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Clinical and Demographic Characteristics of Patients with Molluscum Contagiosum Treated at the University Dermatology Clinic Maribor in a 5-year period

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ABSTRACT Molluscum contagiosum virus (MCV) is a common skin pathogen in both adults and children. In this prospective study, we clinically evaluated consecutive patients with molluscum contagiosum (MC) who had been examined during a 5-year period at the second-largest dermatology clinic in Slovenia and described their main demographic and clinical characteristics, concomitant diseases, and treatment success. The study included 188 patients, of which 121 (64%) were men and 67 (36%) were women. A total of 135 (72%) patients were adults, with lesions that were most commonly located in the anogenital region (98%) and were probably sexually acquired. Two adult patients were diagnosed with concurrent human immunodeficiency virus (HIV) infection. Fifty-three (28%) patients were children with a mean age of 5.7 years, most commonly presenting with lesions on the torso and extremities (85%). In adults, the infection most commonly occurred in male patients, while in children it was slightly more common in female patients. At presentation, 58% of patients had more than 5 MC lesions. A total of 30% of the included children had concomitant atopic dermatitis. We did not observe an increased occurrence of MCV infection in patients with atopic dermatitis. All patients were treated with curettage of the lesions. The cure rate at the first follow-up visit after 2 months was relatively high (63%), and recurrences were not associated with the number or site of lesions at presentation or with concomitant atopic dermatitis.

KEY WORDS: molluscum contagiosum, sexually transmitted infection, curettage

INTRODUCTION

Molluscum contagiosum (MC) is a common dermatologic disease caused by the molluscum contagiosum virus (MCV) (1). MCV is a large, brick-shaped, double-stranded DNA poxvirus and is the sole member of the genus *Molluscipoxvirus* (2). After eradication of smallpox, MCV is the only poxvirus that exclusively infects humans (3). MCV is epidermotropic and replicates in the cytoplasm of cells, producing cytoplasmic inclusions and enlargement of infected cells (4). To date, four subtypes of MCV have been identified (5,6). The subtype 1 comprises approximately 76-97% of the cases (7,8). The subtype 2 is more prevalent in

patients infected with human immunodeficiency virus (HIV) (9), while subtypes 3 and 4 are relatively rare (5,6,9).

Characteristics of patients with molluscum contagiosum

MCV infection is characterized by a single or multiple flesh-colored umbilicated papules (10). MCV is transmitted directly from person to person or by autoinoculation (11). MC is relatively frequent in children, and although lesions may appear anywhere, in children they commonly occur on the face, torso, and extremities (12). In adults, MC is regarded as a sexually transmitted infection (STI), thus all adult patients with MC should be carefully screened for other STI and appropriately counselled. In adults, MC characteristically involves the genital region, but extragenital appearance can be more commonly observed in persons with immunosuppressive conditions, especially HIV/AIDS (13). The characteristic umbilicated papules develop after an estimated incubation of 2 weeks to 6 months or longer (11,14). Clinical findings are the most important for establishing the final diagnosis. MC is generally self-limited and regresses spontaneously after several months or years (15,16). However, treatment is recommended and also frequently required by the patient, as it is beneficial in preventing further MCV transmission or autoinoculation. Currently, there is no specific treatment for MC, and according to the literature, no treatment is definitively effective (17). Patients are usually treated by physical removal of the lesions by curettage or cryotherapy (18,19). Both methods are painful and have the potential for scarring and hypopigmentation. Other physical methods, such as mechanical expression of the lesion core, electrosurgery, and laser therapy, might also be beneficial (20,21).

There are many options for topical treatment that have been tried for treating MC. These include cantharidin (22), 0.5% podophyllotoxin cream (23), imiquimod 5% cream (24,25), potassium hydroxide (26,27), and salicylic acid (19). Topical retinoids such as tretinoin (0.1 or 0.5 % cream, or 0.025% gel) and adapalene have been described as treatment options (28,29). Topical phenol (20), silver nitrate 40% paste (30), intralesional injections with Candida antigen (31), and trichloroacetic acid 70% (32) or iodine (33) have also been used for the treatment of MC. Systemic therapy with oral cimetidine, an H_2 antihistamine, has been found successful in the treatment of MC in one study (34). In HIV-infected patients with refractory disease, antiretroviral treatment has been associated with reports of significant improvement of MC lesions (35). There are also reports of successful treatment of refractory MC in immunocompromised patients with topical imiquimod (36-38), systemic or intralesional interferon alpha (39-41), parenteral or topical cidofovir (42-44), pulsed dye laser, or photodynamic therapy (45,46).

In this prospective study we clinically evaluated in detail consecutive patients with MC who had been examined during a 5-year period at the second largest dermatology clinic in Slovenia, and described their main demographic and clinical characteristics, concomitant diseases, and treatment success. To the best of our knowledge, this is the largest clinical study of MC in Central Europe to date.

PATIENTS AND METHODS

The study included consecutive patients who were clinically suspected of MC and were treated at the Department of Dermatology and Venereal Diseases at the University Medical Centre (UMC) Maribor, Slovenia, from October 2009 to April 2015. The main inclusion criterion was lesions that could be clinically defined as MC and were located either on the skin, torso, or extremities or in the anogenital region. Diagnosis was established based on the characteristic clinical picture commonly characterized by an umbilical papule of less than 1 cm in diameter. We obtained data on patient age, sex, concomitant diseases, site, and number of lesions. Patients clinically suspected of acquiring MC by a sexual route underwent tests for HIV, syphilis, and hepatitis B and C. We photographed the lesions using a digital camera before treatment. Patients were treated with curettage of all visible lesions. If required, lidocaine plus procaine (EMLA cream) was applied on the treated spot 1 hour before the procedure. At a follow-up visit 2 months after the end of treatment the success of treatment or eventual recurrence of the disease were assessed.

The study was approved by the Medical Ethics Committee of the Republic of Slovenia (consent number: 101/12/09). Written consent was obtained from all patients older than 18 years of age and from parents of those aged 17 years or less. For categorical variables, statistical analyses were performed with the exact test with a Monte Carlo approximation due to unbalanced data. A probability of $P<0.05$ was considered statistically significant. The data were analyzed using the statistical software IBM SPSS, version 22 (SPSS Inc., Chicago, IL, USA).

RESULTS

In the period from October 2009 to April 2015, we examined a total of 188 patients with MC lesions, of which 121 were men (64%) and 67 were women

Table 1. Study group demographics

Variable	Number of patients	%
All patients	188	100.0
Men	121	64.4
Women	67	35.6
Age >17 years	135	71.8
Age <17 years	53	28.2
Men aged >17 years	100	74.0
Women aged >17 years	35	26.0
Men aged <17 years	21	40.0
Women aged <17 years	32	60.0

(36%). Patient age was 0-62 years. Of these, 135 were adult patients aged 17 years or older (range 17-62 years; mean age 27.5 years) who developed MC mainly as a result of a sexual/anogenital contact with an infected individual, and 53 were children aged 0-16 years (mean age 5.7 years) who had non-sexually transmitted MC lesions (Figure 1, Figure 2). In adults, we noticed more male patients (74%), whereas in children there were more female patients (60%) (Table 1). The difference in the distribution by sex was statistically significant (P<0.001).

In adults, lesions were distributed primarily in the anogenital region 133/135 (98%), while MC lesions in children were most commonly observed on the torso and the extremities 45/53 (85%) (Table 2). The difference in lesion distribution between adults and children was statistically significant (P<0.001).

At examination, 78/135 (58%) of adult patients and 32/53 (60%) of children had more than 5 MC lesions. The difference in frequency of those with 5 or more MC lesions between adults and children was not statistically significant (P=0.869).

All adult patients had a larger number of lesions (>5) in the anogenital region, whereas in children we observed more lesions (>5) on the torso and the extremities.

Out of the 53 children included, 16 (30%) presented with atopic dermatitis. We found more than 5 lesions in 81% of children with atopic dermatitis (n=16), while this was observed in only 52% of children without atopic dermatitis. (n=37). However, the difference was not statistically significant (P=0.066). Two adult patients were diagnosed with an HIV infection, and four patients also had genital warts.

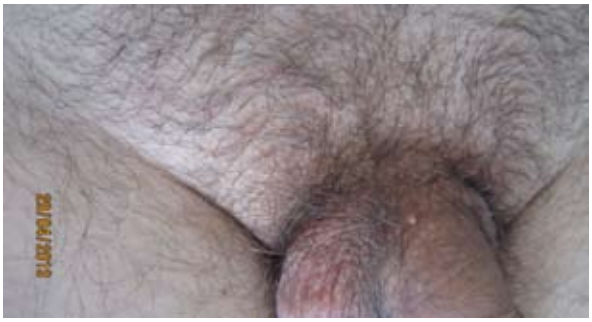

Figure 1. Penile molluscum contagiosum in a 25-year-old man.

At presentation, all patients were treated with curettage and had all visible lesions removed. At the 2-month follow-up visit, recurrence of MC lesions was recorded in 69/188 (37%) patients. The disease recurred in 51/135 (38%) of all included adult patients, while recurrence was observed in 18/53 (34%) of children. There was no statistically significant difference with regard to recurrence by age (P=0.737). All recurrences of MC in adults were observed in the anogenital region, whereas in children the disease most commonly recurred on the torso and the extremities. In adults, MC recurrence was more often observed in patients with more than 5 lesions, and the same was found in children. However, the difference was not statistically significant compared to patients with less lesions (P=0.376 and P=0.565, respectively) (Table 3).

Disease recurrence was observed in only 5 out of 16 children with atopic dermatitis and in 13 out of 37 children without atopic dermatitis. The difference was not statistically significant (P=1.00).

DISCUSSION

Although MC is a relatively frequent disease, there is a lack of large published cohort studies in the available literature, especially from Central and Eastern Europe.

This prospective clinical study presents main demographics, lesion localization, concomitant diseases, and results of the most common treatment of the

Table 2. Distribution of molluscum contagiosum (MC) lesions

Sites of lesions	Torso and extremities	Head and neck	Anogenital region	*P*
All patients (N=188)	47	4	137	
Children (n=53)	45	4	4	<0.001
Adults (n=135)	2	0	133	

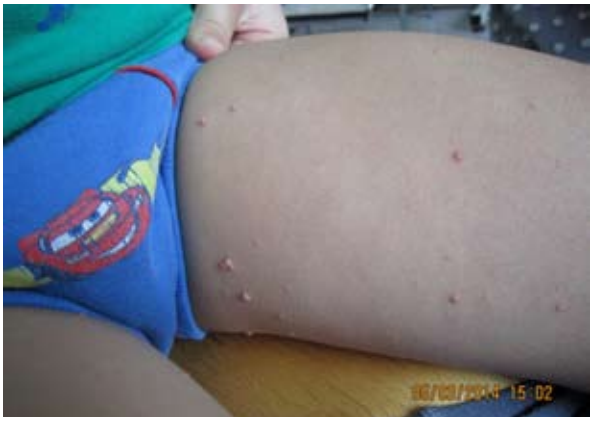

Figure 2. Molluscum contagiosum lesions on the inner thigh of a 4-year-old boy

cohort of patients with MC treated at the UMC Maribor in a 5-year period. According to literature data, the disease has a bimodal age of onset and most commonly occurs in children and young adults (47). Although MCV infection more commonly develops in children than adults (48,49), we treated more adult patients than children at our hospital in the observed period. The most probable reason is that children with MC in our medical system are usually evaluated and treated by school medicine practitioners and only fraction is referred to tertiary hospital. The mean age of our adult patient was 27.5 years, which is in accordance with the literature since MCV infection in adults most commonly occurs between 20 and 29 years of age, similarly as with other sexually transmitted diseases (STD) (11,50).

The mean age of children included in our study who had a non-sexually transmitted MC infection was 5.7 years, which is comparable to the results of other studies, which found that MC is most common in children aged 8 years or younger (48). In our study, MC was recorded 3 times more commonly in adult men than in women patients. This is similar to published data, where the authors found that MC occurred twice more commonly in the male population (51). In our cohort, distribution of the disease in children did not differ significantly by sex; however there was a slight predominance of female patients. A similar distribution by sex was also established in the above mentioned study (48).

Table 3. Comparison between adults and children with lesions recurrence at 2-month follow-up visit

Recurrence	Adults	Children
All patients (N=69)	51	18
Anogenital region	51	2
Trunk and extremities	0	16
Number of lesions (>5)	32	12
Number of lesions (<5)	19	6
Concomitant atopic dermatitis	0	5
Without atopic dermatitis	51	13

Children usually present with multiple MC lesions on the face, torso, and extremities. 10-50% of children have lesions in the genital region, which is usually a result of autoinoculation (52). Very rare non-genital lesions in adult patients point to the importance of sexual transmission of MCV infections in adults (53), whereas non-genital lesions are prevalent in children, and lesions in the anogenital region are probably a result of autoinoculation (16). In our adult patients, MC lesions were most commonly located in the anogenital region (98%), while in children they were most commonly observed on the torso and extremities (58%). Only 7% of all evaluated children had lesions in the anogenital region; we strongly believe that this is a result of autoinoculation.

At presentation, the majority of adults had more than 5 MC lesions. Children had a larger number of lesions (>5) on the torso and extremities and less than 5 lesions on the head or neck and in the anogenital region. This leads to the conclusion that parents decide to visit the physician earlier if lesions are located on the visible parts (face) or in the anogenital region. Adult patients often come to the dermatologist quite late, when the infection has already spread.

According to the literature data, MCV infection most commonly occurs in children with atopic dermatitis (54,55), although this result was contradicted by some studies (56). In our study, 30% of children with MC also had concomitant atopic dermatitis. Children with atopic dermatitis more commonly presented with a larger number of lesions (>5) than children without atopic dermatitis, but the difference was not statistically significant (P=0.066).

MC is a frequently found in HIV patients (57), with prevalence and incidence of the disease reflecting advanced immunodeficiency (58). Extragenital distribution of lesions is characteristic in patients infected with HIV, with lesions appearing somewhat more commonly on the face (59). Two of our patients presented with HIV infection, and none of them had been receiving antiretroviral therapy at the time of presentation. The HIV-positive male patient had lesions located in the pubic region, and the HIV-positive female patient had them on the abdomen. Incidentally identified HIV infection points to the importance of testing all adult patients for other STIs, as adult patients with sexually-transmitted MC lesions are at a higher risk of developing other STIs (60).

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Curettage is the most frequent and effective method for removing MC with the least recurrences and complications (19). In a previous study, the lesions were fully cured in 80% of patients after only one treatment (19). Other descriptive studies in the literature recorded a lower cure rate, namely 34% (22 out of 64) and 39% (29 out of 75) (18,61). The number of lesions, concomitant AD, and the number of involved anatomical sites were described as the risk factors for treatment failure (18). In our study, the cure rate after a single treatment with curettage was 63% (119/188). At the 2-month follow-up visit, lesion recurrence was identified in the rest of the patients (69/188, 37%), both adults and children. Considering that most adult patients had lesions in the anogenital region, recurrences in this site were expected. Somewhat later, recurrences occurred in those patients who had a larger number of lesions (>5), but the difference was not statistically significant. Recurrences in children were most commonly observed in those who had lesions on the trunk and extremities, as well as in those who presented with more than 5 lesions at examination. The differences were not statistically significant. We did not find a statistically significant difference in disease recurrence in children with atopic dermatitis as compared to children without atopic dermatitis.

CONCLUSION

In the largest clinical study of MC in Central Europe to date, MC was more commonly observed in adult men compared to adult women, whereas age distribution was the reverse in children. Adults in our study most commonly presented with MC lesions in the anogenital region, whereas in children they were most commonly located on the torso and extremities. We did not observe an increased occurrence of MCV infection in patients with atopic dermatitis. The cure rate following treatment with curettage was relatively high (63%), and recurrences were not associated with the number of lesions or concomitant atopic dermatitis.

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