Acta Dermatovenerol APA

Acta Dermatovenerologica
Alpina, Pannonica et Adriatica

2021;30:99-104
doi: 10.15570/actaapa.2021.25

A retrospective analysis of clinical characteristics and management of perianal streptococcal dermatitis in children and adults

Anja Šterbenc[1], Olga Točkova[2], Liza Lea Lah[3], Tina Kamhi Trop[4], Katja Seme[1], Nataša Švent-Kučina[1], Irena Peteln[2], Mateja Pirs[1] ✉

[1]Institute of Microbiology and Immunology, Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia. [2]Department of Dermatovenereology, University Medical Centre Ljubljana, Ljubljana, Slovenia. [3]Department of Infectious Diseases, University Medical Centre Ljubljana, Ljubljana, Slovenia. [4]Department of Gastroenterology, Hepatology and Nutrition, Children's Hospital, University Medical Centre Ljubljana, Ljubljana, Slovenia.

Abstract

Introduction: Due to the paucity of recent literature on perianal streptococcal disease (PSD), we performed a comprehensive analysis of clinical characteristics of PSD and its management.
Methods: We conducted a retrospective search in the laboratory information system of the Institute of Microbiology and Immunology, Ljubljana, Slovenia, between January 2006 and December 2016 and identified patients with suspected PSD. We reviewed patients' medical records and obtained data on patient age and sex, concomitant illnesses, duration of complaints, signs and symptoms of PSD, epidemiological history, date of diagnosis, microbiological characteristics of beta-hemolytic streptococcal isolates, additional laboratory findings, duration and type of systemic and/or topical therapy, and recurrence of PSD.
Results: We identified 64 pediatric and eight adult PSD cases in total. The most common signs and symptoms were perianal erythema (67/72; 93.1%), anal fissures (28/72; 38.8%), itching (22/72; 30.6%), and blood-streaked stools (19/72; 26.4%). The duration of symptoms varied from ‹ 1 week to › 1 year, with 58.3% of patients experiencing symptoms between 1 week and 6 months. The majority of patients received systemic (63/72; 87.5%) and topical (56/72; 77.8%) treatment.
Conclusions: Although the signs and symptoms of PSD are non-specific, clinicians should be highly suspicious of the disease in adults and especially in preschool children with perianal complaints. Despite being a common disease, there is still considerable delay in correct diagnosis and treatment, prolonging the discomfort of PSD patients.

Keywords: perianal streptococcal dermatitis, children, adults, clinical characteristics, treatment

Received: 20 July 2021 | **Returned for modification:** 8 August 2021 | **Accepted:** 10 August 2021

Introduction

Perianal streptococcal dermatitis (PSD), also referred to as perianal infectious dermatitis (PIS), is a superficial bacterial infection of the perianal skin that is most commonly caused by beta-hemolytic streptococci (BHS) of groups A (GABHS) and B (GBBHS). Rarely, PSD may also be caused by infection with non–group A or B BHS and *Staphylococcus aureus* (1, 2). Although PSD is considered to primarily be a pediatric condition (1, 3, 4), several cases have also been reported in adults (5–7). Despite being a well-documented clinical entity especially in children, it is still considerably underrecognized by physicians, mostly because of its non-specific symptoms (3, 4, 8, 9). PSD mimics other common diseases in the perianal region and can thus be mistaken for candidiasis, irritant diaper dermatitis, pinworm infestation, chronic inflammatory bowel disease, seborrheic dermatitis, or even sexual abuse (8, 10).

In order to provide additional data that would alert clinicians and allow better recognition of the disease, we conducted a comprehensive retrospective analysis of clinical characteristics of PSD performed on a relatively large number of pediatric and adult patients with perianal complaints.

Patients and methods

Study design

Figure 1 shows the flowchart of the study. In 2016, a pilot study was performed to evaluate the microbiological characteristics of PSD, described in detail elsewhere (11). Briefly, in the pilot study we searched the laboratory information system (LIS) of the Institute of Microbiology and Immunology, Faculty of Medicine, University of Ljubljana, Slovenia, between January 2006 and December 2015 using the filters *swab*, *BHS*, *perianal*, *anal*, *perineal*, *intergluteal*, and *rectal*. Patients were identified based on their first BHS isolate within our LIS. The following inclusion criteria were used: 1) perianal or perineal swabs were obtained from clinically intact skin, and 2) patients were not hospitalized at the hematological or oncological department at the time the swab was obtained.

In this study, we additionally searched for microbiology laboratory records of perianal BHS isolates that were cultured between January and December 2016 using the same filters and inclusion criteria as in the pilot study. After all eligible patients from both the pilot study and the current study were identified, we limited our analysis to patients that were diagnosed in one of the three

✉ Corresponding author: mateja.pirs@mf.uni-lj.si

departments at the University Medical Centre Ljubljana that manage most PSD cases; namely, the Department of Dermatology, the Department of Gastroenterology, Hepatology, and Nutrition at the Children's Hospital, and the Department of Infectious Diseases. For each patient identified, we examined the patient's medical record and obtained relevant demographic and clinical data. Patients with a positive perianal BHS culture that were asymptomatic at the time of the examination were excluded from our analysis (Fig. 1).

Microbiology testing

BHS identification to the species level and antimicrobial susceptibility testing were determined, as described in detail previously (11). Data regarding BHS species and antimicrobial susceptibility were analyzed only for the first perianal BHS isolate obtained from each patient included.

Ethics

The study was conducted in accordance with the Helsinki Declaration and was approved by the Ethics Committee of the Ministry of Health of the Republic of Slovenia (consent reference 0120-241/17). The protocol of this study was approved by the Institutional Review Board of the Institute of Microbiology and Immunology, Faculty of Medicine, University of Ljubljana. All perianal swab samples were submitted to the Institute of Microbiology and Immunology as a part of a routine diagnostic procedure, and none of the BHS isolates were obtained solely for the purpose of this study. Patient confidentiality was ensured through coding, and the data obtained were analyzed anonymously.

Results

Of the 125 microbiology laboratory records of perianal BHS infections identified between 2006 and 2016, a total of 72 patients (64 children and eight adults) with clinically and laboratory-confirmed PSD were eligible for inclusion in the final analysis (Fig. 1).

The majority of patients (51/72; 70.8%) were examined at the Department of Dermatovenereology, followed by the Department of Gastroenterology, Hepatology, and Nutrition at the Children's Hospital (14/72; 19.4%), and the Department of Infectious Diseases (7/72; 9.7%). Almost half of PSD cases were diagnosed between April and June (30/72; 41.7%), whereas a nadir was observed during August and September.

The characteristics of the study population and the frequency of the signs and symptoms reported are presented in Tables 1 and 2, respectively. The median age at diagnosis was 5 years (mean age 10.7 years, age range 1–79 years). The duration of symptoms varied significantly, from less than 1 week to several years (Fig. 2).

Table 1 | Demographic, epidemiological, and clinical characteristics of patients with perianal streptococcal dermatitis.

Characteristic	Patients, *n* (%)
Age (years)	
1–6	48 (66.7)
7–15	16 (22.2)
16–65	5 (6.9)
› 65	3 (4.2)
Sex	
Male	50 (69.4)
Female	22 (30.6)
Epidemiology	
Preceding upper respiratory infection	7 (9.7)
Relatives with perianal symptoms / streptococcal tonsilopharyngitis	4 (5.6)
Preexisting/concomitant conditions	
Dermatological disease	22 (30.6)
Atopic dermatitis	9 (12.5)
Allergy	4 (5.6)
Keratosis pilaris	2 (2.8)
Id reactions	2 (2.8)
Pityriasis rosea	2 (2.8)
Other	7 (9.7)
Systemic/skin infections	17 (23.6)
Fungal	7 (9.7)
Bacterial	6 (8.3)
Viral	3 (4.2)
Parasitic	1 (1.4)
Anorectal disease	4 (5.6)
Other conditions	13 (18.1)
No preexisting/concomitant conditions	30 (41.7)

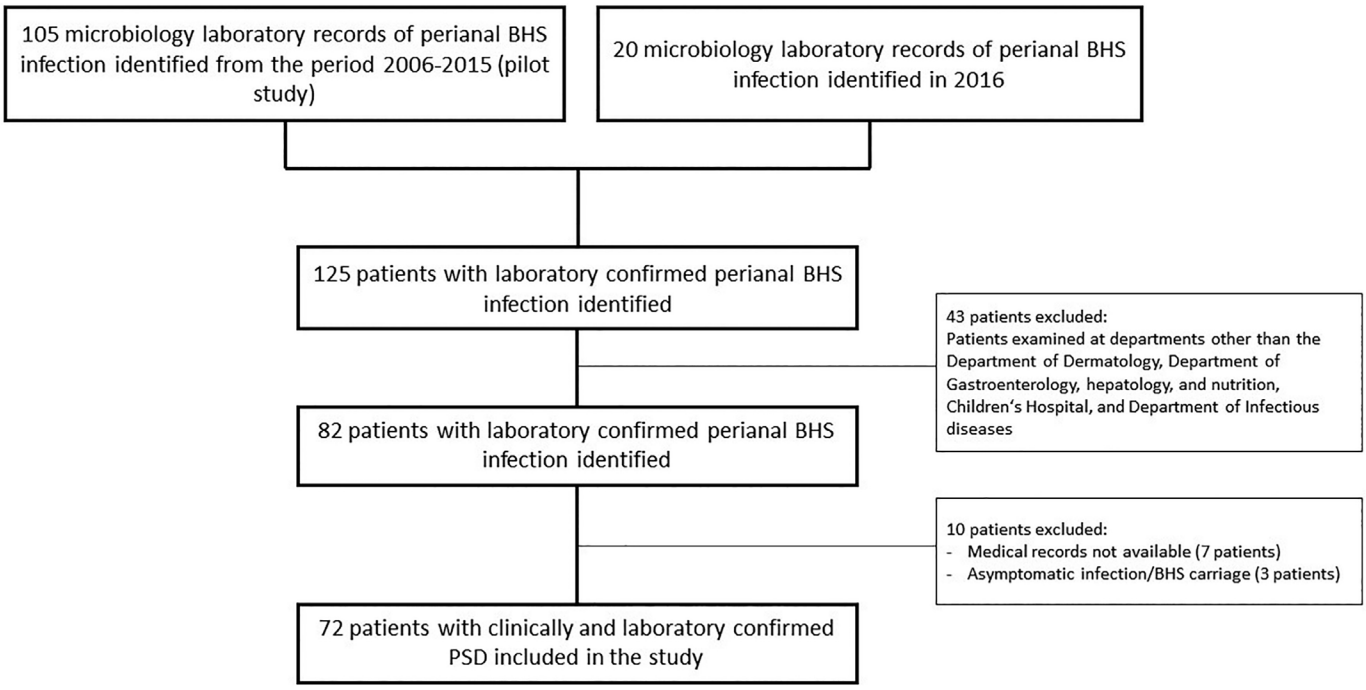

Figure 1 | Flowchart of the study; BHS = beta-hemolytic streptococci, PSD = perianal streptococcal dermatitis.

Prior to perianal swab sampling, 14 patients (19.4%) had already received systemic treatment that consisted of oral penicillin (12/72; 16.7%), amoxicillin/clavulanic acid (1/72; 1.4%), and an oral antifungal agent (1/72; 1.4%). Moreover, 41 patients (56.9%) had already been treated using topical ointments prior to sampling, including topical antibiotics (21/72; 29.2%), antifungals (21/72; 29.2%), corticosteroids (16/72; 22.2%), and tacrolimus/pimecrolimus (2/72; 2.8%). Laboratory data and results are shown in Table 3.

GABHS, GBBHS, and non–group A or B BHS were cultured in 51/72 (70.8%), 14/72 (19.4%), and 7/72 (9.7%) cases, respectively. All GABHS, GBBHS, and non–group A or B BHS were susceptible to penicillin and clindamycin. Resistance to erythromycin was detected in 1.9% (1/52) and 14.3% (2/14) of GABHS and GBBHS isolates, respectively, whereas all non–group A or B BHS were susceptible to erythromycin.

After culture results were obtained, systemic and topical treatment was initiated in the majority of patients (63/72 or 87.5% and 56/72 or 77.8%, respectively; Table 4). In 4/72 (5.6%) patients' records there were no indications of either systemic or topical treatment. Among those that were treated, 51/68 (75.0%) received both systemic antibiotics as well as topical therapeutic agents, 12/68 (17.6%) received systemic antibiotic therapy only, and 5/68 (7.4%) received topical therapeutic agents only. Sixteen patients (28.6%) received combination topical treatment that included at least two agents (e.g., antibiotic plus antifungal agent). In most cases, patients received a 10- to 21-day course of systemic antibiotics, although different regimens were also implemented (Fig. 3). The duration of topical therapy varied from 10 days to several weeks (Fig. 3).

Recurrence or relapse of the disease (prior to or after perianal swab sampling) was reported in 21/72 (29.2%) patients.

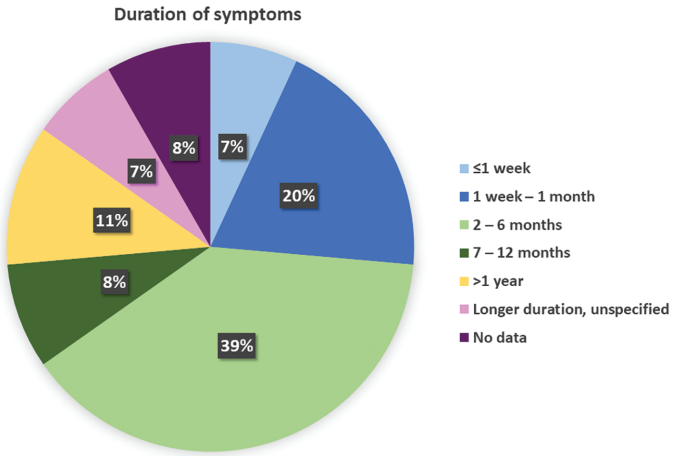

Figure 2 | A significant proportion of PSD patients present with long-lasting symptoms.

Table 2 | Clinical signs and symptoms of perianal streptococcal dermatitis.

Associated symptoms/signs	Patients, *n* (%)
Erythema	67 (93.1)
Anal fissures/rhagades/erosions	28 (38.8)
Itching	22 (30.6)
Blood-streaked stools	19 (26.4)
Constipation	15 (20.8)
Pain on defecation	12 (16.7)
Discharge/oozing	10 (13.9)
Papules/pustules	9 (12.5)
Erythema of perineum and/or genitalia	9 (12.5)
Scaling	7 (9.7)
Burning sensation	5 (6.9)
Irritability	3 (4.2)
Other symptoms/signs	
Whitish membranes	8 (11.1)
Abdominal pain	4 (5.6)
Fever	4 (5.6)
Maceration	3 (4.2)
Encopresis	2 (2.8)
Spread of foci to scalp, face, or trunk	2 (2.8)
Vomiting	1 (1.4)
Loss of appetite	1 (1.4)
Rash in the axilla	1 (1.4)
Umbilical erythema and discharge	1 (1.4)
Sclerotic plaque	1 (1.4)
Pain and swelling of the labia (furuncle)	1 (1.4)
Pain and itching of the genital area	1 (1.4)
Occasional genital discharge	1 (1.4)

Discussion

In this study, characteristic seasonal distribution of PSD cases with a peak in winter and spring months and a nadir in summer months was observed, as reported previously (12, 13).

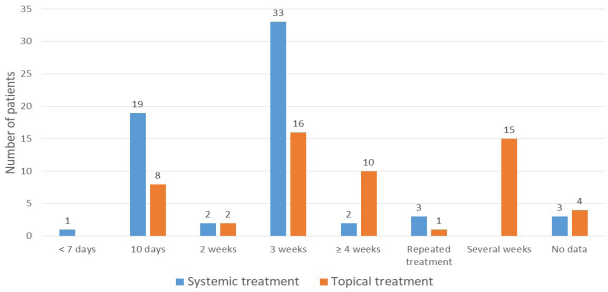

Figure 3 | Systemic antibiotic treatment is usually prescribed for 10 to 21 days, whereas topical treatment is mostly used for longer periods.

Table 4 | Therapeutic agents used for systemic and topical treatment of perianal streptococcal dermatitis.

Therapy	Patients, *n* (%)
Systemic treatment	63 (87.5)
Beta-lactam antibiotics*	60 (83.3)
Other antibiotics†	4 (6.3)
No systemic treatment or no data available	9 (12.5)
Topical treatment	56 (77.8)
Antibiotics‡	53 (73.6)
Antifungal therapy	10 (13.9)
Corticosteroids	6 (8.3)
Tacrolimus/pimecrolimus	3 (4.2)
Zinc cream	2 (2.8)
No topical treatment or no data available	16 (22.2)

* Penicillin (*n* = 52; 86.7%), amoxicillin/clavulanic acid (*n* = 6; 10.0%), cefuroxime (*n* = 2; 6.7%).
† Clindamycin (*n* = 2), azithromycin (*n* = 1), trimethoprim/sulfamethoxazole (*n* = 1).
‡ Gentamycin (*n* = 38; 71.7%), fusidic acid (*n* = 8; 14.3%), mupirocin (*n* = 5; 8.9%), clindamycin (*n* = 2; 3.6%).

Table 3 | Laboratory investigations and results, *n*/total (%).

	Monitored	Low	Normal	Elevated	Positive
White blood cell count	16/72 (22)	–	10/16 (81.3)	3/16 (18.8)	–
C-reactive protein	13/72 (18.1)	–	10/13 (76.9)	3/13 (23.1)	–
Creatinine	10/72 (13.8)	1/10 (10.0)	7/10 (70.0)	2/10 (20.0)	–
Urea	8/72 (11.1)	–	8/8 (100.0)	–	–
Throat swabs	16/72 (22.2)	–	–	–	5/16 (31.3)
Antistreptolysin titers	3/72 (4.2)	–	1/3 (33.3)	2/3 (66.7)	–

The age-related distribution of PSD cases was in line with previous studies (12, 14, 15) because children age ≤ 15 represented 88.9% of PSD cases identified. The typical age-related distribution of PSD might be due to differences in hygiene habits, skin pH milieu, or perianal microbial colonization among children and adults as well as higher frequencies of oral–perianal digital contacts during childhood (4, 5). A predominance in the age group 1–6 years (Table 1) suggests that high clinical suspicion for PSD is paramount in preschool children with perianal complaints. However, PSD can occur at any age, and the presence of signs and symptoms consistent with PSD in adulthood should not deter clinicians from considering PSD as a differential diagnosis. Especially adult cases of PSD may be overlooked due to the frequent co-presence of other anorectal conditions (e.g., hemorrhoids, anogenital warts, skin tags, and anal cancer), which can also explain the signs and symptoms of PSD (7).

In this study, males were significantly more commonly affected than females (the male-to-female ratio was 2:1). This is in line with previous reports, in which the male-to-female ratio of PSD ranged between 3:1 and 2:1 (1, 3, 4, 13). The reason behind the male predominance has not yet been explained, but it may include hormonal or immunological factors (16).

Only four patients reported having family members and/or relatives with PSD or streptococcal tonsillopharyngitis that could have been potential sources of infection. This is in contrast to previous reports suggesting easy spread of BHS through close contacts, which often result in daycare and intrafamilial outbreaks of PSD (8, 13, 17, 18). Similar to previous case series describing the presence of concomitant or recent GABHS-associated tonsilopharyngitis (1, 12, 16), we identified two PSD patients that were diagnosed with streptococcal tonsillopharyngitis, although the association between PSD and streptococcal tonsillopharyngitis was probably underestimated in our study.

As shown previously (12), up to 92% of PSD patients had positive pharyngeal cultures for GABHS at the time of diagnosis of PSD. In contrast, the rates of concurrent pharyngeal GABHS were lower (54–64%) in other studies (1, 16, 19), presumably because elimination of GABHS is faster in the oropharynx than on perianal skin (13). In this study, pharyngeal BHS colonization was detected in only 31.3% of patients with pharyngeal cultures. Thus, as suggested by some authors, swabs of the anterior nares may provide a better correlation with PSD than throat swabs (19).

Associations between PSD and the presence of streptococcal infection in anatomical regions other than the oropharynx have also been previously reported (20). In this study, spread of BHS infection to the scalp, face, and/or trunk and periumbilical area was noted in three patients. Clinicians should thus meticulously examine patients and search for satellite lesions in areas other than the perianal region.

Approximately 60% of PSD patients had at least one preexisting and/or concomitant disease, of which dermatological diseases (30.6%) and infections (23.6%) were the most common. It is possible that certain host factors (e.g., deregulation in immune responses) and environmental factors (e.g., concomitant infections) increase the risk of infection with BHS; however, further studies are needed to confirm our observations.

Few patients (5.6%) reported having a concomitant anorectal disease (e.g., hemorrhoids, proctitis, rectal prolapse, or rectal abscesses). This may be because the majority of PSD patients were children, in whom anorectal diseases have not yet developed. Because only 42% of adult PSD patients become asymptomatic following initial antibiotic treatment if no additional therapies for concomitant anorectal diseases are implemented, it is extremely important that these conditions be appropriately managed (e.g., ligation of hemorrhoids) because they may predispose to PSD and influence the success rates of antibiotic treatment, probably because they compromise the barrier and/or immunological function of the perianal skin (7).

Typically, PSD presents with perianal erythema (Fig. 4), itching, blood-streaked stools, and pain on defecation (1, 4, 9, 13, 21). In this study, perianal erythema was the most common clinical sign of PSD because it was almost universally present in our cohort of patients (93.1%), which is similar to the rate described in previous reports (1, 9, 12, 22). Perianal erythema could be absent in the remaining patients due to previous treatments that could have obscured the typical presentation of PSD. Spread to the perineum and/or genitalia was observed in 12.5% of patients, which is consistent with the results of a recently published meta-analysis (23). Anal fissures were the second most common (38.8%) clinical sign of PSD. This rate is higher compared to previous reports, in which anal fissures were detected in approximately 25% of patients (9). This could be because the majority of patients presented with a long-lasting infection that probably led to progression of the disease or because patients with severe forms and/or recurrent disease were more often referred to a specialist. In contrast, the prevalence of perianal itching (30.6%) and pain on defecation (16.7%) was lower compared to previous studies (78–100% and 52%, respectively) (1, 9, 24). Other relevant signs and symptoms of PSD included blood-streaked stools (26.4%), consti-

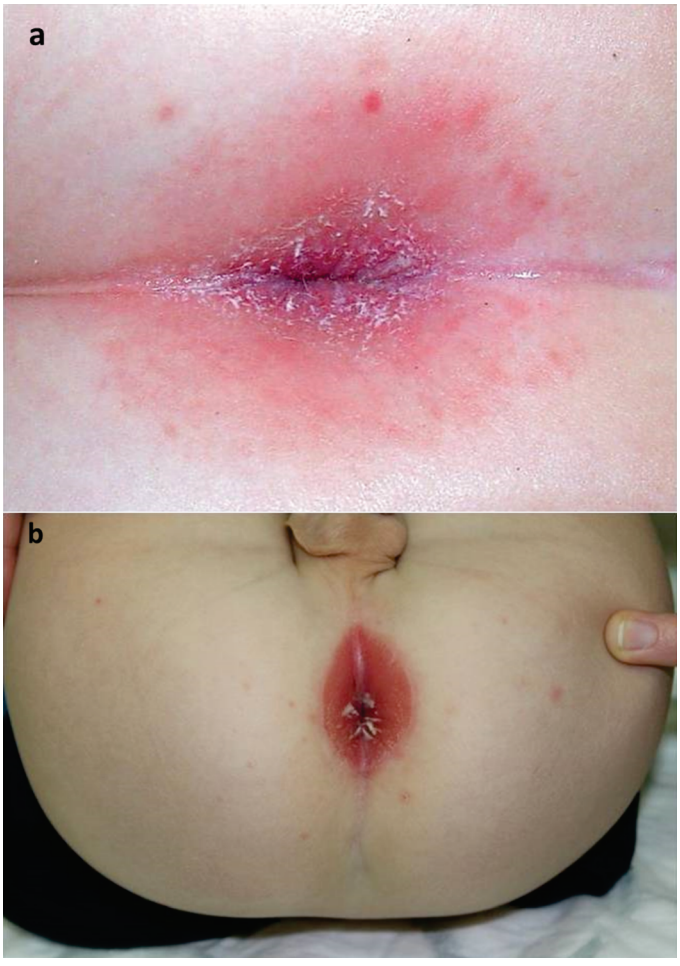

Figure 4 | Clinical presentation of PSD in two children: (a) presence of perianal erythema and scaling; (b) perianal erythema is intense (e.g., "raw beef-like") and sharply demarcated.

pation (20.8%), perianal discharge (13.9%), and the presence of papulopustules (12.5%). Especially constipation and extraperineal impetigo and papulopustules may be more prevalent because they were previously reported to occur in 50% and 36% of PSD patients, respectively (9, 14). Three patients presented with irritability, which may be the first sign of PSD in young children that are not yet able to describe their complaints (24). This could be a result of a severe superficial inflammation of the perianal skin (24), which older children and adults describe as an itching and/or burning sensation.

Four patients reported having fever; however, they also had signs and symptoms of a concomitant bacterial/viral infection. Systemic symptoms (e.g., fever) are typically lacking in PSD, suggesting that BHS only cause a superficial infection of the perianal skin (8, 14, 15, 24).

Diagnosis of inverse psoriasis was established in 12.5% of patients. There is a strong correlation between streptococcal tonsillopharyngitis and precipitation of inverse psoriasis (25, 26). On the other hand, PSD-induced inverse psoriasis was thought to be less common, although several cases of inverse psoriasis associated with GABHS-induced PSD have been documented to date (26–29). To the best of our knowledge, we identified cases of inverse psoriasis in PSD patients with non–group A or B BHS infection (three cases) for the first time. A high proportion of PSD patients with inverse psoriasis identified in our study suggests that careful examination of especially pediatric patients with inverse psoriasis is needed because it may indicate an ongoing pharyngeal and/or perianal BHS infection (26). Other possible immunologically mediated sequelae include post-streptococcal glumeronephritis and postreptococcal myalgia (23), the latter was not specifically evaluated in this study.

A delay in correct diagnosis and/or treatment was common (Fig. 2), with over half of patients reporting symptoms that appeared to be consistent with PSD for several months prior to the diagnostic encounter, which is similar to previous reports (4, 14, 15, 22, 30). According to a recent systematic literature review (23), time to diagnosis was ≥ 3 weeks in 65% of pediatric PSD cases. It is even more worrisome that approximately every 10th patient in our study reported having perianal symptoms for more than a year before a correct diagnosis was established (Fig. 2), with the longest duration being 4 years. Although patients usually present initial complaints to their pediatrician or family physician, a correct diagnosis and treatment is often established following a referral to a dermatologist (4). Olson et al. (14) have shown that 30.7% of PSD patients had at least one physician encounter prior to their diagnostic visit. Because PSD does not resolve spontaneously and it usually goes unrecognized for longer periods, patients are often erroneously treated for other conditions. As shown by a recent review, the most common topical agents used are antifungals and corticosteroids (31). Due to a vast differential diagnosis, patients might also receive improper oral medication that includes laxatives, antihelmintics, antihistiminics, and probiotics, among others (31).

Although biochemistry laboratory data were only available for a subset of patients, white blood cell count and C-reactive protein were within normal ranges in all but those that had an additional ongoing bacterial/viral infection. Similarly, creatinine and urea levels were normal in most patients tested. Based on our review of medical records, physicians rarely decide to monitor inflammatory markers and kidney function, most likely due to the superficial and limited manifestation of the disease. Although serious sequelae of PSD are extremely uncommon, post-streptococcal glumeronephritis may occur (9). Hence, creatinine and urea may be monitored in patients that are at risk for potential development of post-streptococcal glomerulonephritis (13); however, routine or preemptive monitoring of antistreptolysin titers is unnecessary in PSD (32, 33).

GABHS (70.8%) were the most common group of BHS identified in this study, followed by GBBHS (19.4%) and non–group A or B BHS (9.7%). Although GABHS are the most common etiological factors of PSD in children, GBBHS are predominately found in adults (7). Non–group A or B BHS are rare causative agents in both children and adults (3, 7, 22). Susceptibility to penicillin remains excellent among all groups of BHS; however, resistance to erythromycin is increasing, especially among GBBHS. Although none of the isolates included in this study were resistant to clindamycin, we showed in our previous analysis based on a larger number of perianal BHS isolates that resistance to clindamycin is also emerging among GBBHS (11).

Whereas early initiation of appropriate antibiotic treatment leads to a dramatic improvement of PSD (8), there is a lack of consensus regarding the treatment of choice. Initial treatment commonly consists of oral penicillin or amoxicillin, although amoxicillin/clavulanic acid, cephalosporins, and macrolides have also been previously used (1, 3, 14, 17). Unfortunately, only one randomized control trial evaluating cefuroxime as an alternative agent for treatment of PSD has been performed to date (34). As shown in this study, the majority of patients received combination therapy that consisted of a systemic beta-lactam antibiotic together with topical ointments (mostly antibiotics). The majority of patients received systemic narrow-spectrum penicillin, whereas wider-spectrum beta-lactams such as cefuroxime or even amoxicillin/clavulanic acid were used only in a few cases (12.5%). Topical antibiotics and corticosteroids are commonly added to the systemic antibiotic treatment (4, 7), although no conclusive evidence is available to confirm that combining both systemic and topical therapeutic agents provides faster relief of symptoms and eradication of BHS (7).

The duration of therapy is also disputable. Whereas a 5- to 10-day course of systemic narrow spectrum antibiotics (with or without topical therapeutic agents) represents the initial treatment of PSD and is indeed the recommended treatment duration of streptococcal skin infections in general, some authors suggest that a prolonged treatment with a 14- to 21-day course of systemic antibiotic therapy is necessary because of the high recurrence rates of PSD (11, 13, 21, 22, 35).

Due to the high rates of relapses, close follow-up of adults and children with PSD is crucial (8). In this study, recurrence and/or relapse of the disease occurred in approximately one-third of PSD patients, which is slightly higher than in previous studies (23). Nevertheless, the recurrence rate was probably underestimated because patients could have experienced a recurrence of disease that was managed by a family physician. As shown previously (14), approximately one in every three pediatric PSD cases will experience clinical recurrence of the disease, which will usually occur within 6 weeks following their incident PSD. In the case of recurrence or relapse of the disease, patients are advised to maintain strict personal hygiene to prevent further (re)infections (11). Moreover, bleach baths and antiseptic ointments (e.g., biguanide-based ointments such as polyhexanide or chlorhexidine) are also thought to accelerate recovery and decolonization of BHS (2, 4). Repeated courses of systemic antibiotics are usually successful (4, 8).

Our study had several limitations. Inclusion of patients that were referred to a specialist could have led to a selection bias with a higher number of patients with a more severe disease and/or higher recurrence rates. The analysis of characteristics of PSD was based solely on a retrospective review of patients' medical records. It is thus possible that the frequency of signs and symptoms (and also epidemiological history) was underestimated because physicians were not specifically instructed to search for typical characteristics of PSD. In addition, although the majority of PSD cases affect the perianal area only, infection may also spread to the genitalia (12, 15, 16, 27). Because our search criteria for laboratory records were limited to perianal BHS isolates, it is possible that patients with vulvovaginal or scrotal and penile involvement could have been missed. Moreover, due to the low number of adult PSD patients, we could not evaluate potential differences in the prevalence of respective signs and symptoms in adults and children with PSD.

Conclusions

The paucity of contemporary literature on this relatively common clinical entity, as emphasized by a recent systematic literature review, which identified only 63 reports on pediatric PSD since 1965 (23), highlights the need for increased awareness of PSD among healthcare professionals.

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