Molluscum contagiosum

BRUCE TATE PhD, FACD

Molluscum contagiosum is a common viral skin infection in children and also occurs in adults. Although it is usually self-limiting and treatment is therefore generally not necessary, treatment is often requested. Treatment needs to be tailored to the particular situation.

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Dr Tate is a Dermatologist in St Albans, Vic, and with the Skin and Cancer Foundation Australia.

CASE PRESENTATION

A 4-year-old girl presented with a five-month history of largely asymptomatic prominent, smooth, red umbilicated papules on her trunk and limbs (Figures 1 and 2). The papules had been slowly developing and then settling, leaving faint red marks. Recently some mildly itchy dermatitis had appeared around some of the papules (Figure 3). She had started swimming lessons nine months ago.

The patient had a past history of mild atopic dermatitis as an infant but so far no other atopic diseases have developed. There was a family history of atopy. There was no history suggesting allergies. None of her siblings were affected.

Diagnosis

The condition was diagnosed as molluscum contagiosum (MC).

Differential diagnoses

Warts

Although warts and MC are caused by viruses – warts by human papillomaviruses and MC by a poxvirus – it is usually easy to distinguish the two conditions. Warts are most often seen on the hands and feet but can be on a variety of sites including genitals (where they may be sexually transmitted, via the hands). They are usually not as smooth as MC lesions, being more verrucous (rough) or keratotic, and they lack the central pit (i.e. are not umbilicated). Plane type warts may be smooth but are smaller than molluscum and only slightly raised above the surface. They vary from few to large in number and occur mostly on the dorsal aspects of the hands and forearms and on the face and neck.

Other conditions

Other differential diagnoses of MC includes appendageal tumors (usually of hair or sweat gland origin), condylomata lata (a manifestation of secondary syphilis), basal cell carcinoma (for solitary or few MC papules), flesh coloured melanocytic naevi, the papular variant of granuloma annulare, pyogenic granuloma

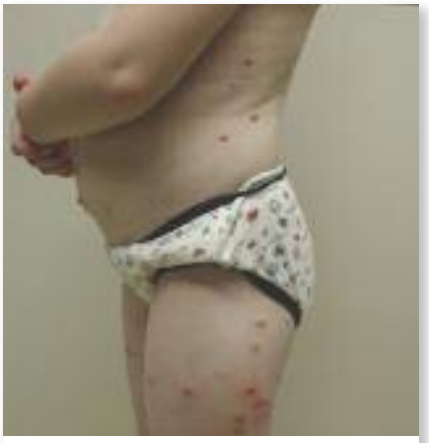

Figure 1. Multiple papules of molluscum contagiosum on the trunk and legs of a young girl.

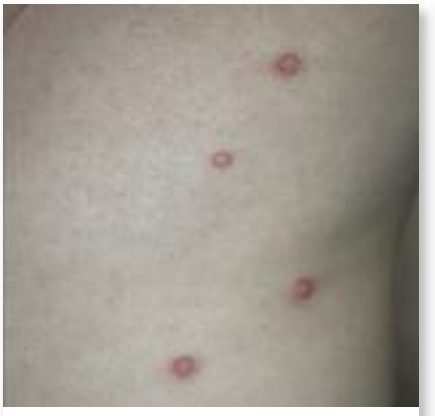

Figure 2. Close up of patient in Figure 1, showing characteristic smooth dome-shaped flesh-coloured to red papules with central pits.

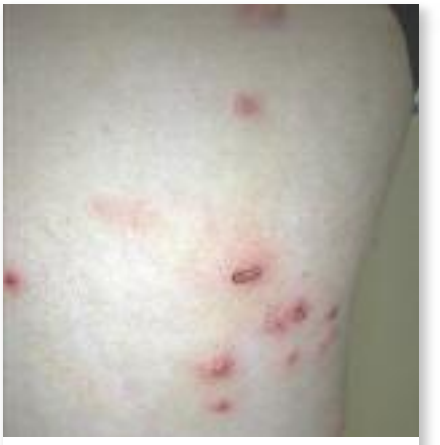

Figure 3. Close up of patient in Figure 1, showing mild eczema around some papules.

(usually solitary and more easily bleeding than MC) and folliculitis/boils (usually pustular and sore). In immunocompromised hosts, infectious processes such as cryptococcosis or histoplasmosis may mimic MC.

COMMENT

MC is a common viral skin infection that is usually easy to diagnose. The lesions are small (usually 1 to 5 mm diameter but up to 10 mm), smooth, dome-shaped, flesh-coloured to red papules. They often have a small central depression, and this may be filled with a cheesy keratinous material. They are usually multiple (average of 10 to 20 papules but ranging from one to hundreds), and occur on the trunk, limbs and face. Unlike warts, MC lesions usually spare the palms and soles. More lesions slowly appear, spread by autoinoculation and rubbing on clothes or towels. Individual lesions may spontaneously resolve but new ones continue to appear. The time to complete resolution of MC is usually six to 12 months but can be up to four years. The condition may never settle in immunosuppressed patients. It is quite common for eczema to develop around some of the molluscum, mostly in people with an atopic background.

In adults, it is not uncommon to see MC as a sexually transmitted disease on the genitals, perianally or occasionally around the mouth. Children with MC on or around the genitals mostly have it from autoinoculation but sexual abuse should be considered. Severely immunosuppressed patients (e.g. those with AIDS and occasionally organ transplant recipients) are prone to large numbers of lesions of atypical appearance, including in the beard area, spread by shaving.

Pitted scars from settled MC are uncommon if they spontaneously settle but scarring is common after some of the destructive treatment options. There may be postinflammatory hyper- or hypopigmentation after resolution, particularly in darker skinned people, and this often takes many months to normalise.

Atypical presentations include:

- 'giant' – up to a few cm in size
- a confluent plaque of papules
- hair follicle involvement – seen as multiple red or pale 'waxy' papules or nodules more deeply in the skin than the typical exophytic MC[1,2]
- mucosal MC – usually genital, rarely oral mucosal
- conjunctival MC (follicular conjunctivitis and keratoconjunctivitis) – usually unilateral secondary to eyelid MC and tends to be persistent until the eyelid MC is treated;[3] corneal involvement is rare.

The virus is usually caught from other people with MC, from skin to skin contact and from shared items such as towels, bathtub toys or, in swimming pools, foam swimming aids (noodles and kickboards).[4] MC is often spread from child to child in swimming pools or baths at home, perhaps because there is more skin to skin contact and because the water softens the skin, enhancing transmission. Infection is more likely in people with skin conditions that reduce the skin barrier, such as atopic dermatitis and other dry skin conditions (for example, ichthyosis vulgaris and the much rarer Darier disease). The infectivity of MC is hard to determine but probably intermediate. It is common for one or more other family members to be infected but usually not all family members, perhaps because adults tend to be already immune to the virus. The incubation period is variable, ranging from two weeks to six months.

MC is a large (200 to 300 nm) double-stranded DNA virus (a poxvirus) that can infect other primates and kangaroos as well as humans. DNA analysis shows four different viral subtypes but these are not routinely tested. The virus replicates in the epidermis and induces abnormal proliferation of keratinocytes. MC virus-encoded proteins have a range of effects including inhibition of normal epidermal maturation (the virus survives in more immature keratinocytes) and reduction of local immunity and inflammation against the virus. Clearance of MC is linked to the presence of antiviral antibodies and also a T-cell response. Once MC clears, it is rare for it to recur.

Other diseases caused by poxviruses are uncommon or rarely seen. The most common is orf, a solitary inflamed nodule, usually on a finger. Orf is usually caught from sheep so is seen in rural communities. Other poxvirus infections include vaccinia, monkeypox, tanapox and milker's nodules (also known as cowpock), as well as cowpox and smallpox. Cowpox was the source of Jenners vaccine for smallpox and still occurs occasionally in Europe. Smallpox was caused by two viruses, variola major (overall mortality rate, 30 to 35%) and the milder form variola minor (also known as alastrim). The last recorded case was of the variola minor type in Somalia in 1977 so it is now hopefully of historical interest only.

Diagnosis

The diagnosis of MC is usually clinical. However, it is sometimes made on biopsy (the histopathological features of MC are characteristic) or microscopy (via an office-based KOH preparation or a Tzanck smear, Giemsa or Pap stain required, for simple slide microscopy of a smear taken from a papule scraped with a surgical blade).

Treatment

There are many treatment options for patients with MC and treatment needs to be tailored to the particular situation. It is important to advise patients/parents that prevention of spread of infection to others requires separate bathing and the use of separate towels and swimwear that effectively covers the molluscum. Managing dry skin with regular use of an emollient after bathing, short bathing and showering times and soap avoidance are helpful. Treating dermatitis (see below) is also helpful for both symptomatic relief

of the dermatitis and to improve the barrier function of the skin to help reduce autoinoculation.

It is reasonable to advise no treatment if the patient/parent will accept it, given that MC eventually spontaneously clears. When treatment is required, the options can be divided into physical destruction, antiviral and immune enhancement. However, none of the currently available treatments kill the virus, and no medications are TGA approved for the treatment of MC. There are many studies of various sizes into the numerous treatment options but comparative research is inadequate. The choice of treatment depends on the factors below and individual preferences.

- Number of lesions and age of the patient – painful treatments are less suitable if there are many lesions or in young children.
- Treatment availability – cantharidin (see later) and lasers are harder to obtain, and painful treatments such as curettage for many lesions in young children need to be performed under sedation so are infrequently done.
- Likely efficacy – treatments such as topical retinoids (see later) are less likely to work.
- Cost – treatments such as lasers are expensive and available to relatively few practitioners so are used rarely. Topical imiquimod (see later) is expensive if used at the 5% strength contained in the commercially available sachets; it is cheaper if the pharmacist dilutes it but research into efficacy rates of weaker strengths is lacking.
- Likelihood of scarring or pigment change due to treatment.

In adults, cryotherapy is the often the best treatment as it is quick and effective, although repeat treatments are often needed to clear new papules. The risk of unsightly hypopigmentation makes it less desirable for darker skinned people with lesions on cosmetically sensitive sites. The pain of freezing makes it more difficult to use in children and usually other treatments are tried before this.

As my practice can obtain it and we have nurses trained in its use, I often use topical cantharidin. This has a good success rate and is not painful when applied although it may be painful later. If treatment with cantharidin is not suitable, I often try podophyllotoxin for up to eight weeks. Tape stripping and imiquimod cream are other treatments commonly tried by dermatologists. A Cochrane review has been published on treatment for MC.[5] Details of the possible treatments are outlined below.

Physical methods

Some physical methods are less suitable for young children. This is because they can be painful, tend to cause scarring or pigment change and may require multiple treatments as new papules continue to appear for a few months (the child may refuse to return for repeat treatment). Physical methods are listed below.

- **Squeezing lesions.** Squeezing individual lesions with gloved fingers or tweezers to remove the soft white core or firmly pricking each lesion with a sharp orange stick or tooth-pick clears about 76% of treated lesions; the risk of scarring from this method is roughly 35%.[6] Application of phenol via pricking with an orange stick is cited as a treatment but has been shown to be no more effective than simple squeezing and 80% of such treated lesions formed a scar.[6]
- **Freezing.** Freezing, typically with liquid nitrogen, is usually effective and is often the best treatment for teenagers or adults with MC. Most young children will not tolerate it unless the area is numbed with a topical local anaesthetic (see below). The freeze time is short, three to seven seconds, and freezing is repeated every three weeks until new lesions stop appearing. Pigment changes are likely on healing, particularly hypopigmentation in darker skinned people.
- **Adhesive tape.** There is only one reported case of duct tape applied to individual MC lesions until they cleared; clearance took two months.[7] Dermatologists at the Royal Children's Hospital Melbourne may advocate stripping of MC lesions with an adhesive tape such as Micropore or Elastoplast (leaving the tape in place on individual or groups of lesions for two days and then pulling it off to strip the top from the lesion, done repeatedly) but have not published results of this method.
- **Curettage.** Curetting individual lesions with a sharp disposable curette after numbing with a topical local anaesthetic (e.g. EMLA) is an option. For practical reasons and because there is a high recurrence rate if there are many papules, it is usually not done if there are large numbers of lesions.[8] The total area treated should be limited particularly in neonates or if there is abraded skin because of the risk of CNS toxicity and methaemoglobinaemia from the local anaesthetic. Sometimes the curettage is done under midazolam sedation in appropriately equipped settings. Because the treated site may bleed and is prone to pigment change and mild scarring on healing, the treatment is less suitable for cosmetically sensitive sites. Electrodessication with an electrosurgical device is an alternative treatment also requiring prior numbing, but is more likely to leave a small scar.
- **Cantharidin.** The application of cantharadin is a popular treatment in the places that have access to it (some dermatologists' rooms and outpatient clinics). Cantharadin is a vesicle-forming terpenoid derived from certain beetles found in the Americas, Europe and Asia. It works by activating serine proteases that destroy desmosomal proteins within the epidermis, with the result that the healing blisters do not scar. The application is pain free and the blisters that later develop (in hours to two days) vary from pain free to quite painful (usually pain is minimal) and heal within a week.

Cantharadin is used as a 0.7% solution in a collodion base. The preparation

is not available through pharmacies or standard medical suppliers in Australia but is imported (trade name, Cantharone) with special customs approval. It is only suitable for office use. A thin smear of cantharidin is applied by the wood end of a cotton applicator to each MC lesion and allowed to dry (the collodion forms a rubbery film). Occlusion is not required but if done increases the intensity of the blister. Some recommend washing it off a few hours later but this is difficult because of the collodion film. The lesions often clear after a single application but two or three applications may be needed (every one to two weeks until new lesions stop appearing). Cure rates are above 90%.[9] Pigment changes may occur after treatment. The chemical is toxic and should not be used on the lips or eyes and cautiously in skin folds.

- **Trichloroacetic acid.** Trichloroacetic acid (TCA; 25 to 50% in water) applied to MC lesions in the office via the wood end of a cotton applicator has been shown to be effective.[10] It causes immediate quite painful stinging for a prolonged time so is less suitable for children. It also causes temporary frosting of the skin and tends to cause later pigment change. TCA has been successfully used in the form of a chemical peel for widespread MC on the face.[11]
- **Potassium hydroxide.** Potassium hydroxide 10% is a cheap and easily available caustic agent that can be applied by the patient or parent at home via the wood end of a cotton applicator every night or second night. A small study showed 77% of lesions cleared, most by two months.[12] Care is required to avoid eyes and mucosae. Pain is uncommon but 40% of patients develop transient minor side effects (redness, scaling and hypopigmentation) and sometimes ulcers.
- **Various lasers.** The 585 nm pulsed dye laser is usually used to treat vascular lesions but several series and case reports have shown this laser effective in treating MC; the mechanism is not clear. In one study of 19 children with MC, 16 patients completely cleared after one laser treatment , two after two treatments and one needed a third treatment.[13] Another study reported similar results.[14] Yet another reported that in 20 children with MC, 70% of lesions treated with this laser cleared after one treatment and a further 11% with a second treatment two weeks later.[15] The treatment is painful and topical local anaesthesia may be needed for young children. Single case reports have found the potassium titanyl phosphate (KTP) laser effective; this is another vascular laser.[16] Destructive lasers such as CO_2 lasers can also be used but treatment with these is painful and prone to causing scarring and pigment change.
- **Photodynamic therapy.** Photodynamic therapy involves the use of a topical photosensitiser, usually aminolevulinic acid, applied for several hours to the affected areas and then activated by a blue light source. This has been used successfully for MC in isolated cases and in incompletely described series of patients with more extensive MC.[17] The treatment causes a painful oedematous or vesicular phototoxic reaction and may cause pigment change.

Antiviral methods

- **Podophyllotoxin 0.5%.** Podophyllotoxin is a purified form of podophyllum and works by inhibiting topoisomerase, the enzyme that unwinds DNA before replication. Treatment (off-label use) involves twice daily application for three successive days each week for six weeks; 92% of 50 patients were cured with this weekly regimen followed for up to five weeks, with no recurrences by nine months.[18] Side effects were common (pruritus 21% and erythema 18%) but no patients dropped out of the study. Podophyllotoxin is not suitable for use on lesions near the eyes.
- **Podophyllum resin 5%, in tincture of benzoin.** Podophyllum resin is derived from mayapple (*Podophyllum peltatum*), a herbaceous plant native to North America, and is the crude form of podophyllotoxin. Treatment (off-label use) is weekly until the MC lesions clear (maximum trial about six weeks) and involves leaving the chemical on the lesions for six hours before wiping it off; treatment should only be performed in the doctor's office. Podophyllum resin is more toxic than podophyllotoxin and prone to causing irritation so should not be applied near the mouth or eyes (or used in children likely to bring the treated part to their mouth or eyes). The small amount used on the skin seems safe, although the treatment should not be used in pregnant women. This treatment is now rarely used because better alternatives exist.
- **Silver nitrate.** A study of 389 patients with MC lesions treated with 40% silver nitrate solution made to a paste in flour and applied after 2% lignocaine jelly application had a cure rate of 98% (most lesions settled after one application), with no scarring.[19] Silver nitrate can also be applied wet by an applicator stick to each lesion.
- **Potassium nitrite and salicylic acid.** Acidified potassium nitrite 5% (a nitric oxide donor) mixed with salicylic acid 5% cream applied by the patient or parent nightly, usually under adhesive tape, performed well in treating MC lesions.[20] Unfortunately, pharmaceutical grade potassium nitrite is not available in Australia.
- **Cidofovir 3% solution in a cream base.** A topical formulation of cidofovir has been found effective for MC in four cases.[21-23] However, cidofovir solution is not available in Australia.

Immune enhancing

- **Imiquimod.** Imiquimod is an activator of the innate immune system via Toll-like receptors, causing mild to substantial inflammation. Imiquimod 5% cream is expensive and is used off-label for the treatment of MC. To reduce the expense, lower concentrations (down to 0.1%) have been tried (made up by the pharmacist) but there is no research on the

best concentration to use. Using the 5% strength (one sachet applied every second day), studies have shown cure rates by 12 to 16 weeks varying from 33 to 92%.[24] Irritation is a common side effect but most patients continue with treatment. When used at low concentrations, such as 0.1%, it is applied three times daily.

- **Topical diphencyprone.** Diphencyprone is available from compounding pharmacies. It induces a contact allergy in most patients. It is applied on a small area of skin at a 2% concentration to induce sensitisation; this usually occurs within 10 days (a patch of dermatitis, often quite active). A very low concentration of the diphencyprone (0.005% in acetone) is then applied to the MC lesion once a week, with the aim of achieving a low grade itchy dermatitis. The concentration of the diphencyprone may need to be increased to a maximum of 0.1% to achieve this. This treatment may be a good choice for people with larger numbers of MC lesions. A small study of 22 children showed 64% completely cleared with a mean treatment time of five weeks.[25] Four patients dropped out due to adverse events, presumably too much itching. The same treatment has been used successfully for warts. It is intriguing that the atopic dermatitis often seen around MC lesions does not clear the lesions; diphencyprone treatment should not be used in these patients for fear of worsening their eczema.
- ***Candida* antigen immunotherapy.** The *Candida albicans* allergen used for intradermal testing for candidal hypersensitivity is used (off-label) to induce an immune response by injecting it into individual MC lesions. A small trial in children showed 14 of 25 completely cleared (but five of these also had cryotherapy of the lesions) and seven of 25 partially cleared after an average of around 3.5 treatments per patient.[26] Given the spontaneous clearance rate of MC and low numbers treated, it is impossible to say whether this is a useful approach.
- **Cimetidine.** Oral cimetidine has immune-modulating effects and has been proposed as a treatment for warts and MC lesions. The trials on its effectiveness for MC are inadequate, some case reports and small series suggesting efficacy and others less so. With the limitation of small numbers reported, oral cimetidine may be more likely to work in atopic patients with MC.[27-29]

Others

Various other wart and acne treatments have been shown in trials to have some efficacy in the treatment of MC, as reported below.

- **Topical salicylic acid.** Salicylic acid 12% gel applied once or twice a week cleared 88% of children's MC by six months; however, this was compared with 59% clearance with vehicle alone, which was not a statistically significant difference.[30]
- **Povidone iodine–salicylic acid.** A small study of children with MC found all of 20 children completely cleared with 10% povidone-iodine solution and 50% salicylic acid as a plaster compared with three of five treated with the iodine alone and seven of 10 treated with the salicylic acid plaster alone.[31] The numbers treated were too small for the differences to reach statistical significance.[5]
- **Benzoyl peroxide.** Benzoyl peroxide 10% cream for four weeks cleared 92% of MC cases treated in a small trial.[32]
- **Topical retinoids.** In a small trial, tretinoin 0.05% cream for six weeks cleared 45% of MC cases, which was less effective than benzoyl peroxide 10% cream.[32] A case report found topical adapalene effective.[33] Retinoids may irritate the skin and aggravate co-existing dermatitis.
- **Lemon myrtle oil.** A 10% solution of the essential oil product derived from the Australian native tree, lemon myrtle (*Backhousia citriodora*), applied daily for up to three weeks cleared MC in five of 16 children treated, and achieved more than 90% clearance in a further four children; none of the 12 children treated with vehicle cleared over the same time.[34] Adverse effects were minimal. The reason this oil may be effective is not known.

Treatment of eczema around MC papules

If the eczema around MC lesions is very mild, it can be treated with emollients alone. Topical corticosteroids generally work well, either mildly potent corticosteroids such as hydrocortisone 1% ointment (particularly for the face or flexures) or moderately potent corticosteroids such as betamethasone valerate 0.02% ointment, both twice daily till the dermatitis clears and as needed for recurrences. Worsening of the MC does not seem to be an issue.

CONCLUSION

MC is a common and usually self-limiting viral infection in children but is also quite common in adults (in whom it is also a common sexually transmitted disease). Additional eczema around the papules is a common event, particularly in atopic individuals, and is easily treated. Measures to prevent cross infection are important. Advising no treatment is a viable option for MC but treatment is often requested and reasonable. There are many treatment options – the decision on which to use depends on likely efficacy versus availability and acceptability. MT

REFERENCES

A list of references is available on request to the editorial office.

This article is for general information purposes only, and the full product information should be consulted before prescribing any of the mentioned medications.

COMPETING INTERESTS: None.

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BRUCE TATE PhD, FACD

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