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Review

Treatment of vitiligo in children

Kseniia K. Kadanina, Kira Yu. Kryuchkova, Konstantin M. Lomonosov

I.M. Sechenov First Moscow State Medical University (Sechenov University), Moscow, Russia

ABSTRACT

Vitiligo is an idiopathic disease of skin hypopigmentation that affects between 0.2% and 8% of the world's population. In half of the cases, this hypomelanosis manifests in young adolescence and childhood and can lead to profound psychological trauma and deterioration of the quality of life of both the child and his/her parents. Patients with vitiligo experience shame, anxiety and even depression, leading to low self-esteem and social isolation. Negative experience can affect not only childhood development, but also the further adult life of the patient, in this regard, the actual problem is the selection of effective and safe therapy in this cohort of patients. In the arsenal of doctors there are many therapeutic and surgical methods used in the treatment of this disease. However, not all therapies can be used in paediatric patients, which creates a challenge for paediatric dermatologists.

This review presents current, effective, and safe treatments for vitiligo in paediatric patients. Thus, external calcineurin inhibitors are first-line therapy, especially in children with stable vitiligo and limited lesions on the face, neck and body folds with thin skin. External glucocorticoid agents are recommended for moderate activity. Topical Janus kinase inhibitors provide the best results in the facial area. Demonstrated their effectiveness in achieving repigmentation in children with widespread and progressive vitiligo UVB-311 nm therapy, therapy with ultraviolet excimer light, PUVA-therapy (psoralen together with long-wave ultraviolet skin irradiation). Therapy with systemic corticosteroids can stop the progression of the disease and stimulate the repigmentation process. Surgical treatment (transplantation of melanocytes from healthy skin foci to depigmented foci) is rarely used in children. Cosmetic agents (camouflage) are used as symptomatic treatment, and psychological support is used as cognitive therapy.

Childhood vitiligo should be detected early to improve treatment outcomes and prognosis. Early detection of new exacerbations will allow rapid therapeutic intervention to prevent widespread spread of the disease.

Keywords: glucocorticosteroids; pediatric vitiligo; psychotherapy; systemic therapy; UVB therapy; phototherapy; surgical methods.

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Научный обзор

Лечение витилиго у детей

К.К. Каданина, К.Ю. Крючкова, К.М. Ломоносов

Первый Московский государственный медицинский университет имени И.М. Сеченова (Сеченовский Университет), Москва, Россия

АННОТАЦИЯ

Витилиго — идиопатическое заболевание кожи (гипопигментация), которым страдают от 0,2% до 8% населения Земли. В половине случаев данный гипомеланоз манифестирует в молодом и детском возрасте и может привести к глубокой психологической травме и ухудшению качества жизни как ребёнка, так и его родителей. Пациенты с витилиго испытывают стыд, тревогу и даже депрессию, что приводит к низкой самооценке и социальной изоляции. Негативный опыт может повлиять не только на детское развитие, но и на дальнейшую взрослую жизнь пациента, в связи с чем актуальной проблемой является подбор эффективной и безопасной терапии у данной когорты пациентов. В арсенале врачей имеется множество терапевтических и хирургических методов, применяемых в терапии витилиго, однако не все методы лечения могут быть использованы у пациентов в педиатрической практике, что создаёт сложности для детских дерматологов.

В представленном обзоре освещены актуальные, эффективные и безопасные методы лечения витилиго у пациентов детского возраста. Так, наружные ингибиторы кальциневрина являются терапией первой линии, особенно у детей со стабильной формой витилиго и ограниченными поражениями на лице, шее и складках тела с тонкой кожей. Наружные глюкокортикоидные препараты рекомендованы при умеренной степени активности. Лучшие результаты в области лица дают местные ингибиторы янус-киназы. Продемонстрировали свою эффективность в достижении репигментации у детей при распространённом и прогрессирующем витилиго УФВ-311 нм терапия, терапия ультрафиолетовым эксимерным светом, ПУВА-терапия (псоралены совместно с длинноволновым ультрафиолетовым облучением кожи). Терапия системными кортикостероидами позволяет остановить прогрессирование заболевания и стимулировать процесс репигментации. Хирургическое лечение (трансплантация меланоцитов с очагов здоровой кожи на депигментированные очаги) применяется у детей крайне редко. В качестве симптоматического лечения используют косметические средства (камуфляж), в качестве когнитивной терапии — психологическую поддержку.

Витилиго детского возраста должно быть выявлено на ранней стадии, чтобы улучшить результаты лечения и прогноз заболевания. Раннее выявление новых обострений позволит быстро провести терапевтическое вмешательство для предотвращения широкого распространения заболевания.

Ключевые слова: глюкокортикоиды; детское витилиго; психотерапия; системная терапия; УФБ-терапия; фототерапия; хирургические методы.

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ABSTRACT

Vitiligo is a common idiopathic skin disorder characterized by hypopigmentation, affecting between 0.2% and 8% of the world's population. Approximately 50% of patients develop the disease before 20 years of age, whereas 25% develop it before 8 years of age. The epidemiology of pediatric vitiligo is similar to that in adults but has some distinctions: unlike in adults, where the disease affects both sexes equally, pediatric vitiligo is more common in girls [1, 2].

In childhood, vitiligo can impose a significant psychological burden on both patients and their parents, leading to a decreased quality of life. Patients with vitiligo experience shame, anxiety and even depression, leading to low self-esteem and social isolation. Mood disorders are particularly prevalent among adolescents. Children with vitiligo usually avoid or limit participation in sports and miss school. Negative experience can affect not only childhood development, but also the further adulthood of the patient [3].

The differential diagnosis of pediatric vitiligo can be challenging due to its similarity to other hypopigmented conditions, such as tinea versicolor, postinflammatory hypopigmentation, leprosy, localized scleroderma, and piebaldism. Recent studies have also highlighted a potentially stronger association between pediatric vitiligo and various autoimmune diseases (e.g., autoimmune thyroiditis) as well as systemic inflammatory conditions (e.g., obesity, metabolic syndrome) [4].

Currently, the effectiveness of any vitiligo treatment is approximately 60% [5]. Therapy is long-term and stepwise. Although doctors have access to a wide range of therapeutic and surgical methods, not all of them are suitable for use in children. This review presents current and effective treatment methods for vitiligo in pediatric patients.

TREATMENT METHODS FOR VITILIGO IN PEDIATRIC PATIENTS

External therapy

Topical calcineurin inhibitors are the first-line therapy, particularly for children with stable vitiligo and limited lesions on the face, neck, and body folds with thin skin (e.g., inguinal and axillary regions). In pediatric patients, 0.03% tacrolimus ointment is applied topically in a thin layer twice daily for up to 3 months, or 1% pimecrolimus cream is used in the same manner for the same duration. The efficacy of monotherapy with these agents is approximately 43% [6]. Topical calcineurin inhibitors may be used in combination with narrowband ultraviolet B (NB-UVB) therapy.

In pediatric patients, moderate-potency *topical glucocorticoids*, such as 0.1% mometasone cream and 0.05% betamethasone cream, are recommended under either a continuous or an intermittent regimen. The continuous regimen involves the daily application of topical glucocorticoids. The intermittent regimen, which is preferred, consists of once-daily applications for 2 weeks, followed by a 2-week break. For vitiligo lesions on the trunk and limbs, moderate-potency corticosteroids are recommended, whereas low-potency corticosteroids should be used for lesions on facial skin. Treatment should continue for at least 3 to 4 months. Available studies report a response rate of 45% to 64% [7].

Topical Janus kinase inhibitors type 1 and type 2. In 2022, the United States approved ruxolitinib cream (Opzelura), a topical Janus kinase inhibitor (types 1 and 2), for the treatment of vitiligo in adults and children aged >12 years. The cream is applied twice daily for 24 to 52 weeks [8].

311 nm narrowband ultraviolet B (NB-UVB) therapy

NB-UVB therapy has demonstrated effectiveness in achieving repigmentation in children with widespread and progressive vitiligo (lesion area >20%) and is considered the treatment of choice for these forms of the disease [9]. Studies have reported significant repigmentation (>75%) in 14% to 75% of pediatric vitiligo cases treated with NB-UVB. However, treatment outcomes vary depending on the patient's skin phototype and lesion location. Facial and neck vitiligo respond better to treatment than lesions on the trunk and extremities [10].

In children and adults with Fitzpatrick skin type I, phototherapy is generally avoided due to poor tolerance and minimal clinical manifestations on the skin [11]. NB-UVB therapy exhibits a proportional relationship: earlier initiation of treatment is associated with greater clinical effectiveness. NB-UVB therapy is considered a safe treatment option. Current data do not confirm an association between NB-UVB therapy and an increased risk of malignant skin neoplasms in patients with vitiligo [12].

Reports indicate that NB-UVB therapy has been used in children as young as 3 years. However, according to Russian clinical guidelines, the minimum recommended age for initiating NB-UVB therapy is 7 to 10 years. Key prerequisites for its use in pediatric vitiligo include the child's ability to follow instructions, remain still during the procedure, and tolerate enclosed spaces without fear. Precautionary measures should not be overlooked to minimize phototoxicity. To reduce the risk of cumulative effects, experts recommend discontinuing treatment if no repigmentation occurs within 3 months [7].

Phototherapy is usually combined with other treatment methods. For example, the combination of NB-UVB with topical corticosteroids or calcineurin inhibitors [13] has demonstrated effectiveness in pediatric vitiligo.

Ultraviolet 308-nm excimer light therapy

Excimer light sources emit ultraviolet radiation at 308 nm, inducing photobiological effects similar to those of NB-UVB,

including inflammation reduction and T-cell apoptosis. Additionally, excimer radiation stimulates the differentiation of melanocytic stem cells, enhances melanin production, and promotes the proliferation and migration of melanocytes, leading to repigmentation [11].

Koh et al. [14]compared excimer light therapy with other phototherapy modalities, including NB-UVB and PUVA therapy. There were no significant differences in effectiveness of these methods.

The key advantage of excimer light therapy is its selective action, targeting only affected skin areas while sparing surrounding healthy skin. This reduces the risk of ultraviolet-related side effects. However, the primary advantage of this phototherapy method can also be its drawback: ultraviolet excimer light does not stabilize vitiligo, as unaffected areas are not exposed to radiation. Excimer laser (or lamp) phototherapy has been shown to be effective in achieving repigmentation in both adults and children, with the best results observed in lesions on the neck and face [15].

In children, the effectiveness of this method in achieving 75% repigmentation can reach 65.4%, with the most favorable outcomes seen in those with a disease duration of less than six months. Excimer light with a wavelength of 308 nm is indicated for children with localized vitiligo affecting <10% of the body surface area [11]. Excimer radiation has demonstrated efficacy in combination with topical corticosteroids and calcineurin inhibitors for the treatment of pediatric vitiligo, including its refractory form [16].

PUVA therapy

PUVA therapy (synonym: photochemotherapy) involves the use of psoralen photosensitizers followed by exposure of the skin to long-wave ultraviolet light (UVA) with a wavelength of 320–400 nm [17].

Since UVA penetrates the skin more deeply than UVB, PUVA therapy is preferred for refractory lesions with significant skin infiltration or progressive vitiligo. The repigmentation initiated by PUVA therapy persists for many years. Photochemotherapy reduces depigmentation by stimulating the release of growth factors into the bloodstream and promoting melanocyte proliferation. The median repigmentation rate with PUVA therapy ranges from 40% to 45% [18].

According to national guidelines, PUVA therapy is contraindicated in pediatric vitiligo. However, foreign authors suggest that photochemotherapy is permissible for children over 10–12 years of age. In exceptional cases, this treatment may also be considered for younger age groups under 12 years, provided that regular ophthalmologic monitoring is conducted. Magdaleno-Tapial et al. [19] emphasize that PUVA therapy is a safe and effective treatment for vitiligo in children and can be prescribed at the same doses as for adults.

Systemic corticosteroid therapy

For patients with actively progressing unstable vitiligo, another therapeutic option is the systemic administration of corticosteroids (e.g., betamethasone, methylprednisolone), which help halt disease progression and stimulate repigmentation. Due to the risk of significant adverse effects, corticosteroids are prescribed for a short duration or in a pulse regimen [20].

In vitiligo treatment, systemic corticosteroid mini-pulse therapy is commonly used, involving oral administration of the drug for two consecutive days per week over 2 to 6 months. The recommended doses for children are 0.1 mg/kg of body weight for betamethasone and 8 mg/kg/day for methylprednisolone [21]. This therapeutic approach provides favorable clinical outcomes while minimizing adverse effects. Pasricha et al. [22] evaluated the effects of betamethasone mini-pulse therapy in children with vitiligo, reporting disease stabilization in 89% of participants and spontaneous repigmentation in 80% of cases. In another retrospective study, 56% of children who received methylprednisolone mini-pulse therapy (8 mg/kg/day) achieved disease stability without further progression, while 63% experienced more than 25% repigmentation six months after treatment initiation [23].

Surgical treatment

Surgical treatment of vitiligo involves transplanting melanocytes from healthy skin areas to depigmented lesions using various techniques [24].

Although surgical methods are quite popular abroad, they are not considered the first-line therapy in pediatric patients. In Russia, their use is very limited. There is no consensus on the minimum age for transplantation. However, surgery is not recommended for very young children, as even stable vitiligo lesions tend to enlarge proportionally with body growth. Some studies have investigated various transplantation methods in children under 10 years of age. Although there are reports of successful outcomes, most authors tend to conclude that these methods should be approached with caution, including considering the painful nature of the procedure [25].

Cosmetic products

As a symptomatic approach to reduce clinical manifestations, various cosmetic products, including self-tanning agents and camouflage products, can be used. Makeup can be matched to the patient's skin tone and applied daily or before important events [26]. Recent data have shown that makeup concealing depigmented lesions improves the quality of life in children with vitiligo affecting the facial skin [27].

Depigmentation

Depigmentation is performed with 20% monobenzyl ether of hydroquinone in patients with extensive lesions that have remained refractory to all available treatment methods for

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at least five years. This approach achieves uniform skin tone by depigmenting areas unaffected by vitiligo. This method is exclusively used in adults and is contraindicated in children [28].

Psychotherapy

Psychological support or cognitive therapy is an essential component of comprehensive treatment for both adult and pediatric vitiligo. Psychological support is important not only for the child but also for their parents, particularly when the skin condition significantly affects the quality of life. If a child exhibits severe psychological distress or motor impairments, psychiatric consultation and pharmacological correction should be considered [29].

CONCLUSION

Thus, early detection of pediatric vitiligo is crucial for improving treatment outcomes and disease prognosis. Identifying new exacerbations in a timely manner enables prompt therapeutic intervention, helping to prevent widespread progression. Currently, a wide range of therapeutic options has been proven effective in vitiligo treatment. Given the cosmetic concerns associated with the disease, its potential psychological impact should not be underestimated, particularly in adolescents.

ADDITIONAL INFORMATION

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AUTHORS' INFO

*** Kseniia K. Kadanina;**
address: 4/1 Bolshaya Pirogovskaya street, 119991 Moscow, Russia;
ORCID: 0009-0001-7433-7963;
eLibrary SPIN: 5714-1605;
e-mail: kseniiakadanina@gmail.com

Kira Yu. Kryuchkova;
ORCID: 0000-0002-1172-9695;
eLibrary SPIN: 4743-6244;
e-mail: kira.kruchkova@mail.ru

Konstantin M. Lomonosov, MD, Dr. Sci. (Medicine), Professor;
ORCID: 0000-0003-0524-6950;
eLibrary SPIN: 4784-9730;
e-mail: lamclinic@yandex.ru

* Corresponding author / Автор, ответственный за переписку

ОБ АВТОРАХ

*** Каданина Ксения Константиновна;**
адрес: Россия, 119991, Москва, ул. Большая Пироговская, д. 4, стр. 1;
ORCID: 0009-0001-7433-7963;
eLibrary SPIN: 5714-1605;
e-mail: kseniiakadanina@gmail.com

Крючкова Кира Юрьевна;
ORCID: 0000-0002-1172-9695;
eLibrary SPIN: 4743-6244;
e-mail: kira.kruchkova@mail.ru

Ломоносов Константин Михайлович, д-р мед. наук, профессор;
ORCID: 0000-0003-0524-6950;
eLibrary SPIN: 4784-9730;
e-mail: lamclinic@yandex.ru