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Approach to Pediatric Psoriasis

Developed by Dr. Harry Liu, David Jung, and Dr. Joseph Lam for PedsCases.com.
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Introduction:

Welcome to “Approach to Pediatric Psoriasis”, a podcast made for PedsCases.com at the University of Alberta. I am Dr. Harry Liu, a dermatology resident at the University of British Columbia, and I am David Jung, a medical student at the University of British Columbia. This podcast will provide an organized approach to understand pediatric psoriasis, a common dermatological condition in pediatric population. We would like to thank Dr. Joseph Lam, a pediatric dermatologist practicing in Vancouver, BC, Canada, for developing this podcast with us!

Learning Objectives

After listening to this podcast, we expect the learner to be able to:

1) Describe the typical clinical presentations of psoriasis
2) Discuss the underlying pathophysiology of psoriasis
3) Identify different types of psoriasis and their unique characteristics
4) Recall epidemiological risk factors and comorbidities associated with psoriasis
5) List common treatment options for pediatric psoriasis

Case

First, we’d like to present a case. It is your day at an urban pediatric clinic as a fourth-year elective student. Your first patient is Lucy, an 8-year-old girl brought in by her mother for the concern of a newly developed rash. On history, Lucy has had the rash on her knees for about 3 months. The rash has gradually increased in size and has become quite scaly. When Lucy scratches, her mother also notices some bleeding. The mother is quite concerned because the rash has made many kids at school avoid Lucy. Before the development of the rash, Lucy had an episode of culture proven group A *Streptococcal* (GAS) pharyngitis which resolved with oral antibiotics; she is otherwise very healthy.

On physical examination, Lucy is overweight, and you note round, brightly erythematous, well-demarcated plaques about 5cm in width. These plaques are covered with silvery-white scale.

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The remainder of the dermatological examination is normal. The mother asks you, “I have psoriasis and had a similar rash when I was younger. Could this be psoriasis?”.

Epidemiology, including risk factors

Before answering the question, let’s review the epidemiology and risk factors of psoriasis.

In terms of epidemiology, psoriasis is a relatively common condition. Global estimates for the prevalence of psoriasis range from 0.51% to 11.4% for adults, and 0% to 1.37% for children. There is an increase in prevalence with age, and it is estimated that one-third of cases manifest before the age of 20. In Canada, psoriasis was found to affect 2.5% of adults in Ontario.

Multiple risk factors have been identified for psoriasis. The genetic heritability of psoriasis has been well-established, and up to 30% of pediatric patients report a family history of the disease. The risks of developing psoriasis in monozygotic twins is two to three times greater than that for dizygotic twins. In particular, the psoriasis-susceptibility (PSORS1) locus of the human leukocyte antigen (HLA)-Cw6 gene in chromosome 6 has been associated with early-onset psoriasis.

Infections have also been recognized as a predisposing factor, especially with perianal and pharyngeal group A beta-hemolytic *Streptococcal* infections. Additional triggers include increased body weight, emotional stressors, cutaneous trauma (known as Koebner phenomenon), Kawasaki disease, and second-hand smoking exposure. Other triggers include withdrawal of systemic corticosteroids, and paradoxically tumor necrosis factor (TNF)-alpha inhibitors, which are also used to treat psoriasis. As we can see in Lucy’s case, several risk factors were present, such as: her family history of psoriasis, recent *Streptococcal* infection, and obesity.

Brief pathogenesis and pathophysiology

Psoriasis is a dynamic and heterogenous condition. People can have variable presentations of the disease, ranging from a limited and localized rash causing minimal distress, to life-threatening presentations such as generalized neonatal pustular dermatosis.

Psoriasis is an immune-mediated disorder, and our knowledge of its complex pathogenesis is constantly evolving with the development of new treatments. As mentioned earlier, there is a genetic component and certain genes increase the chances of acquiring psoriasis. Clinical manifestations of psoriasis are thought to be multifactorial, caused by the dysregulation or alteration in the functioning of many body systems including keratinocytes, vascular structures, and components in the innate and adaptive immunity. T-cell regulation is notably impaired, with Th1 and Th17 cytokines predominating. This is in contrast to atopic dermatitis, which is a largely Th2-mediated process. IL-12 and IL-23 are also important inflammatory mediators involved in psoriasis.

Clinical Presentation and Differential Diagnosis

There are different clinical variants of psoriasis, which are classified based on morphology. These include chronic plaque, guttate, erythrodermic, pustular, and inverse/flexural psoriasis. We will discuss them one by one later. Compared with adults, pediatric patients have a different distribution, and they are more likely to have the face, scalp, intertriginous, and diaper areas involved.

The most common type of psoriasis is chronic plaque psoriasis, which manifests with papules and plaques that appear scaly and erythematous. Its distribution is usually symmetric and clinical presentation can range from a few papules/plaques to a more diffuse disease involving the extensor surfaces, scalp, lower back, and anogenital region. In young children, an isolated diaper rash can be the initial presentation, and plaques may be less scaly than expected due to the increased moisture in the diaper area. Therefore, always keep psoriasis in your differential for diaper rash, especially when the rash is not responsive to standard treatment. Moreover, plaque psoriasis can be accompanied by nail findings, including nail pitting and discolouration, onycholysis, and subungual thickening. Therefore, a complete skin examination is very important. One classic sign of chronic plaque psoriasis that was mentioned earlier is the "Koebner phenomenon," which is the formation of psoriatic plaque in sites of cutaneous trauma.

Guttate psoriasis is another common presentation of pediatric psoriasis. It is classically associated with group A *Streptococcal* infections, such as GAS pharyngitis. Guttate psoriasis presents with dew drop-like lesions, hence the name "guttate" (which means drop-like), and presents as 1 to 10 mm salmon-pink papules with fine scales on top. However, these can appear violaceous or hyperpigmented in patients with darker skin.

Other types of psoriasis are less common compared with plaque and guttate psoriasis. Erythrodermic psoriasis is characterized by generalized erythema covering nearly the entire body surface area, with varying degrees of scaling and exfoliation. Meanwhile, pustular psoriasis is marked by pustules that can rupture and become infected. This is a more severe form of psoriasis, and acute generalized pustular psoriasis requires hospitalization. Lastly, inverse/flexural psoriasis has erythematous plaques located in the skin folds, with minimal scale. While pustular psoriasis is thankfully rare in children, inverse/flexural psoriasis is more common in the pediatric population compared to adults.

The differential diagnosis of psoriasis should include psoriasiform dermatitis and other papulosquamous disorders including pityriasis lichenoides chronica, pityriasis rosea, pityriasis rubra pilaris, lichen planus, drug eruptions, cutaneous T-cell lymphoma, and widespread dermatophytosis.

Psoriasis is diagnosed clinically in children and skin biopsy is rarely required except in cases of pustular psoriasis. As always, we want to compile and synthesize information from both the history and physical examination to reach the diagnosis. Besides the morphology of the lesions, several factors will increase our clinical suspicion of psoriasis, such as family history, presence of known triggers (like the *Streptococcal* infection in Lucy's case), history of Koebner phenomenon, and comorbid symptoms that will be discussed later. Going back to our case, given the information presented, we should be able to diagnose Lucy with plaque psoriasis.

Comorbidities

The effects of psoriasis extend far beyond the skin of patients. Therefore, a holistic approach involving multiple healthcare professionals may be important. While obesity was previously discussed as an important risk factor for psoriasis, it is also a common comorbidity. Furthermore, patients are more likely to experience dyslipidemia, insulin resistance, and even metabolic syndrome.

Patients are also susceptible to psoriatic arthritis, which manifests as tenderness, stiffness, and edema affecting the joints, tendons and ligaments. The onset of pediatric psoriatic arthritis is bimodal, with the greatest risks during preschool years and during middle to late childhood. The prevalence of psoriatic arthritis among children remains unknown, but Canadian adult estimates cite the prevalence of approximately 0.2%.

Finally, the psychosocial impact of psoriasis can be profound. Patients are more vulnerable to psychiatric disorders, including anxiety and depressive disorders. In our case, for example, Lucy's classmates are avoiding her because of her rash. A European study investigating the psychological effects of multiple skin diseases found that psoriasis was the only condition significantly associated with suicidal ideation. Other comorbidities of psoriasis include inflammatory bowel disease and hypertension. Again, these comorbidities emphasize the need for a comprehensive care-plan for psoriasis patients.

Treatment

All patients should be provided with educational resources to better understand psoriasis. This is especially important, considering the chronicity of psoriasis. Treatments for psoriasis are continuously evolving, and include topical, light, and systemic therapies. The selection of treatment may depend on the clinical presentation, comorbidities, and preferences of patients.

Topical options

Topical therapies include corticosteroids, Vitamin D analogues, calcineurin inhibitors, and anthralin/tar preparations. These agents are used in milder form of psoriasis, especially in chronic plaque type. Among topical options, corticosteroids are generally first-line and effective for limited psoriasis. For our patient Lucy, topical corticosteroids would be an appropriate treatment to start. Vitamin D analogues are another first-line therapy, but can be more costly, which may complicate medication compliance. Calcineurin inhibitors, including tacrolimus and pimecrolimus, are another option for the face and intertriginous areas. Finally, tar and anthralin preparations can be used in cases of thicker plaques.

Topical treatments are unfortunately not free from side effects. Long-term topical steroid therapy can cause skin atrophy and striae. Meanwhile, other topical therapies may be associated with skin irritation or staining.

As psoriasis is a systemic condition, topical therapies can be tailored to treat specific body sites. For instance, scalp psoriasis can be addressed using foam or shampoo formulations of topical corticosteroids. Meanwhile, nail psoriasis can be difficult to treat as corticosteroids must be targeted to penetrate the nail plate. While corticosteroids can be injected, these are painful and undesirable. Instead, corticosteroids in tape and gel formulations can be attempted to address nail lesions.

Ultraviolet phototherapy

Patients may also benefit from exposure to ultraviolet phototherapy, either as monotherapy or in conjunction with topical treatments. Among the spectrum of electromagnetic radiation, narrow-band ultraviolet B light has shown the best evidence. Patients can receive phototherapy in an outpatient dermatology office, or through a home light-box. Phototherapy is usually initiated at a lower dose, and titrated up to a more therapeutic range while monitoring for symptoms and tolerance. It is essential to monitor for and manage side effects including pruritus, skin darkening and burning.

Systemic options

Systemic therapies are usually more potent than topical counterparts, but at the expense of more potential adverse effects. These treatments can be delivered as oral, subcutaneous, or intravenous forms, and include methotrexate, cyclosporine, and biologics such as TNF-alpha inhibitors and interleukin inhibitors. Some side effects for these agents include hepatotoxicity, nephrotoxicity and pancytopenia.

Systemic therapies are generally reserved for patients with resistance to topical therapies, in addition to erythrodermic and pustular psoriasis. These should be ideally initiated by dermatologists as further investigations and closer monitoring of side effects may be necessary.

Some of the newer agents approved for the treatment of psoriasis include anti-IL 12/23 and anti-IL-17 therapies. These biologics do not require intensive monitoring, and patients only need a tuberculosis skin test prior to initiating therapy. Psoriasis is an active area of research, and there may be newer agents available in the future so be sure to keep yourself up to date with the latest available therapies.

Take Home Points

We hope you found our podcast helpful and learned something new. Here are some quick take home messages for you:

1) Psoriasis is a relatively common condition with an increase in prevalence with age, affecting up to 1.4% of children worldwide.
2) Risk factors for psoriasis include family history, obesity, psychological and physical stress, and environmental factors such as skin trauma and infections (ie. GAS).
3) There are multiple types of psoriasis, including chronic plaque, guttate, erythrodermic, pustular, and inverse/flexural psoriasis. Chronic plaque psoriasis is the most common variant.
4) Psoriasis is accompanied by several comorbidities, including metabolic syndrome, cardiovascular risks, psoriatic arthritis, and psychosocial effects.
5) Treatment options for psoriasis include topical, light, and systemic therapies. The choice depends on the clinical severity of psoriasis, and patient preferences.

This concludes our discussion. Thank you for listening to PedsCases Podcasts!

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