Oral mega pulse methylprednisolone in alopecia universalis

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ABSTRACT

Intravenous pulse corticosteroids is an alternative method of corticosteroids delivery, which proved to be safe with rapid and potent efficacy. It is an effective treatment of alopecia areata, but not for the totalis, universalis or ophiasis types, for which no effective therapy is available yet. Recently, it has been confirmed that oral and intravenous pulse methylprednisolone (MP) have comparable efficacy. Here, we report a 9-year-old Saudi boy with alopecia universalis who was treated with MP sodium succinate (15 mg/kg ideal body weight) orally for 3 consecutive days bimonthly for 12 sessions. Complete hair regrowth was obtained without toxic effects. When the interval was increased to 4 weeks, he showed partial relapse. So, 2 more pulses were given with an interval of 3 weeks in between. This maintained his regrown hair for a year without treatment.

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Alopecia areata is a common disorder, characterized by loss of hair. It has a variable clinical course, and severities.[1] Various treatment modalities have been used to induce remission in alopecia areata through an immunomodulating effect, with variable success. Among them, intravenous (IV) administration of suprapharmacologic doses of corticosteroids.[1-3] There have been conflicting reports on the usefulness of pulse corticosteroids in severe alopecia areata. It has been concluded that it is effective in widespread alopecia areata, but not the totalis, universalis or ophiasis types.[1,2,4-6] We report a Saudi child with alopecia universalis who was treated with multiple pulses of oral mega dose methylprednisolone (MP) with good control of his disease without any toxic effects.

Case Report. A 9-year-old boy was recruited from the dermatology clinic. He presented with alopecia universalis for a period of 4 months with no response to topical corticosteroid (**Figure 1**). He showed also nail involvement in the form of pitting. He had a positive history of bronchial asthma with no history of other autoimmune disorder and no family history of alopecia. An informed consent was obtained after full explanation of the therapy to the patient and his parent including the patient's right to withdraw at any time. Detailed history and complete physical examination (cutaneous and systemic) including height, weight, and blood pressure were taken. They were taken before the treatment, at the end of the treatment and before giving any pulse. Looking for any evidence of improvement or side effects.

Laboratory work carried out before and after treatment in different time periods were as follows: 1. At the start and every 3 months: complete blood count**,** differential, erythrocyte sedimentation rate, random blood sugar (RBS), renal profile (U/E),

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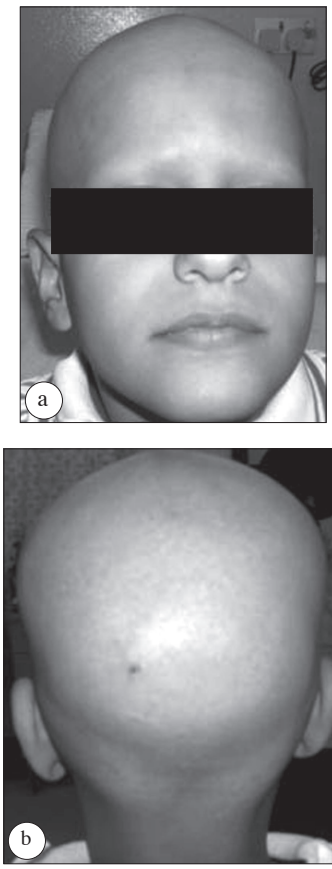

Figure 1 - Patient before treatment. **a)** anterior view and **b)** Posterior view

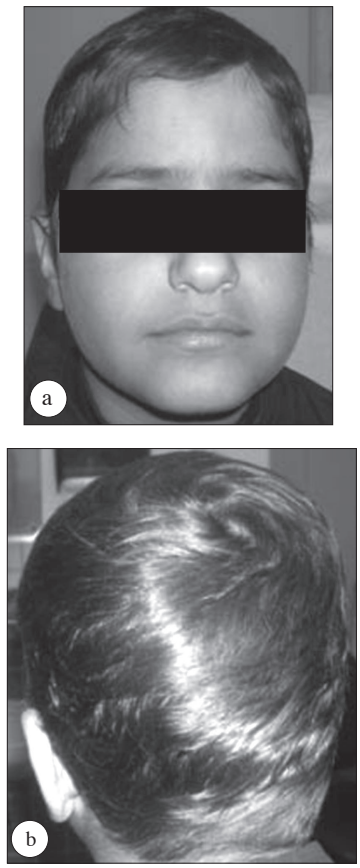

Figure 2 - Patient after 6 months of treatment. **a)** anterior view and **b)** Posterior view

liver function test, bone profile, fasting lipid profile (including high density lipoprotein and low density lipoprotein), urinalysis, stool analysis. 2. Before the start of treatment: chest x-ray, paranasal sinuses x-ray, tuberculin test, hepatitis serology and thyroid function test. 3. After 2 hours of the MP intake: ECG. 4. After each pulse in the 1st month then after every 3rd dose: RBS and U/E. 5. Early morning cortisol and short synacthen test: carried out pretreatment; one week after the 1st pulse and at the end of treatment. 6. Before and at the end of treatment: Dual energy x-ray absorptiometry scan, scalp biopsy and ophthalmologic assessment

Methylprednisolone sodium succinate was given orally as a bolus of 15 mg/kg of ideal body weight/day diluted in 200 ml of fresh orange juice within one hour after breakfast for 3 consecutive days. He was kept in the outpatient clinic for 2 hours for observation when ECG and relevant blood tests were carried out. The treatment protocol has been approved by the ethical committee and the deanship of scientific research of our institution (the College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia). It was comprised of 2 phases: During the induction phase; he received 12 pulses over 22 weeks as one pulse every 2 weeks. He started to show some response on the eyebrow at the 4th week of treatment. He showed scalp hair, and an eye lashes regrowth at the 10th week. He continued to show gradual improvement over the scalp, eyebrow and lashes, and body hair. Until he achieved cosmetically acceptable hair regrowth at the 14th week of treatment. Then 100% improvement by the 22nd week (**Figure 2**). During the maintenance phase; we started to increase the intervals between the pulses by increasing the interval to 4 weeks for the first pulse of that phase were he showed partial relapse after the 3rd week. The hair fall occurred mainly in the area above the posterior hairline, upon which we decided to give him 2 more pulses with an interval of 3 weeks in between. This maintained his regrown hair and prevented further hair loss. He was observed off treatment for a year

more. During which, he had regrowth of hair. Except for a tiny ophiasic patch, which persisted with no further hair loss, he tolerated the treatment very well, and the only detected side effect was transient short-lived hyperglycemia after some of the pulses. Three weeks from the start of treatment he was found to be nervous with increased attacks of nocturnal enuresis up to once every 2-3 days, which disappeared when he achieved a cosmetically acceptable hair regrowth at the 14th week. He was known to have few attacks of nocturnal enuresis almost every 2-3 weeks before treatment. His electrolytes, ECG readings, and the rest of his work up showed no abnormalities through out the course of treatment.

Scalp biopsy from alopecic patch before therapy, showed multiple hair follicles, the majority of them are in Catagen phase, with moderate perivascular and perifollicular lymphocytic infiltration. Multiple peribulbar fibrotic bands were seen. No pigment within fibrotic tract. The 2nd and 3rd scalp biopsies were taken after a year of treatment. With no treatment for 3 months. The 2nd scalp biopsy, taken from a regrown patch after treatment, showed multiple hair follicles, the majority of them are in Anagen phase (Terminal), without neither perivascular nor perifollicular lymphocytic infiltration. No pigment within fibrotic tract. The 3rd scalp biopsy, taken from a relapsed patch after treatment, showed multiple hair follicles; the majority of them are in Anagen phase (Vellous). With mild perivascular and perifollicular lymphocytic infiltration. Also, pigment within fibrotic tract.

Discussion. Alopecia areata in children accounts for approximately 20% of cases of alopecia areata.[6] Its clinical course is variable, wherein some patients have spontaneous remissions, while others progress to a total loss of their scalp hair (alopecia totalis) or body as well as scalp hair (alopecia universalis). Although the pathogenesis of alopecia areata is unknown, there is increasing evidence that a reversible tissue-restricted autoimmune process may be the underlying mechanism.[1]

Treatment of alopecia areata in children presents a special problem as the prognosis is poor.[6] Several therapies have been used for the treatment of extensive alopecia areata. But, none of these modalities consistently achieved cosmetically acceptable results. Systemic corticosteroids showed to be the most effective, but carry the risks of severe side effects in long-term therapy.[1] However, interest in systemic corticosteroids was regenerated by successful IV administration of suprapharmacologic doses in a spectrum of inflammatory conditions.[2] The mechanism by which pulse MP may affect a response in severe alopecia areata is unknown yet. It is known that glucocorticoid acts by binding to the intracellular glucocorticoid receptors leading to dimer formation and subsequent binding to specific DNA regulatory sequences or motifs known as glucocorticoid response elements. It may also exert their effects by non-genomic mechanisms such as membrane bound receptors or physiochemical interactions with cellular membrane. Some effects of pulse glucocorticoid are too rapid to be mediated by genomic mechanism of action. These effects might explain the additive benefits of pulse glucocorticoids. In addition, apoptosis of inflammatory cells, especially peripheral blood CD4+ T lymphocytes, may occur only at pulse doses of glucocorticoid.[2] By reviewing the literature, some clinical observations suggest that pulse glucocorticoid induce long lasting effects. However, this was not supported by immunological studies.[7] The regimens for pulse glucocorticoids administration and the glucocorticoid used may vary widely. Doses of MP are usually 10-20 mg/kg of body weight (250 to 1000 mg).[2] Most previous studies preferred the IV to the oral route of pulse glucocorticoids due to the uncertainty of its bioavailability and the gastric effect of the latter. However, recently it has been proven that short-term high dose oral prednisolone is not associated with greater gastric damage as measured with permeability test, than IV MP.[8] The relative bioavailability of the orally administered MP sodium succinate was 50-60% of the IV form.[9] In addition, oral administration decreases the cost and inconvenience of steroid therapy.

Dermatological use of pulse glucocorticoid therapy was first introduced in 1975 by Burton and Shuster[3] who used a single 2 gm IV MP pulse in 22 patients with alopecia areata with little success. But, subsequent reports using different treatment regimens concluded that it is effective in widespread alopecia areata. But not the totalis, universalis or ophiasis types.[1,2,4-6] Whether the failure is due to inadequate dosing or inadequate frequency is a matter of debate.[4] Oral pulse MP has been used in adult and young patients with alopecia areata. Given as 300 mg oral prednisolone pulses (at 4-week intervals) for a minimum of 4 doses produced good response. This response improved upon increasing the dose to 1000 mg per pulse.[4] Based on these data we made our protocol to be of high dose and to be given frequently. To find out, whether alopecia universalis will respond to pulse corticosteroid, if the protocol changed. It is well known that high-dose pulse glucocorticoids have the benefit of sparing the traditional long term

corticosteroid adverse effects. Large studies evaluating acute and long-term complications have found pulse therapy to have a low risk of significant adverse events. Most acute side effects where mild; though severe adverse events have been reported, including acute cardiovascular complications. A review of reported adverse cardiovascular effects of pulse glucocorticoid therapy found that those events were rare and occurs in patients with underlying kidney or heart diseases. Electrolyte shifts, hypersensitivity and a rapid rate of infusion were believed to be important causative factor in some of the events.[2]

Using our protocol in this patient led to complete hair regrowth after 6 months of treatment. Though partial relapse has occurred, it was localized and could be managed by topical, or intralesional steroid. This outcome is encouraging for alopecia universalis where spontaneous remission is rare. Especially that our patient has a strong atopic background. Both are considered to be poor prognostic factors. The initial success may be attributed to the short delay between disease onset and active medical treatment. Our experience reported here on the use of oral mega pulse MP in alopecia universalis along with the previous reports suggest that this mode of treatment should be evaluated using a large series of patients suffering from alopecia universalis.

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