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Molluscum Contagiosum

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A 9-year-old HIV-positive Hispanic girl with a CD4 count of ≈500 cells/mm^3 and a viral load of 20,000 copies/mL presented with molluscum on her face (Figure) and body. Although she was not on antiretroviral therapy, she had received topical tazarotene (Medicaid did not pay for other retinoids), liquid nitrogen applied with a cotton swab, topical imquimod, and topical benzoyl peroxide without effect. Topical cidofivir was not available. She did not tolerate curettage, needling, cryotherapy with a cryospray unit, or electrodesiccation. It was not practical to put the patient under general anesthesia for removal of the lesions. Due to risk of scarring, her mother was reluctant to permit surgical removal of these lesions. Months of trying different therapies was fruitless; the patient was lost to follow-up.

Discussion

Molluscum contagiosum was first described in 1817 by Bateman. It was named for its nodules' domed, delled shape, which resembles that of a mollusk (mollusc is the British spelling) and their propensity to spread, hence "contagiosum." Two unrelated conditions also carry the name molluscum. Skin tags that occur in pregnancy are referred to as molluscum fibrosum gravidarum, and keratoacanthomas are also referred to alternatively as molluscum sebaceum, keratic molluscum, pseudocarcinomatous molluscum, and keratinous molluscum.

Molluscum (singular or plural) is caused by a pox virus, a large, double-stranded DNA virus that is in the same family as cowpox (vaccinia) and smallpox (variola). There are 4 subtypes of 4 types, all of which behave identically clinically. Subtypes I (75%–90%) and II are common, and subtypes III and IV are rare. Analysis of the molluscum contagiosum virus (MCV) genome reveals that it encodes approximately 182 proteins, 105 of which have direct counterparts in orthopoxviruses. There is a protein that may be a homologue of the myosin heavy chain–1 and may inhibit presentation of molluscum contagiosum–specific peptides. MCV proteins MC159 and MC160 share substantial homology to the death effector domain present in the adaptor molecule Fas-associated death domain protein (FADD) and the initiating death protease FADD-like interleukin-1β-converting enzyme (caspase-8) attenuate host immune killing mechanisms and prevent apoptosis, helping MCV to evade the immune system. The antioxidant protein (MC066L) selenoprotein is encoded by MCV, which works as a scavenger of reactive oxygen metabolites and protects cells from UV or peroxide damage.

MCV is spread by direct contact, which can take a variety of forms (Table I), or by fomites including bath towels, tattoo instruments, beauty parlor implements, swimming pools, and Turkish baths. The average incubation time for MCV is between 2 and 7 weeks but can be as long as 26 weeks. Most authorities suggest that MCV infects humans only; however, there have been a handful of transmissions of MCV in chickens, sparrows, pigeons, chimpanzees, kangaroos, a dog, and a horse.

Clinical Appearance

Infection with MCV manifests as smooth, umbilicated, usually symmetric papules, usually 1 to 20 mm in diameter. They can be white, flesh-colored, translucent, yellow, pink, or red (especially when irritated). They are usually firm and lack the gelatinlike consistency of cutaneous cryptococcosis. The central dell or umbilication sits atop a white, waxy, curdlike core. They can be solitary or

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Figure. *Need caption.* **[AU: PLEASE PROVIDE A BRIEF FIGURE CAPTION.]**

appear in groups, in plaques, generalized, as pseudo-koebner–type arrays. Other rare presentations exist (Table I).

MCV can affect any part of the body except for the palms and soles (perhaps due to the lack of hair follicles on these areas, although this does not explain how they occur in the mouth). In children, MCV infection seems to mostly affect the limbs and torso, and in the immunosupressed the face and neck are commonly affected. Molluscum contagiosum nodules more rarely appear in intertriginous areas; if they do appear in these locations, they can be numerous. Nodules rarely can appear in the mouth.

The diagnosis of molluscum contagiosum is usually made clinically because in most cases a central dell or umbilication is at the center of a papule. Pseudocystic molluscum contagiosum, giant molluscum contagiosum, pedunculated molluscum contagiosum, and molluscum contagiosum associated with other cutaneous pathology, in particular, cysts sometimes present diagnostic uncertainty. A variety of other entities can mimic the morphology of umbilicated papules and thus are on the differential diagnosis list for MCV infection (Table II). Other conditions can coexist with MCV infection, in particular, epidermal inclusion cysts (Table III). The reason for this is uncertain.

In immunocompetent patients, most cases of MCV infection are self-limited, lasting months in children, although untreated cases lasting years are not uncommon. In children, virtually all cases abate by puberty. The individual papules of molluscum contagiosum tend to last 1 to 2 months. Infection can recur after initial clearance in about one-third of patients. It is not clear whether the recrudescence of molluscum contagiosum papules signifies reinfection, ongoing disease exacerbation, or a rebound from latency.

In the United States, infection with MCV is common and accounts for approximately 1% of all skin diseases that are diagnosed. Findings from the National Disease and Therapeutic Index survey, which reviewed data from 1969 to 1983, suggested that the incidence of MCV infection is increasing. I find it to be the most commonly encountered sexually transmitted disease in my practice.

MCV infection is most common in children, with a prevalence of ≈5% (5.6% of kindergarten-aged children and 7.4% of elementary school–aged children). This infection is more common and severe in children with atopic dermatitis. In adults, MCV infection most commonly manifests below the umbilicus, in particular, in the hair-bearing areas of the groin and the genitals. **[AU: EDIT OK?]** If nodules occur above the umbilicus or beneath the inner upper thigh, a search for immunosuppression should be performed, in particular in HIV testing (Table I). The prevalence of MCV infection in patients also infected with HIV may be as high as 20%, and the incidence and severity of MCV infection increases as the CD4 T-lymphocyte count falls. When CD4 cell counts are >100 cells/mm^3, the prevalence of MCV infection appears to approach 33%. MCV infection can also be noted in other states of immunosupression, whether intrinsic or due to medications.

Diagnosis of MCV infection is usually made clinically. In the exam room, so-called crush preparation can be performed with material expressed from molluscum contagiosum nodules and placed on a slide with Papanicolaou, Wright, Giemsa, or Gram stains **[AU: AND?**

Table I. Associations and Presentations of Molluscum

Diseases	Activities/ Grooming	Presentations	Medication Use	Treatment Adverse Effects	Secondary Eruptions
HIV infection	Electrolysis	Giant molluscum pendulum of the breast	Rheumatoid arthritis treated with etanercept and methotrexate	Purpura after application of EMLA	Eczema molluscum
Hyper-IgE syndrome	Athletes in close-contact sports (eg, wrestlers, rugby players)	MC on a tattoo	IRIS is a recently described entity in which HIV-positive patients have severe immunodepression after being started on HAART	Methemoglobinemia and CNS toxicity after topical application of EMLA	Erythema multiforme
Kidney transplant recipients	Leg shaving	Purple penile papules	During topical treatment of atopic dermatitis with tacrolimus	Local MC infection as a side effect of pulsed dye laser treatment	Eosinophilic cellulitis
Lymphoma	Swimming	Agminated plaques	Chronic plaque psoriasis with methotrexate use	Keloid scars as a result of CO_2 laser for MC	Vascular infiltration and scarring of the peripheral cornea
Reduced-intensity cord blood transplantation	Cross-country runners	MC on burned skin	Paradoxical development of a profuse eruption of MC treated with erythromycin	Toxic shock syndrome following cantharidin treatment	Erythema annulare centrifugum
Systemic lupus erythematosus	Donor venipuncture	Penile horn	Treatment of vitiligo with tacrolimus ointment		Pyogenic granuloma
Lepromatous leprosy		MC in herpes zoster scars	Chronic lymphocytic leukemia after alemtuzumab therapy		Chronic conjunctivitis
Ataxia-telangiectasia		Pseudocystic	Systemic lupus erythematosus treated with azathioprine and methylprednisolone		Keratoconjunctivitis
Recurrent angioedema and solitary molluscum contagiosum as presenting signs of non-Hodgkin B-cell lymphoma		Giant			Metaplastic upper dermal ossification
Atopic dermatitis		Cheek swelling			
Epidermodysplasia verruciformis		Intraocular			
Splenectomy		Scalp mass			
Selective IgM deficiency		Cutaneous horn			
Thymoma		Folliculitis			
Sarcoidosis		Oral			

Abbreviations: CNS, central nervous system; EMLA, eutectic mixture of local anesthetics; HIV, human immunodeficiency virus; HAART, highly active antiretroviral therapy; IRIS, immune reconstitution inflammatory syndrome; MC, molluscum contagiosum.

OR? PLEASE CLARIFY SENTENCE] potassium hydroxide. Biopsies of molluscum contagiosum demonstrate intracytoplasmic inclusion bodies (molluscum bodies or Henderson-Patterson bodies) with hematoxylin and eosin staining. Researchers have assessed, in a nonstandardized fashion, serum antibodies by complement fixation, tissue-culture neutralization, fluorescent antibody assay for detecting MC antigen, and gel agar diffusion techniques. Specific antibodies to MCV proteins have been noted in ≈80% of patients with MCV infection clinically and in ≈15% of controls.

In most cases, the complications of MCV infection are not severe and include an eczematous reaction in 10% of cases. If nod-

Table II. Differential Diagnosis of Molluscum Contagiosum

Neoplasms	Fibroma/Collagen/Acanthoma	Fungal	Bacterial/Viral	Inflammatory
Syringoma	Acantholytic acanthoma	Cryptococcosis	Bacterial folliculitis	Lichen niditus
Keratoacanthoma	Reactive perforating collagenosis	Penicillium marneffei	Ecthyma contagiosum	Granuloma annulare (papular)
Nodular basal cell carcinoma	Perifollicular fibrosis	Atypical mycobacterium	Condylomata acuminata	Sarcoidosis
Neurilemmoma	Fibrosis papule	Histoplasma duboisii	Varicella	Infantile gluteal granulomata
Nevus **[AU: "sebaceus"?]** of Jadassohn	Milia	Pneumocystis carinii	Cowpox	Keratosis pilaris
Nodular "pure" mucocutaneous histiocytosis X	Any disease with a perforating variant	Primary cutaneous aspergillosis	Smallpox	
Juvenile xanthogranuloma	Infarcted skin tag	Coccidioidomycosis		
Spitz nevus	Pyogenic granuloma	Histoplasmosis cap		

Table III. Conditions Report to Coexist With Molluscum Contagiosum in Biopsy Specimens

Growths/Cysts	Nevi	Other
Epidermal cysts	Halo nevus	Cutaneous pseudolymphoma
Metaplastic ossifications	True epidermal nevi	Actinic granuloma
Soft fibroma	Sebaceous hyperplasias	Incidental granular parakeratosis
Comedo and secondary abscess formation	Nevocellular nevi	Kaposi's sarcoma

ules appear on the eyelids, however, complications can be severe and include scarring of the peripheral cornea. Eutectic mixture of local anesthetics is often used as an anesthetic agent in children receiving treatment with destructive modalities, and a variety of side effects have been linked to in its use (Table I).

A variety of treatments exist for MCV infection (Table IV). While many claim success, the Cochrane Database concluded in 2006: "No single intervention has been shown to be convincingly effective in treating molluscum contagiosum." Lack of therapeutic success can occur, particularly against the backdrop of immunosuppression as in the instant case.

RECOMMENDED READING

1 Hanson D, Diven DG. Molluscum contagiosum. *Dermatol Online J.* 2003;9(2):2.

2 van der Wouden JC, Menke J, Gajadin S, et al. Interventions for cutaneous molluscum contagiosum. *Cochrane Database Syst Rev.* 2006;(2):CD004767.

Table IV. Treatments of Molluscum Contagiosum

Topical: Office-Applied	Topical: Home-Applied	Oral/Injectable	Homeopathic/Natural	Surgical/Destructive	Photomedicine/Other
5%, 10%, 20% Potassium hydroxide	0.05%, 0.1% Tretinoin cream	Cimetidine	Natrum sulphuricum	Curettage	Photodynamic therapy
10% Tincture of iodine	Imiquimod 5%	Streptococcal antigen OK-432 injection	Sulfur and natrum muriaticum	Indirect electrosurgery	Potassium-titanyl-phosphate laser
Silver nitrate paste	Cidofovir (topical)	Cidofovir (intravenous, intralesional)	Essential oil of Australian lemon myrtle	Needling	Electron beam therapy
Topical acidified nitrite, nitric oxide liberating cream	Adapalene	Interferon α treatment (subcutaneous)	Calcarea carbonica	Cryotherapy with liquid nitrogen, dry ice, Frigiderm dimethyl ether-propane cryogenic spray	585-nm pulsed dye laser
Trichloroacetic acid	Topical vitamin A acid	Effective antiretroviral therapy in HIV		Squeezing out core	CO_2 laser
Phenol		Oral griseofulvin		Electrodesiccation	Duct tape occlusion
Povidone iodine plus salicylic acid		Smallpox vaccination			Tape-stripping
Povidone-iodine		Methisazone			
Sodium nitrite co-applied with salicylic acid					
Salicylic acid alone					
Cantharidin					
Salicylic acid gel					
Diphencyprone					
50% Salicylic acid plaster and tape					

Abbreviation: HIV, human immunodeficiency syndrome.