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CLINICAL REPORT

Paediatric Skin Disorders Encountered in an Emergency Hospital Facility: A Prospective Study

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To determine the frequency of skin disorders encountered in a paediatric emergency care unit and to evaluate the benefits of advice from a dermatologist, we prospectively recorded data of children admitted with skin disorders to the emergency care unit during a 5-month period. Diagnostic agreement between paediatricians and dermatologists evaluating the patients separately was assessed. Three hundred and ninety-five children (median age 3 years; interquartile 1–6) were included. Skin disorders represented 4% of all paediatric emergency care unit visits. Visits were considered as appropriate in 19–30% of cases according to different criteria. Six diseases accounted for 57% of cases: viral exanthema, urticaria, atopic dermatitis, varicella, diaper dermatitis and herpetic gingivostomatitis. The dermatologist modified the diagnosis in 42% of cases and the treatment in 30%. Greater emphasis on teaching the skin disorders encountered in this setting and efforts to provide easy access to advice from dermatologist would improve the quality of care. ***Key words: care organization; dermatology; paediatric emergency care unit.***

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Skin disorders usually account for 4–6% of paediatric emergency visits (1–4). The diagnosis and management of these disorders in the paediatric emergency care unit (PECU) can be difficult, suggesting a need for greater emphasis on dermatological emergencies in medical training programmes, better organization of care, and evaluation of the role for dermatologists in PECUs. Few studies have reported the frequency of various skin disorders encountered in PECUs (2, 5, 6). The aim of our study was to determine the frequency, types and epidemiological characteristics of skin diseases seen in emergency paediatric care, to evaluate the appropriateness of emergency room visits for paediatric skin disorders, and to assess the potential benefits of obtaining advice from dermatologists.

METHODS

We prospectively recorded all paediatric emergency visits for skin disorders at the medical and surgical PECU of our university hospital (Lille, France), from 3 December 2001 to 22 April 2002. The PECU has 23,000 outpatient visits and 3000 short-stay hospitalizations per year. The population in Lille area is close to 220,000 children (1.2 million inhabitants).

We included all consecutive children younger than 15 years and 3 months of age (legal age of paediatric care in France) seen at the PECU for a skin disorder occurring as the primary complaint, or related to the primary complaint and discovered upon examination at the PECU. We also included visits during which the patient or parents asked for advice about a previous skin disorder. We only included the first visit per patient for a same complaint. Patients with trauma-induced skin disorders were excluded.

All patients underwent a standardized assessment including a description of the skin disorder, the familial and personal history, a physical examination, and investigations. Advice from a dermatologist was sought for patients with a skin disorder other than varicella as the primary complaint. The dermatologist was not told of the diagnosis suspected at the PECU. All study patients were seen by the same dermatologist (A.I.). The final diagnosis was defined as the diagnosis made by the dermatologist, by laboratory investigations or, for patients not seen by the dermatologist, as the PECU diagnosis provided if it was deemed correct by chart review. The charts were concomitantly reviewed by a paediatrician and a dermatologist. When the chart review suggested a diagnostic error, or when no diagnosis was made in the PECU and the patient was not seen by the dermatologist, the diagnosis was considered unknown. The appropriateness of emergency room visits was evaluated using the criteria of De Angelis et al. (7) and emergency care criteria. We defined emergency care criteria as appropriate if any of the following criteria were met: need for advice from a specialist, need for investigations, need for treatment that was not available elsewhere at the time, or need for hospital admission. We defined night-call as the period from 6 pm to 8 am and the weekend as the period from 12 am on Saturday to 8 am on Monday.

The emergency paediatricians reported for each child whether or not they wished dermatologic advice, and if this dermatologic advice was urgent or not. We defined advice as urgent if necessary within 24 h. The dermatologist reported for each child referred if dermatologic advice seemed necessary.

Statistics

Patient data were recorded anonymously using Epi-Info software (6.04 version, CDC, Atlanta, GA, USA). Statistical tests were performed using SPSS software (11.0.1 version, LEAD Technologies, Chicago, IL, USA). Percentages were

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rounded to the nearest integer. Concordance of diagnoses between paediatricians and the dermatologist was studied. Categorical variables were analysed using either the chi-square test or the Fisher exact test; $p < 0.05$ was considered statistically significant.

RESULTS

Skin disorders ($n = 395$) accounted for 4% of all PECU visits and 7% of non-surgical PECU visits. The skin disorder was the primary complaint in 338 (86%) patients and was found upon examination for another primary complaint in 48 patients (fever in 40%, diarrhoea in 10%, vomiting in 6%, crying in 4%, abdominal pain in 4%, limb pain in 4%, coughing in 4%, and multiple complaints in 28%); for the 9 (2%) remaining patients, the parents asked for diagnosis or treatment of a skin disorder not related to the primary complaint.

Epidemiological characteristics

Median age was 3 years (interquartile range 1–6). Slightly more than half the patients (52%) had been examined previously for the same complaint by one or more physicians (family's general practitioner in 37%, other general practitioner in 7%, paediatrician in 11% and dermatologist in 6%). The children were referred to the PECU by a physician after examination (21%), were brought by the parents on their own initiative (69%) or were brought on advice from a physician without examination (10%). The median time from skin lesion onset to the visit was 2 days; 25% of the visits occurred on the day of onset. Slightly more than half (53%) of the visits occurred during the night-call period.

Appropriateness of visits

The De Angelis criteria (7) classified 30% and the emergency care criteria 19% of the visits as appropriate. Appropriateness of visits to the PECU was similar during the day and the night-call periods.

Diagnosis

Viral exanthema, urticaria, atopic dermatitis, varicella, diaper dermatitis and herpetic gingivostomatitis accounted for 57% of visits, and 62% of visits for which a final diagnosis was made (Table I). In all, 22% of patients with acute urticaria had annular lesions and 13% had haemorrhagic or purpuric lesions. In case of atopic dermatitis, 26 presented an exacerbation in whom 16 were associated with impetigo, and 7 patients were seen for advice because of persistence of the dermatitis. Four of 36 patients with varicella presented a complication of the disease (cerebellitis, pneumonia, cellulitis, abscess). Diaper dermatitis was caused in seven patients by candidosis and in the other seven patients by irritation. Diagnoses of the 15 newborns were: Erythema toxicum neonatorum ($n = 2$), miliaria (2), cytosteatonecrosis (2), seborrhoeic dermatitis (2), congenital naevus (1), acne (2), candidosis of mouth (2) and umbilical lesions (2). In 31 patients (8%), no final diagnosis was made.

Table I. *Skin diagnoses encountered in the paediatric emergency care unit of the Lille Teaching Hospital over a 5-month period (395 children)*

Diagnosis	*n*	%
Viral exanthema	68	17
Urticaria	59	15
Varicella	36	9
Atopic dermatitis	33	8
Diaper dermatitis	14	4
Herpetic gingivostomatitis	14	4
Henoch-Schönlein purpura	12	3
Impetigo	8	2
Mechanical purpura*	7	2
Cellulitis	7	2
Abscesses	6	2
Paronychia	6	2
Molluscum contagiosum	6	2
Contact dermatitis	5	1
Other diagnoses (<1%)	83	21
Absence of final diagnosis	31	8

*Including facial purpura due to vomiting.

Diagnostic agreement and benefits of dermatological consultation

Among the 312 patients who had criteria to be referred to the dermatologist, 216 (69%) attended the dermatology department. The rate of diagnostic agreement between emergency paediatricians and the dermatologist was 58%. Agreement was higher for urticaria (73%) than for the other diagnoses ($p = 0.04$). Agreement was similar during day and night-call periods. The treatment was modified by the dermatologist in 30% of children.

The paediatricians wished advice from a dermatologist for 124 of the 395 patients (31%), for either diagnostic ($n = 92$) or therapeutic ($n = 32$) purposes. Advice was wished urgently for 51 (41%) patients. In 196 of the 216 patients who were referred to the dermatologist, we had information both about the wish for advice (judged by emergency paediatricians) and the necessity of advice (judged by the dermatologist) (Table II). The dermatologist considered that advice was necessary in 57% of cases and urgent in 19%. An agreement about the need for dermatologist referral between paediatricians and dermatologist was observed in 74% of cases (Table II). The wish for advice from a dermatologist was more frequent when there was a diagnosis disagreement between the paediatricians and

Table II. *Concordance of the wish for advice (judged by emergency paediatricians) with the necessity of advice (judged by dermatologist) in 196 children seen by the dermatologist*

	Necessity of advice	
Wish for advice	Yes	No
Yes	32% ($n=63$)	1% ($n=2$)
No	25% ($n=49$)	42% ($n=82$)

dermatologist (59% of referrals with different diagnoses vs 34% of referrals with the same diagnosis, $p=0.001$).

DISCUSSION

In the PECU, skin disorders were a daily complaint (4% of all consultations and 7% of the non-surgical consultations), and six diagnoses accounted for 57% of visits (62% of diagnoses) for skin disorders. The proportion of visits for skin disorders in our study (4%) was similar to that in earlier studies (range 4–6%) (1–4). Availability of a paediatric emergency consultation at the dermatological outpatient clinic (DOC) in our hospital may decrease the number of PECU visits for skin conditions. To exclude a misinterpretation, we included concomitantly all children seen at an emergency consultation at the DOC. Seventy-three children were included, of whom 31% had been seen previously at the DOC or 12% had a family member receiving follow-up at the DOC. The most common diagnosis was atopic dermatitis (38%) (Auvin et al., unpublished observations). Previous studies have found such differences in the pattern of skin disorders encountered in paediatric dermatology clinics and in acute paediatric care settings (8, 9).

As with other complaints leading to emergency visits, the parents themselves often made the decision to come to the PECU for evaluation of the child's skin disorder. Similarly, Dolan et al. (2) reported that only 7% of children with skin disorders seen in 1994 at an emergency unit in Belfast, Northern Ireland were referred by general practitioners or other doctors. In a few cases another practitioner (e.g. ophthalmologist) who had first seen the skin disease referred the patient.

The PECU visit was appropriate in 30% (De Angelis criteria) or 19% (emergency care criteria) of cases. Although differences in definitions between studies make comparisons difficult, our result is consonant with the 34% rate of appropriate visits reported by Oberlander et al. (10) from Vancouver, Canada. In this study, PECU visits were classified as appropriate if the child needed to be seen by a physician at that time and in the PECU. De Angelis et al. (7) reported that one-third of children visiting an emergency department did not require urgent care. We are not aware of any published studies on the appropriateness of emergency visits for skin disorders.

The final diagnoses in our study show several differences compared with those in previous studies, mainly from the USA. In a 20-year-old study by Hayden (5), bacterial infections were more common and viral exanthemas less common than in our study; the main diagnoses were diaper dermatitis (16%), atopic dermatitis (9%), impetigo (9%), seborrhoeic dermatitis (6%), miliaria (5%), contact dermatitis (5%), viral exanthemas (5%) and scarlet fever (4%). Shivaram et al. (6) reported in 1993 that after exclusion of trauma-related skin lesions, 20% of reasons for PECU visits included a skin problem; the most common diagnoses were contact dermatitis (13%), non-specific viral exanthema (10%), cellulitis (7%), diaper dermatitis (7%), non-specific rash (6%), varicella (6%), urticaria (5%) and tick bites (5%). The geographic area and season may influence the distribution of diagnoses (e.g. insect bites in Shivaram's study). In our study, the 5-month period included the winter and early spring, when non-specific viral exanthemas may be more common than during other periods of the year. The frequency and type of skin disorders should be determined for each geographic area, and this information should be used when designing medical school curricula and resident training programmes.

Our study revealed a rate of diagnosis concordance of 58%. In the study by Dolan et al., the diagnostic agreement between junior doctors and dermatologists in an open-access dermatology clinic was 66% (2). Soriano-Hernandez et al. (11) reported very poor agreement (20% of diagnoses) between paediatricians and dermatologists in Mexico City, for exanthemas in hospitalized paediatric patients. In our study, diagnostic agreement could not be studied in the entire PECU population because a DOC visit did not always occur immediately after the PECU visit. In addition, patients with potentially contagious diseases (e.g. varicella) were not sent to the DOC. Of all the patients referred by the PECU to the DOC, 69% attended the DOC visit. The diagnosis agreement rate in our study was close to that reported by Dolan et al. (2). Reassuringly, in both studies agreement was best for one of the most commonly encountered disorders – urticaria – which was the second most common disorder in our study, and papulosquamous lesions, the second most common disorder in the study by Dolan et al. In our study, we noted that errors in the diagnosis of common skin disorders were consistently related to specificities of the clinical presentation in childhood. The percentage of modification of the therapeutic management could be explained by the diagnostic concordance rate. During the study, failure to establish the correct diagnosis at the PECU never required emergency measures and did not pose any risk to the patients. The limited diagnostic

agreement, as well as the need for a change in treatment in a substantial proportion of cases, shows that more emphasis should be placed on training PECU paediatricians in the diagnosis and management of skin disorders.

Our results indicate that easier access to dermatology visits on an emergency basis may improve the diagnosis and treatment in children with skin conditions. We report 42% misdiagnosis in PECU and 30% of therapeutic modification. Although continuous presence of a dermatologist in the PECU does not seem necessary, structured cooperation between PECUs and dermatology clinics might improve the quality of care. Dolan et al. (2) previously suggested that open access to a dermatology clinic seemed useful. Our data indicate that advice from a dermatologist, either at the PECU or at the DOC of the same hospital should be available. Improved training of PECU paediatricians in the diagnosis and management of the most common acute skin disorders seen in children and an easy access to advice from a dermatologist may improve the quality of care in patients seen in PECUs for skin disorders.

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