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 ORIGINAL ARTICLE

Molluscum Contagiosum in the Pediatric Population: Expert Consensus Guidance on Prevention and Treatment

Nanette B. Silverberg MD FAAD,[a] Latanya Benjamin MD FAAD FAAP,[b] Mercedes E. Gonzalez MD FAAD,[c] Adelaide A. Hebert MD FAAD,[d] Pearl C. Kwong MD FAAD FAAP,[e] Peter Lio MD FAAD,[f] Anthony Mancini FAAD FAAP,[g] Vanja Adzovic PharmD,[h] Anneke Andriessen PhD,[i] Lawrence A. Schachner MD FAAD FAAP[j]

[a]Department of Dermatology, Icahn School of Medicine at Mount Sinai, New York, NY
[b]Young Skin MD, Florida Atlantic University, Parkland, FL
[c]Pediatric Skin Research, Dr. Phillip Frost Department of Dermatology and Cutaneous Surgery, University of Miami Miller School of Medicine, Miami, FL
[d]Department of Dermatology and Pediatrics, McGovern Medical School, and Children's Memorial Hermann Hospital, Houston, TX
[e]Wolfson Children's Hospital, Jacksonville, FL
[f]Dermatology and Pediatrics, Northwestern University Feinberg School of Medicine, Chicago, IL
[g]Division of Dermatology, Department of Pediatrics, Ann & Robert H. Lurie Children's Hospital of Chicago, Northwestern University Feinberg School of Medicine, Chicago, IL
[h]Clinical Pharmacist, Blue Quill Communications, Toronto, Canada
[i]Radboud UMC Nijmegen, Andriessen Consultants, Malden, The Netherlands
[j]Dermatology and Pediatrics, Pediatric Dermatology, University of Miami School of Medicine, Miami, FL

ABSTRACT

Background: Molluscum contagiosum (MC), caused by the molluscum contagiosum virus, is a common viral skin infection in children. MC may persist for months to years and can substantially impair the quality of life for affected children and their families through discomfort, pruritus, cosmetic concerns, social stigma, and household transmission. Newer US Food and Drug Administration (FDA)-approved therapies have demonstrated patient-acceptable clearance rates, providing clinicians with additional options to treat pediatric MC. The paper summarized literature on MC in childhood and provided evidence-based guidance to help clinicians manage pediatric MC.

Methods: A panel of dermatologists developed a consensus paper to address the challenges of treating pediatric MC. The modified Delphi process comprised a two-pronged literature review, development of evidence-supported statements, physician review and modification, and a face-to-face panel meeting to discuss the systematic literature search results and draw on clinical experience and opinion to create six consensus statements, followed by voting.

Results: Consensus was achieved for 6 statements. Self-limiting, prolonged infection is common, particularly in children with impaired skin barrier conditions and immune deficiencies. Families may seek treatment to reduce patient discomfort from inflammatory symptoms, limit transmission, and reduce disease burden. Physicians should focus on patient and family quality of life through education and shared decision-making. Berdazimer gel 10.3% and cantharidin 0.7% are FDA-approved therapies that achieve meaningful lesion clearance (>50%) within 6 weeks to 3 months.

Conclusions: The use of FDA-approved therapies with clinically meaningful clearance rates, combined with supportive management, provides an opportunity to improve outcomes and quality of life for children with MC.

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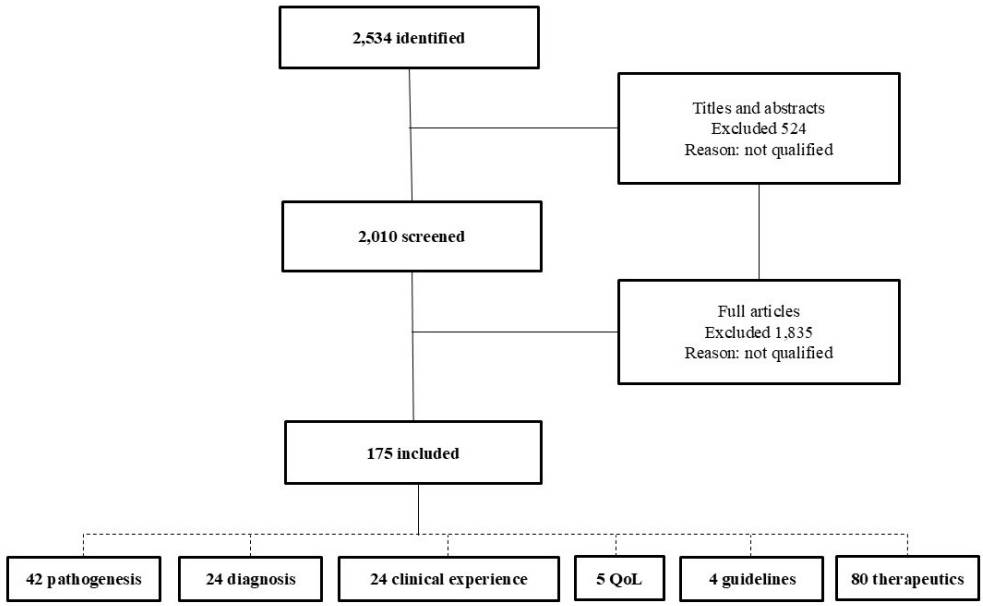
INTRODUCTION

Molluscum contagiosum (MC), caused by the molluscum contagiosum virus (MCV), is a cutaneous infection that commonly affects children.[1] Molluscum can significantly impair quality of life, contributing to social stigma, discomfort, and caregiver burden.[2] Although the condition is self-limiting, lesion resolution can take months to years, and scratching of MC papules can lead to autoinoculation or spread to others.[2] Beyond disease persistence and potential spread, families may elect to treat the condition for additional reasons, including prevention of molluscum dermatitis and other sequelae.[2] Current treatment options include several off-label treatments that are associated with limited efficacy and/or local side effects, as well as 2 FDA-approved treatments

FIGURE 1. A systematic literature review of molluscum contagiosum infections in pediatric patients[3]



QoL, Quality of life

that meet patient-acceptable thresholds for lesion clearance. However, treatment challenges remain, including the lack of pediatric guidelines and the variation in treatment practices between dermatologists and pediatricians. This paper was developed to address the lack of pediatric guidelines and the historically limited attention given to MC. Given its prolonged course and potential to cause itching, pain, inflammation, scarring, and social stigma, there is a need for clear, evidence-based guidance to support clinicians in managing pediatric MC in practice and to aid shared decision-making.

MATERIALS AND METHODS

This project started with 2 systematic literature reviews, followed by the development of consensus statements, expert discussion, statement refinement, and consensus voting. The literature review was conducted in 2 prongs. Prong 1 involved a systematic review of the epidemiology of pediatric MCV. A total of 274 articles were initially identified through database searches, of which 63 were selected for full-text review based on relevance and inclusion criteria. Prong 2 (Figure 1) was a separate, IRB-exempt systematic review performed using broad search terms of "molluscum contagiosum" and "pediatric" on PubMed.[3] Articles had 2 reviewers using the criteria of MCV, pediatric data, outcome of interventions, counseling, pathogenesis, quality of life, and diagnosis. Titles and abstracts were reviewed first, followed by the full articles. Exclusion criteria were adult interventions, non-English language, review articles, and case reports (<5 patients). This search yielded 2,534 articles, of which 2,010 were screened, and 175 were extracted for contents which included articles regarding pathogenesis (n = 42), diagnosis (n = 24), clinical appearance (n = 24), quality of life (n = 5), clinical guidelines (n = 4), and therapeutic interventions (n = 80). Following the literature review and the creation of 14 draft statements supported by the reviews, the panel of advisors participated in a face-to-face meeting to discuss the statements during a workshop. Six consensus statements were selected based on expert opinions and discussions about the challenges of treating pediatric MC and the need for clear, actionable guidance for clinicians in practice. Voting on final statements was performed to confirm consensus of opinion (Table 1).[3-12]

RESULTS

Section 1: Epidemiology and Clinical Burden

Consensus statement 1: Molluscum is an infectious disease that is becoming more common over time in children and significantly impairs quality of life in affected patients and families.

MC is a common viral skin infection in children worldwide. This infection accounts for approximately 1% of all skin diagnoses, and its prevalence appears to be increasing across all age groups.[2] Two strongly associated risk factors for transmission of MC are skin-to-skin contact with affected individuals (classmates, siblings, other family members) and shared fomites (shoes, clothing, towels, bath sponges, razors, brushes, combs, and bar soap). Additional minor risk factors in the pediatric population include gender, swimming in pools, sharing bathtubs/showers, immunocompromise (immunodeficiency, organ transplantation,

TABLE 1.

Consensus Statements and Level of Evidence[3-12]	
Consensus statement	**Level of evidence**
Consensus statement 1: *Molluscum is an infectious disease that is becoming more common over time in children*	*(Level 1-* Olsen JR, Gallacher J, Piguet V, Francis NA. Epidemiology of molluscum contagiosum in children: a systematic review. *Fam Pract.* 2014;31(2):130–136. doi: 10.1093/fampra/cmt075.) *and significantly impairs quality of life in affected patients (Level 1-* Olsen JR, Gallacher J, Finlay AY, Piguet V, Francis NA. Quality-of-life impact of childhood skin conditions measured using the Children's Dermatology Life Quality Index (CDLQI): a meta-analysis. *Br J Dermatol.* 2016;174(4):853-861. doi:10.1111/bjd.14361) *and families (Level 4-* Braue A, Ross G, Varigos G, Kelly H. Epidemiology and impact of childhood molluscum contagiosum: a case series and critical review of the literature. *Pediatr Dermatol.* 2005;22(4):287-294. doi:10.1111/j.1525-1470.2005.22401.x).
Consensus statement 2: *Prolonged infection (> 1 year) is common (Level 2- Basdag), especially in the setting of impaired skin barrier conditions, such as atopic dermatitis, and immune deficiencies*	*(Level 1-* Hill RC, Parikh AK, Lipner SR. Molluscum contagiosum is associated with atopic dermatitis and sexually transmitted infections in a matched case-control study using a national database. *Int J STD AIDS.* 2024;35(13):1050-1054. doi:10.1177/09564624241276571).
Consensus statement 3: *Molluscum can trigger inflammatory skin reactions (such as molluscum dermatitis, "Beginning Of The End" sign, and Giannotti-Crosti-like reactions) in over one-third of patients*	*(Level 4- Silverberg Cutis), which can increase discomfort and associated impairment in quality of life and increase the risk of spread via auto-inoculation (Level 2-* Berger EM, Orlow SJ, Patel RR, Schaffer JV. Experience with molluscum contagiosum and associated inflammatory reactions in a pediatric dermatology practice: the bump that rashes. *Arch Dermatol.* 2012;148(11):1257-1264. doi:10.1001/archdermatol.2012.2414)
Consensus statement 4: *Quality-of-life impairments in molluscum infection include itch, pain, scarring, and social stigma, as well as impact on activities such as co-bathing, swimming, sports, sleep, and limitations on clothing worn.*	*(Level 1-* Olsen JR, Gallacher J, Finlay AY, Piguet V, Francis NA. Quality of life impact of childhood skin conditions measured using the Children's Dermatology Life Quality Index (CDLQI): a meta-analysis. *Br J Dermatol.* 2016;174(4):853-861. doi:10.1111/bjd.14361)
Consensus statement 5: *Treatment of molluscum contagiosum infection should be directed by shared decision-making (Level 5- Expert opinion). Patients/parents prefer agents that reduce lesion count by 50% or more*	*(Level 1-* Olsen JR, Gallacher J, Finlay AY, Piguet V, Francis NA. Quality of life impact of childhood skin conditions measured using the Children's Dermatology Life Quality Index (CDLQI): a meta-analysis. *Br J Dermatol.* 2016;174(4):853-861. doi:10.1111/bjd.14361)
Consensus statement 5: *Treatment of molluscum contagiosum infection should be directed by shared decision-making (Level 5- Expert opinion). Patients/parents prefer agents that reduce lesion count by 50% or more* *a) FDA-approved molluscum therapies include home-applied berdazimer 10.3% gel and in-office 0.7% cantharidin. These two agents meet the 50% clearance threshold (within 6 weeks to 3 months).* *b) Non-FDA-approved topicals commonly used for molluscum include imiquimod, retinoids, apple cider vinegar, glycolic acid, and herbal agents. These agents can cause excessive local side effects and generally only clear a third of lesions, a metric that does not meet patient satisfaction.* *c) Destructive therapies (such as cryotherapy, curettage, and topical cantharidin) require multiple treatments and may cause pain during and after the procedure.*	*(Level 5- Expert opinion). Patients/parents prefer agents that reduce lesion count by 50% or more (Level 1-* Maeda-Chubachi T, McLeod L, Enloe C, et al. Defining clinically meaningful improvement in molluscum contagiosum. *J Am Acad Dermatol.* 2024;90(2):443-445. doi:10.1016/j.jaad.2023.10.033.) *Ad a) (Level 1-* Maeda-Chubachi T, McLeod L, Enloe C, et al. Defining clinically meaningful improvement in molluscum contagiosum. *J Am Acad Dermatol.* 2024;90(2):443-445. doi:10.1016/j.jaad.2023.10.033. *and Level 1-*Eichenfield LF, Siegfried E, Kwong P, et al. Pooled Results of Two Randomized Phase III Trials Evaluating VP-102, a Drug-Device Combination Product Containing Cantharidin 0.7% (w/v) for the Treatment of Molluscum Contagiosum. *Am J Clin Dermatol.* 2021;22(2):257-265. doi:10.1007/s40257-020-00570-8) *Ad b) (Level 2-*Hanna D, Hatami A, Powell J, et al. A prospective randomized trial comparing the efficacy and adverse effects of four recognized treatments of molluscum contagiosum in children. *Pediatr Dermatol.* 2006;23(6):574-579. doi:10.1111/j.1525-1470.2006.00313.x and Level 5-Expert Opinion) *Ad c) (Level 2-*Hanna D, Hatami A, Powell J, et al. A prospective randomized trial comparing the efficacy and adverse effects of four recognized treatments of molluscum contagiosum in children. *Pediatr Dermatol.* 2006;23(6):574-579. doi:10.1111/j.1525-1470.2006.00313.x *and Level 1-*Chao YC, Ko MJ, Tsai WC, Hsu LY, Wu HY. Comparative efficacy of treatments for molluscum contagiosum: A systematic review and network meta-analysis. *J Dtsch Dermatol Ges.* 2023;21(6):587-597. doi:10.1111/ddg.15063)

chemotherapy), and a history of cutaneous illnesses that impair skin barrier function.[4] Due to the infection's lengthy persistence, the presence of newly emerging and multiple lesions, lack of consistently effective treatment, frequent use of destructive modalities that can cause pain, scarring and/or dyschromia, and concern regarding its transmission to others, MC can create significant psychosocial distress and have an adverse impact on the quality of life in affected patients and/or caretakers of affected children.[2]

Section 2: Clinical Presentation and Diagnosis

MC lesions typically present as small, smooth, dome-shaped papules measuring 1–3 mm in diameter.[1,13] These lesions are pearly white or flesh-colored and are usually confined to the skin, with rare mucosal involvement.[13] Following MCV exposure, lesions generally appear after an incubation period of 2 to 6 weeks.[13]

In children, lesions cluster in the trunk, axillae, and extremities, with an average of 10 to 20 per child.[1,14] Lesions may remain limited in number or multiply rapidly, especially in areas of increased moisture and skin-to-skin contact.[14] While lesions may present in the diaper area, molluscum is not considered a sexually transmitted infection in children; however, in rare situations, lesion distribution and history may prompt further evaluation.

Given their distinct appearance, the diagnosis of molluscum is clinical, with confirmatory tests available in case of uncertainty (Table 2).[3,15-19] Diagnostic challenges can occur when lesions deviate from their classic morphology (Table 3).[1] MC can mimic cysts, cellulitis, abscesses, pseudolymphomas, folliculitis, warts, milia, acne, periorificial dermatitis, bacterial or other viral infections, unilateral laterothoracic exanthem-like reactions, and atopic dermatitis, thus complicating diagnosis.[3] Furthermore, secondary phenomena such as inflammation or bacterial superinfection may obscure the lesion and complicate recognition. Awareness of these mimics and use of dermoscopy or biopsy when needed can help ensure accurate diagnosis and avoid unnecessary interventions.

TABLE 2.

Diagnostic Tests for Molluscum Contagiosum[3,15-19]

Confirmatory test	Details
Dermoscopy	Dermoscopic features include a polylobular, white-yellow, amorphous structure in the center with a surrounding crown of vessels that do not cross the centers of the lobules, shiny clods, roundish structures, four-leaved clover, and polylobular structures
Extraction dermoscopy	Can be performed on sac contents Features of MC include white bodies with visible vessels running across the surface of the body
Biopsy	Gold standard when the diagnosis is unclear Histopathology should demonstrate Henderson–Patterson bodies (intracytoplasmic basophilic molluscum bodies).
Tzanck smear	Can be used for rapid diagnosis Should demonstrate Henderson–Patterson bodies
KOH preparation	Can be used for rapid diagnosis
Confocal microscopy	Rapid and noninvasive alternative to procedures such as Tzanck's test or histopathology. Can identify characteristic features of molluscum but is not routinely used in practice

MC, Molluscum Contagiosum

TABLE 3.

Possible Morphologies of MCV/Molluscum Dermatitis[1]
Pearly papules with a central dell
Milia-like lesions on the face
Giant molluscum mimicking condyloma-like lesions
Giant molluscum can mimic cysts, abscesses, or growths
Warty lesions
Viral exanthema-like process: Gianotti Crosti or unilateral laterothoracic exanthema-like
Erosive lesions mimicking eczema vaccinatum
Erythema multiforme-like appearance versus erythema multiforme triggered by MCV
Erythema annulare centrifugum-like reaction
Dermatitis can mimic or trigger atopic dermatitis

MCV, Molluscum Contagiosum Virus

Section 3: Role of the Skin Barrier in MC

Consensus statement 2: Prolonged infection (> 1 year) is common, especially in the setting of impaired skin barrier conditions, such as atopic dermatitis, and immune deficiencies.

MC is typically self-limiting, although spontaneous resolution can take months to years.[2] The average time to spontaneous resolution is approximately 13 months, with 30% of cases persisting for more than 18 months.[2]

Epidermal barrier dysfunctions play a crucial role in facilitating viral entry and persistence. Since the MCV enters the body through a break in the skin, the infection is more prevalent in patients with impaired skin barrier conditions, such as atopic dermatitis.[2,20] Widespread lesions are also more common in patients with atopic dermatitis.[2] A retrospective chart review of more than 300 pediatric patients found that patients with a history of atopic dermatitis were more likely to have a higher number of lesions.[21]

Similarly, individuals with immune deficiencies (eg, HIV infection or immunosuppression from systemic corticosteroids or immunomodulators) are more likely to have extensive and refractory disease. A weakened immune response can impair clearance of MCV, leading to prolonged infection.[22]

Many virulence factors contribute to the persistence of MCV and comorbid inflammation.[3] MCV encodes multiple immunosuppressive proteins that block innate immune signaling pathways, including NF-κB and interferon regulatory factors (IRFs), which are involved in viral nucleic acid sensing, interferon production, and inflammation. These mechanisms allow the virus to persist and evade immune recognition, contributing to the prolonged infection observed in some patients.[23]

Section 4: Inflammatory Skin Reactions

Consensus statement 3: Molluscum can trigger inflammatory skin reactions (such as molluscum dermatitis, "Beginning Of The End" sign, and Giannotti-Crosti-like reactions) in over one-third of patients, which can increase discomfort and associated impairment in quality of life and increase the risk of spread via auto-inoculation.

MC infection can trigger inflammatory skin reactions, such as the "Beginning Of The End" (BOTE) sign – a localized erythema, edema, and sometimes crusting of individual lesions that signals the start of spontaneous resolution.[20,24,25] While it may be mistaken for bacterial infection, the BOTE sign actually reflects the activation of the host immune response and the start of MCV clearance. Another inflammatory reaction, molluscum dermatitis, occurs in approximately 10% of children with MC. Molluscum dermatitis presents as an eczematous eruption near or around MC lesions and has been described as an "id reaction" secondary to an immunologic response to the MC virus.[20]

In rare cases, a hypersensitivity reaction reminiscent of papular acrodermatitis of childhood (Gianotti-Crosti syndrome, GCS) may develop in individuals with MC. The term Gianotti-Crosti syndrome-like reaction (GCLR) was proposed for cases presenting with acute itchy papules and plaques involving the extensor surfaces of the extremities.[26]

These inflammatory responses can increase pruritus and discomfort, contributing to impairment in quality of life. Inflammatory reactions such as molluscum dermatitis can be treated with an emollient; if markedly pruritic, a short course (3–5 days) of low- to medium-potency topical corticosteroid therapy has also been recommended.[11] Inflammatory reactions can increase the risk of viral spread via auto-inoculation. Scratching or rubbing MC lesions can disrupt the epidermis, release viral material, and facilitate viral implantation into adjacent or distant skin sites, leading to the appearance of new papules.[27]

Bacterial superinfection is another potential complication, particularly when the skin barrier is compromised by scratching or eczema. However, the overall prevalence of superinfection appears to be low. In a retrospective study of pediatric patients with, of the 57 cultures collected from 51 patients, only 7 isolated a pathogenic bacterial organism.[28] Bacterial superinfection should be suspected when pus or erythema is observed.[3] Superinfection can further exacerbate discomfort, delay resolution, and complicate treatment.

Section 5: Quality of Life

Consensus statement 4: Quality-of-life impairments in molluscum infection include itch, pain, scarring, and social stigma, as well as impact on activities such as co-bathing, swimming, sports, sleep, and limitations on clothing worn.

MC can cause psychosocial distress and have an adverse impact on the quality of life in affected patients and/or caretakers of affected children.[2] In a survey of 30 parents of children with molluscum, 82% reported that molluscum concerned them moderately to greatly due to concerns about scarring, itching, chance of spread to peers, pain, and the effects of treatments.[6] Furthermore, a prospective cohort study of children with MC (n=301) found that one in ten children with MC is likely to have a substantial effect on their quality of life, particularly in those with a greater number of lesions.[29] Clinical features associated with greater quality-of-life burden include high lesion counts, extensive lesion spread, and intense pruritus, all of which may benefit from therapy to reduce burden. While lesions on exposed or cosmetically sensitive sites (face, hands) can increase psychosocial stress, pruritus can disrupt sleep and

TABLE 4.

Available Treatment Options for Molluscum Contagiosum[2,3,14,32]

	Treatment	Administration	Notes
FDA-approved	Berdazimer 10.3% gel	At-home	• Effectively reduce MC lesions • Low rates of adverse events (mostly mild application-site pain and erythema) • Dosing: Apply once daily to each MC lesion for up to 12 weeks
	Cantharidin 0.7% solution	In-office	• Effective • Risk of blistering, infection; requires thorough patient education • Dosing: Apply a single application directly to each lesion every 3 weeks as needed.
Off-label	Cimetidine (oral)	At-home	• Rarely effective • Potential side effects, drug interactions
	Glycolic acid (topical)	In-office	• Less effective • May cause burning and scarring
	Lactic acid (topical)	In-office	• Less effective • May cause burning and scarring
	Imiquimod (topical)	At-home	• Not effective for MC • May be associated with significant irritation. • Not recommended for young children
	Potassium hydroxide 10–20%	At-home	•Topical; data limited; may cause stinging, burning and dyschromia • Applied once or twice daily over varying durations
	Podophyllotoxin (topical)	At-home	•Topical, prescription required • May be associated with significant irritation • Not recommended for pregnant women
	Retinoids (topical)	At-home	• Minimally effective; risk of irritation • Prescription required
	Salicylic acid (topical)	At-home	•Topical; readily available
Destructive therapies	Cryotherapy	In-office	• Effective •Traumatic/painful; risk of blistering, scarring, infection
	Curettage	In-office	• Effective; immediate results •Traumatic/painful; risk of spread, scarring

MC, Molluscum Contagiosum

lead to scratching that worsens inflammation and the risk of secondary infection.

The impact of MC varies by age. For example, younger patients may be required to stay home from school and other public gatherings until the infection resolves. Meanwhile, older patients with MC can experience diminished quality of life due to unsightly appearance, embarrassment about lesions involving the anogenital region, fear of transmission to sexual partner(s), and the adverse effects of pain and pruritus. Across all age groups, patients might experience uncomfortable physical symptoms, such as pruritus or pain, and visible lesions might cause embarrassment, distress, or anxiety.[2]

MCV impacts the whole family, as family members face practical challenges around limiting shared baths, towels, or bedding, enforcing hygiene routines, and managing siblings' or peers' concerns about contagion. Around 40% of MC cases will transmit the infection to other individuals in the household.[2] Therefore, anxiety about the spread within the household is a valid concern.

Clinicians can help reduce the quality-of-life burden by managing pruritus with emollients and short courses of topical corticosteroids to improve comfort and limit scratching and autoinoculation.[20] Clear guidance on hygiene measures, activity participation, and expected disease course can also reassure families and help minimize unnecessary lifestyle disruption.

A Dutch survey found that most parents preferred treatment to resolve MC symptoms.[30] Treatment should be considered for some children, especially those with many lesions or who have been identified as having a severe effect on quality of life.[29]

Section 6: Therapeutics

Consensus statement 5: Treatment of molluscum contagiosum infection should be directed by shared decision-making. Patients/parents prefer agents that reduce lesion count by 50% or more.

a) FDA-approved molluscum therapies include home-applied berdazimer 10.3% gel and in-office 0.7% cantharidin. These 2 agents meet the 50% clearance threshold (within 6 weeks to 3 months).

b) *Non-FDA-approved topicals commonly used for molluscum include imiquimod, retinoids, apple cider vinegar, glycolic acid, and herbal agents. These agents can cause excessive local side effects and generally only clear a third of lesions, a metric that does not meet patient satisfaction.*
c) *Destructive therapies (such as cryotherapy, curettage, and topical cantharidin) require multiple treatments and may cause pain during and after the procedure.*

For many years, the lack of an established or FDA-approved first-line treatment for MC may have contributed to the conservative "watch and wait" approach of physicians for treatment of pediatric MC. Unfortunately, this noninterventional approach can increase the risk of spreading infection and result in a longer duration of infection, physical discomfort, and psychosocial issues due to persistence of the MC lesions.[2] Early treatment for MC can alleviate discomfort and itching, reduce autoinoculation, limit transmission of the virus to close contacts, reduce cosmetic concerns, and prevent secondary infections.[2]

Management of MC should be guided by shared decision-making between clinicians and families. Discussions should include the self-limiting but often prolonged (1 year or longer) nature of MC, the location and number of lesions, the potential benefits and downsides of treatment, and preferences regarding efficacy, tolerability, and convenience.

MC lesion count has the greatest influence on patient/caregiver and clinician perception of MC severity and clinically meaningful treatment response, with >50% lesional clearance needed for patient satisfaction.[3,9] Basdag et al described natural clearance as molluscum were clear in 12 months for 48.4% of untreated children and 72.6% at 18 months.[31] Olsen et al reported clearance in 13.3 months on average, approximately 70% at 18 months and 87% at 2 years.[29] The duration of disease for the remaining 13% of children with molluscum is unknown.

Therapeutic options for MC include topical treatments, physical treatments, or waiting for spontaneous resolution in immunocompetent patients (Table 4).[2,3,14,32] Currently, only 2 of the available treatment options are approved for molluscum by the United States Food and Drug Administration (FDA); the rest are considered off-label therapies.

FDA-approved therapies

Berdazimer 10.3% gel is a first-in-class nitric oxide-releasing topical treatment that has been shown to effectively reduce MC lesions.[2] Resultingly, this medication represents the only FDA-approved therapeutic for MC that does not require administration by a health care provider. In a multicenter, vehicle-controlled, double-blind, phase 3 randomized clinical trial (B-SIMPLE4) conducted to assess the efficacy and safety of berdazimer gel 10.3% in the treatment of MC, 891 participants (mean age 6.6 years) were randomized: 444 to berdazimer gel 10.3% and 447 to vehicle.[32] At week 12, 32.4% (n=144) in the berdazimer group achieved complete clearance of MC lesions compared with 19.7% (n=88) in the vehicle group (absolute difference, 12.7%; odds ratio, 2.0; 95% CI, 1.5-2.8; $P<.001$). Furthermore, 14.4% (64 patients) of the berdazimer group discontinued treatment because of MC clearance compared with 8.9% (40 patients) of the vehicle group.[32] An integrated analysis of 3 randomized (B-SIMPLE) controlled trials with 1598 patients enrolled (n = 917 berdazimer, n = 681 vehicle) found that berdazimer was superior to vehicle at week 12 in complete clearance rates, 30.0% versus 19.8% (odds ratio, 1.75; 95% CI, 1.38-2.23, $P<.001$). Subgroup analyses of primary efficacy showed consistent favorable efficacy for berdazimer across most subgroups, including age, sex, baseline lesion count, and disease duration.[33] Furthermore, a phase 2 Japanese trial showed 60% complete clearance with berdazimer gel 10.3% at week 12 of treatment in patients ≥2 years old with 3–70 baseline MC lesions.[34] Lesional clearance continued steadily, and complete cure continued to increase during and after the trial, supporting both the antiviral and immune-modulating effects of the agent.[3,32] The most common adverse events associated with Berdazimer gel were application-site pain and erythema, which were mostly mild in severity.[32]

Topical cantharidin 0.7% solution has also been commonly used to treat MC, either as monotherapy or in combination with other additives (eg, salicylic acid, podophyllotoxin). A retrospective study of 300 pediatric patients with MC treated with compounded cantharidin reported that 90% of participants experienced lesion clearance. However, 92% of patients developed blisters. Temporary burning, pain, erythema, and pruritus were also reported in 6–37% of patients.[14] Therefore, although cantharidin is highly effective in treating individual MC lesions, concerns regarding blistering potential and risk of secondary infection have limited its routine use among physicians.[14] Furthermore, this medication can be challenging for many providers to access compounded cantharidin, further limiting its use in clinical practice.

Other topical therapies

Although not FDA-approved for the treatment of MC, several topical therapies can be considered, including topical retinoids, glycolic acid, salicylic acid, and podophyllotoxin (Table 4).[2,3,14,32] These agents are applied to individual lesions as their therapeutic effect is localized. Potential side effects include application site reactions, such as stinging and burning.[2,14]

Topical imiquimod is not generally recommended to treat MC in children. A 2017 Cochrane review found moderate-quality evidence that topical 5% imiquimod was no more effective than vehicle for clinical cure but was associated with more application-site reactions.[35]

While natural agents, including sandalwood oil, primrose oil, and lemon myrtle (*Backhousia citriodora*), may have mild benefits, they have limited evidence to support their use.[3,36-38] Other natural remedies, such as apple cider vinegar, have been associated with chemical burns.[39]

Destructive therapies

Both cryotherapy and curettage can effectively remove lesions, but they typically require multiple treatment sessions and may cause pain, blistering, and postprocedural irritation. These potential side effects and complications limit their acceptability in children.

Adjunctive management strategies remain important regardless of treatment choice. Patient and caregiver education is essential and should include an explanation of the condition, counselling on the risk of autoinoculation from scratching, and guidance on hygiene measures, such as avoiding shared towels or clothing and covering lesions during contact sports or swimming, to reduce transmission. In children with atopic dermatitis, proactive skin barrier repair with emollients and avoidance of irritants may help reduce inflammation and secondary spread.[40] These supportive measures can improve comfort and limit complications alongside active treatment.

CONCLUSION

MC is a common infectious condition and reason for medical consultation, particularly in pediatric populations. Given its often prolonged natural course and potential high impact on quality of life, treatment is frequently recommended. Treatment decisions should be guided by shared decision-making to take into account patient preference, clinical considerations, and disease burden. Additional education and awareness of safe and effective treatment options are crucial for optimal care, as knowledge gaps currently exist. Current treatment options include FDA-approved medications that meet both clinician and patient acceptability criteria. Improving understanding of these options can support timely management of infection and improve patient outcomes. Further studies are needed to address knowledge gaps regarding epidemiology and therapeutic outcomes, particularly in specific patient populations.[2]

DISCLOSURES

Nanette Silverberg MD is a consultant, advisor, or investigator for AbbVie, Avita, Incyte, Pelthos, Pfizer, Regeneron, Sanofi, and Verrica Pharmaceuticals.

The authors (NS, LB, MG, AH, PK, PL, AM, VA, AA, LS) declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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AUTHOR CORRESPONDENCE

Anneke Andriessen PhD

E-mail:..... anneke.a@tiscali.nl