

Successful Use of Silver Impregnated Hydrofiber Dressing in the Treatment of Kerion Celsi Caused by *Microsporum gypseum*

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SUMMARY A method of treatment of tinea capitis is presented in a case of a 10-year-old boy who was referred to the pediatric surgical unit for the treatment of a skin lesion on the scalp, which had persisted for more than two months. The initial dermatologic examination led to the clinical diagnosis of inflammation of the scalp, while mycological analysis revealed an uncommon dermatophyte agent, *Microsporum gypseum*, in the culture. The lesion was subsequently treated with local and oral antifungal agents, but antifungal therapy was discontinued due to the resulting liver dysfunction and was replaced by treatment with a silver impregnated hydrofiber dressing. During one-month treatment, the patient's scalp lesion cleared completely. The treatment of tinea capitis is discussed.

KEY WORDS: kerion celsi, *Microsporum gypseum*, tinea capitis, silver dressing

INTRODUCTION

Tinea capitis is a worldwide spread infection that involves the scalp hair follicles and intervening skin, affecting primarily prepubertal children (1). Depending on the causative organism, the type of hair invasion, and the specific host T lymphocyte inflammatory response, four major clinical patterns of tinea capitis have been outlined (2): noninflammatory black dot pattern, noninflammatory seborrheic dermatitis type, inflammatory kerion, and favus. Kerion, an infrequent type of tinea capitis, is the result of a severe inflammatory response to dermatophyte infection, occurring predominantly in children (3). Because kerion with its pus-filled swellings can look like bacterial abscesses, the gold standard examination of fungal culture plays a crucial role in the early recognition of a potential infection of dermatophytes (4).

Here we present a case of kerion celsi caused by *Microsporum (M.) gypseum*, where treatment with silver impregnated hydrofiber dressing (Aquacel® Ag, ConvaTec) was successfully implemented.

CASE REPORT

A 10-year-old boy, previously healthy and without a history of any severe disease, presented to the family doctor with a several-day history of mildly elevated, non-suppurative nodular mass with alopecia in the right retroauricular scalp region, and local lymphadenopathy. The mass was approximately 1 cm in diameter, with no edema or hyperemia, and slightly painful upon pressure. The diagnosis of nonspecific cutaneous infection was made. Initially, he received a 1-week course of oral antibiotic, cefu-

roxime (Xorimax® tbl, Sandoz GmbH, 250 mg twice daily), but the skin lesion worsened. Two weeks later, the patient was examined by a dermatologist who found erythematous pruritic papules, alopecic areas about 1.5 cm in diameter covered with thick layers of scales, and purulent secretion from follicular openings. Scale and hair samples were obtained and cultivated on Sabouraud agar with chloramphenicol and cycloheximide for mycological culture. Therapy with antiseptic solution (Plivasept®, Pliva) along with betamethasone/gentamicin cream (Belogent®, Belupo) was introduced. In two weeks, *M. gypseum* grew in the mycological culture. Oral terbinafine (Lamisil® tbl, Novartis, 125 mg daily) was administered along with Plivasept® and isoconazole nitrate/diflucortolone valerate (Travocort®, MSD) cream used topically.

After two weeks of treatment, there was a marked deterioration of the scalp lesion and, upon his mother's request, the child was referred to pediatric surgery. On admission, physical examination revealed a solitary painful, elevated, boggy, granulomatous mass measuring 5 cm in diameter, studded with several papules, pustules along with purulent exudate over his retroauricular region (Fig. 1A). Hairs on the infected area were brittle and broken. Because of the distance from home, the patient was hospitalized for further treatment. Immediately upon admission, incision biopsy for histopathologic and cytologic analysis was done. Histologic analysis revealed a pronounced inflammatory tissue reaction, granulation tissue with a number of neutrophils and eosinophils in the upper dermis, while fungal hyphae could not be demonstrated. During the treatment, laboratory tests showed slightly elevated liver enzyme levels (AST 59 H (ref. interval 14-39), ALT 44 H (ref. interval 11-37)). Oral and topical antifungal therapy was discontinued and the lesion was cleaned with saline and treated locally only with Aquacel® Ag silver impregnated hydrofiber dressing. The dressing was applied as a single small dressing. In the first two weeks, the dressing was changed daily, and then every 3-4 days for another two weeks. After a week, the lesion improved significantly (Fig. 1B), and upon completion of the four-week treatment with Aquacel® Ag, the kerion healed completely (Fig. 1C). Repeated complete blood cell counts and hepatic enzymes were all within the normal ranges and the fungal culture was negative. Several patches of alopecia remained on the previous lesion sites. However, at follow up after a few months, hair regrowth was noted (Fig. 1D).

DISCUSSION

In the present report, we describe a case of kerion celsi caused by *M. gypseum*, a geophilic species with



Figure 1. Inflammatory tinea capitis caused by *Microsporium gypseum*. Kerion celsi in the right retroauricular region of the scalp: on the patient's admission to pediatric surgery (A); after 10 days (B); after completing 4-week treatment with Aquacel® Ag dressing (C); and at follow-up 4 months after therapy (D).

low contagious potential that generally causes tinea corporis. Only a few cases of *M. gypseum* as an agent of tinea capitis have been described in the literature so far (5,6). In Europe, the most common etiologic agent of tinea capitis is the zoophilic species *M. canis*, with the highest incidence in the Mediterranean countries (7). The same situation was observed in Croatia, where in the last eight years, 58 cases of typical kerion celsi have been recorded, with *M. canis* isolated in 32% and *M. gypseum* in only 5% of patients (8). Nearly the same pattern has been reported in other European countries (7).

Tinea capitis always requires systemic antifungal treatment, while topical therapy is only used as adjuvant therapy. The gold standard for systemic treatment is griseofulvin, although the long duration of treatment (6-12 weeks or longer) may lead to reduced compliance. The newer oral antifungal agents, terbinafine, itraconazole and fluconazole have the same efficacy as griseofulvin (9). Griseofulvin appears to be superior to terbinafine in treating *Microsporium* tinea capitis; although Silm and Karelson observed an effective cure rate of 65.4% when using terbinafine for tinea capitis caused by *M. canis* (10). Recently, it has been shown that a dose of terbinafine higher than labeled by the manufacturer might be required to treat *Microsporium* tinea capitis, thus the optimal dosing and duration regimen has yet to be established (11). Since griseofulvin is not available in Croatia, we started treating our patient with terbinafine; however, due to the elevation of liver enzyme levels, further systemic antifungal treatment was discontinued. It is

well known that oral antifungal drugs may be associated with some potential for liver dysfunction/damage and even severe hepatic toxicity (12). After discontinuation of the antifungal systemic treatment in our patient, the repeated test showed that all hepatic enzymes were within the normal ranges. Thus, we assumed that even a short 2-week terbinafine treatment might have a mild hepatotoxic effect.

Although kerion with its pus-filled swellings might be misdiagnosed as bacterial abscesses, surgical intervention is inappropriate. It should be stressed that in children with inflammatory scalp lesions resembling bacterial abscesses, mycological examination should be done in order to establish the exact diagnosis, introduce appropriate treatment and prevent unnecessary surgical therapy. However, our patient was referred upon his mother's request to the Department of Pediatric Surgery, where conservative treatment with Aquacel® Ag dressing was successfully applied. This is a new hydrofiber wound dressing consisting of soft non-woven sodium carboxymethylcellulose fibers integrated with ionic silver, which is released within the dressing for up to two weeks (13). Silver or silver ions have a strong inhibitory and bactericidal effect and a broad spectrum of antimicrobial activities and, consequently, Aquacel® Ag has been used as an effective and safe dressing for a variety of wound types. Wright *et al.* have shown that silver dressings are effective against a broad spectrum of common fungal wound pathogens as well (14). Recently, it has been shown that dissolved silver is fungicidal *in vitro*, while silver nanoparticles have a strong antifungal effect that is further enhanced when combining with fluconazole or griseofulvin (15).

CONCLUSION

We report this case because an infection with *M. gypseum*, which is relatively rare in humans and particularly in children, was successfully treated with Aquacel® Ag dressing. To the best of our knowledge, this is the first report on successful treatment of kerion with a silver impregnated dressing, so it might be an alternative therapy in patients with an already existing liver disease or just acquired liver damage due to antifungal oral agents prescribed, as was the case in our patient.

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