, dome-shaped papules with central umbilication. There is no single gold standard treatment despite many therapeutic modalities for its management. Autoinoculation is a novel method that has shown promising results in lesion reduction.

Though the role of autoinoculation is gaining more acceptance and popularity, there is a dearth of studies which look into the immunological process of autoinoculation.

Case Series

We enrolled 10 treatment-naïve patients with >5 molluscum between the ages of 18 and 65 years irrespective of sex and after informed consent. We excluded pregnant, lactating women and patients with immunodeficiency or keloidal tendency. We performed single site autoinoculation by the method described by Kachhawa et al. [1] and sent two biopsies on day 0 and day 7 for histopathology and immunohistochemistry for immunomarkers, after obtaining institutional ethical permission.

The following immunomarkers were used in the study: CD1a, CD303/BDCA2, CD45RB, CD56, MHC1, Granzyme B.

Conclusions

Out of the 10 patients, six had excellent response (>90%), two patient had very good response (76–90%), one showed good response (51–75%), while one patient had poor response (<50% of lesion cleared) at the end of the therapy. In the present study >75% clearance was noted in 80% of patients. This result was comparable to other studies done by Saraswat et al. [2], Gupta K et al. [3], and Sanagami A et al. [4], where clearance was 77.3%, 88.3%, and 91.4%, respectively.

MCV causes a tumor-like lesion with an island of hyperplastic epithelium harboring infected keratinocytes and surrounded by scarce inflammatory infiltrate. This anatomical evasion, along with suppression of local immunity, led to the persistence of infection. Autoinoculation by introducing molluscum bodies in the dermis circumvents the anatomical barrier and triggers an immunological response.

A subset of MC has spontaneous regression, associated with intense inflammatory response. Cytotoxic T cells and innate immune cells, specifically type I IFN-producing plasmacytoid dendritic cells (pDC), make up these infiltrates.

We hypothesize that the same inflammatory response that causes spontaneous regression also causes improvement in autoinoculation. To back up these assertions, we used immunomarkers to show the existence of inflammatory cells on day 0 and day 7 of autoinoculation.

In patients with excellent response, the IHC markers for Langerhans cells (CD1A), pDC (CD303), and NK cell (CD56) were significantly raised more than in the patient with poor response. This demonstrates the role of autoinoculation in initiation of natural innate immunity which until now has lain dormant and the presence of pDC, which has a potent antiviral response by releasing type 1 INF. Autoinoculation, by enhancing immune response, works both at the local lesion and distant lesion (Figure 1).

With the increase in inflammation, the immunogenicity of Molluscum contagiosum lesion increases. This was shown by strong induction of MHC-1 in infected keratinocytes, which was further collaborated in IHC. This reactivation of innate immunity also induces cellular immunity mainly consisting of CD 8 cytotoxic T cell sustained by Th1. They release granzyme B, causing apoptosis of infected keratinocyte, which was supported by the staining of granzyme B (Table 1).

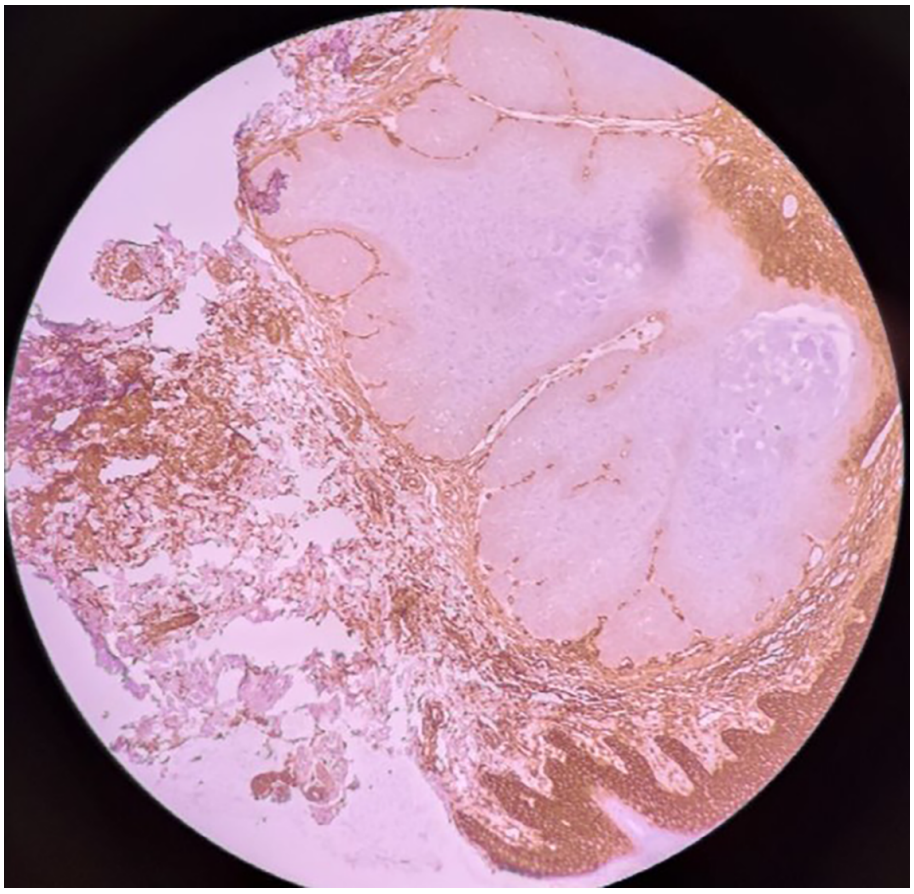

Figure 1. CD56 immunohistochemistry marker (IHC) positive at day 7 following autoinoculation.

Table 1. Percentage of cells positive for CD1a, CD303, CD45BB, CD56, MHC 1, and granzyme B immunohistochemistry (IHC) marker at day 0 and day 7 according to the response of the patient.

IMMUNOMARKER	CD1A		CD303/BDCA2		CD45RB		CD56		MHC 1		GRANZYME B	
DAY	DAY 0	DAY 7	DAY 0	DAY 7	DAY 0	DAY 7	DAY 0	DAY 7	DAY 0	DAY 7	DAY 0	DAY 7
EXCELLENT	5.26	50.13	4.82	21.08	4.78	48.95	8.52	69.0	0.47	4.86	0.65	10.17
VERY GOOD	4.77	44.88	5.0	17.7	3.44	45.00	8.44	62.7	.33	3.5	0.55	7.11
GOOD	3.33	39.33	5.0	14.33	3.0	39.33	5.0	43.3	0.00	2.33	0.00	4.33
POOR	3.0	30.00	0.80	9.6	1.0	31.40	2.6	32.0	0.00	1.0	0.2	2.4

References

1. Kachhawa D, Sonare D, Vats G. Autoinoculation as a treatment modality for molluscum contagiosum: A preliminary uncontrolled trial. *Indian J Dermatol Venereol Leprol*. 2018;84(1):76–8. DOI: 10.4103/ijdvl.IJDVL_1033_16. PMID: 29251278
2. Saraswat S, Choudhary P, Joshi YRet al. Autoinoculation versus 35% trichloroacetic acid for the treatment of molluscum contagiosum: An open-label randomized controlled trial. *Turk J Dermatol*. 2022;16(1):16–22. DOI:10.4103/tjd.tjd_102_21.
3. Gupta K, Bareth A, Agarwal N. Autoimplantation therapy for the management of extensive molluscum contagiosum: a novel treatment approach. *Int J Res Med Sci*. 2016;4(5):1392–6. DOI:10.18203/2320-6012.ijrms20161197
4. Samagani A, Raveendra L, Raju BP. A therapeutic trial comparing modified autoinoculation, a novel approach with topical potassium hydroxide application in the treatment of molluscum contagiosum. *J Cutan Aesthet Surg*. 2022;15(1):65–70. DOI: 10.4103/JCAS.JCAS_228_20. PMID: 35655641
5. Vermi W, Fisogni S, Salogni Let al. Spontaneous regression of highly immunogenic molluscum contagiosum virus-induced skin lesions is associated with plasmacytoid dendritic cells and IFN-DC infiltration. *J Invest Dermatol*. 2011;131(2):426–34. DOI: 10.1038/jid.2010.256. PMID: 20739948