INDIAN ACADEMY OF PEDIATRICS

IAP Case Based Reviews in Pediatric Allergy

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Foreword
TU Sukumaran

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CHAPTER 2

Contact Dermatitis in Children

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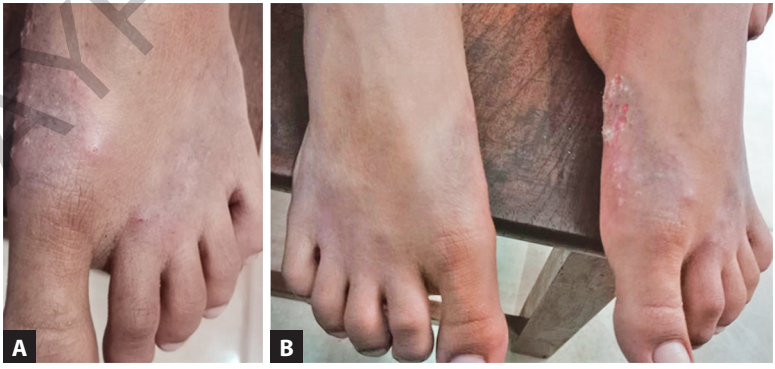
CASE 1

A 10-year-old female child presented with recurrent history of itchy oozing lesions over the dorsum of both feet of 3 months' duration. On examination, there were papules, pustules along the V area of the feet bilaterally corresponding to the V strap of the black rubber footwear she was wearing **(Figs. 1A and B)**. She was treated with saline compresses, oral antibiotics, antihistamines, and topical steroids once the oozing subsided. She gives history of using black rubber footwear prior to the development of the lesion.

1. What is the diagnosis?

Since the child has itchy papular lesions strictly confined to the V strap area corresponding to the black rubber foot wear she was using, a probable diagnosis of allergic contact dermatitis (CD) to footwear was made.



Figs. 1A and B: Allergic CD to footwear showing papules, vesicles and erosions corresponding to the V area of the black rubber foot wear.

Contact dermatitis is an eczematous reaction to a substance either causing irritant or an allergic reaction. This child has more of itchy papular lesions giving a diagnosis of an allergic CD rather than burning and vesicular or blistering lesion seen in irritant dermatitis. CD occurs less frequently in early months of life except for few bouts of irritant dermatitis. This is because of their immature immune system to mount an allergic response in the first 2 years of life. Also, they are less exposed to allergens. But with increasing age, the prevalence increases which could be due to the increased use of accessories which also explains its increased frequency in females.

2. What are the probable allergens in allergic contact dermatitis to footwear?

Allergic CD to footwear could be due to allergy to shoe materials such as rubber, plastic, leathers, glue, nickel, stockings, colors, topical antibiotics, and antiperspirants. In a study conducted in our department, patch testing was done in 40 children with foot dermatoses. Disperse orange, a coloring agent, was the most common allergen in 25% followed by epoxy resin, neomycin sulfate, and black rubber mix in six, five, and four patients, respectively. Allergic CD to shoes involves the dorsa of the foot and usually spares the interdigital areas. The sensitizer in rubber could be thiuram, p-phenylene diamine, and glues such as p-tertiary phenol formaldehyde resins. Potassium dichromate used for tanning of leather is the sensitizer in leather shoes.

3. How can you confirm your diagnosis?

Patch testing is the gold standard and the only scientific tool to identify the allergen in allergic CD. Ideal concentration and standard methods used in adults are safe and reliable in children. Since the area of application of the patch is less in children, sequential patch can be applied and to prevent removal, adequate securing of patches is required. Relevance of patch testing depends on the time of patch testing, concentration, the vehicle used, and its correlation to current clinical presentation. Patch testing is done with allergens from the Indian standard series or patch testing kits specific for footwear. Standard patches are applied on the back 3 weeks after

the subsidence of the lesions but within 6 months and the results are read at 2, 4, and 7 days and examined for erythema and papules and graded using International Contact Dermatitis Research Group (ICDRG) guidelines.

CASE 2

A 5-year-old atopic child came to our outpatient department (OPD) with itchy lesions over the right wrist and distal forearm area **(Fig. 2)** of 1 week duration. On examination, she had erythematous papules over the wrist area extending to the adjacent forearm. She was using red-colored metal bangles in the same forearm since 2 weeks.

1. What is the probable diagnosis? How do you suspect contact dermatitis in atopic children?

With this clinical picture and contact with the red metallic bangle in an atopic child, a probable diagnosis of CD to colored metallic bangle was made, because the lesions were more at the site of

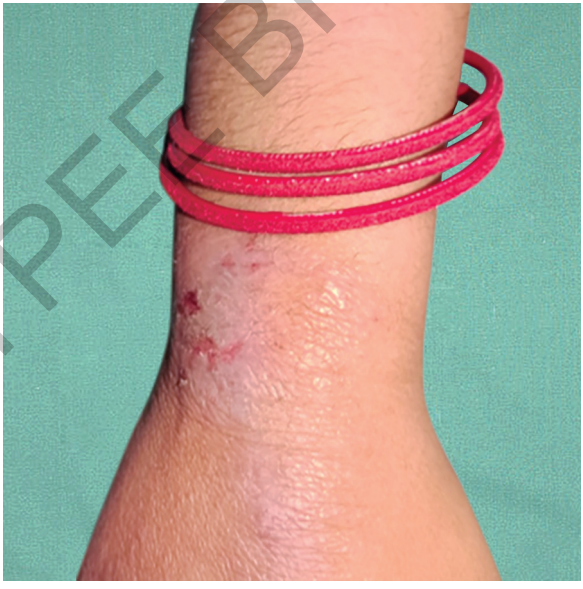


Fig. 2: Allergic CD to nickel showing erythema, papules and erosions over the wrist and adjacent forearm corresponding to the area of contact with red metallic bangle.

contact and patch test will help in confirming the diagnosis and identifying the allergen. Nickel, chrome, and the color in the metal bangle could be the allergens. Patch tests are indicated in cases of atopic dermatitis with persisting lesions and those over areas not characteristic of atopic dermatitis but are the site of contact with various substances, e.g., metals, footwear, and fabrics. They could also develop CD to topical corticosteroids and preservatives in emollients. Protein allergens such as egg white, milk, and wool can exacerbate atopic dermatitis but are usually urticarial, but when delayed reaction occurs, it is usually eczematous where patch test can be done.

2. Which are the common allergens causing allergic contact dermatitis in a young child?

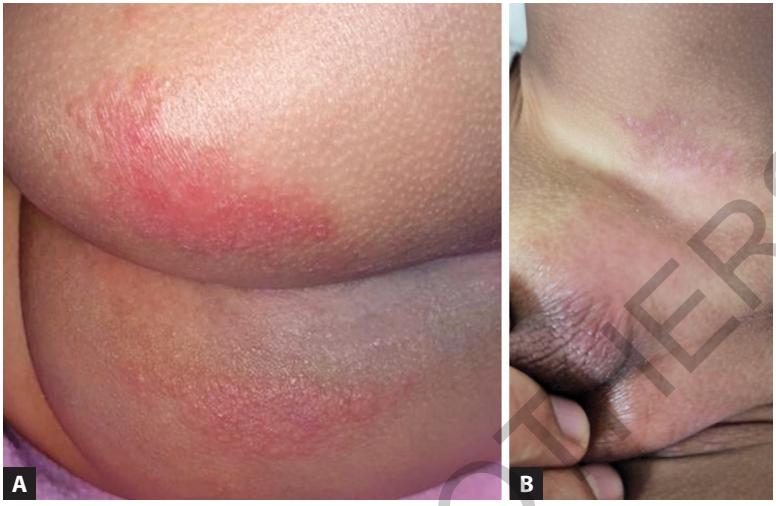
Nickel sulfate is the most frequently encountered allergen in a female child. Ear piercing is the main cause of nickel sensitization and the risk increases with increase in number of piercings. Nickel is also present in jewelry, metal accessories of clothing, spectacles, watch bracelets, orthodontic appliances, and cosmetics, especially mascara, eyeliners, eye shadows, and cleansing agents. They are also exposed to chrome and cobalt. Chrome is used in tanning of leather, wearing leather shoes without socks is the cause of sensitization. Orthodontic appliances containing nickel can cause perioral dermatitis and cheilitis. Fabric CD can occur in areas of contact with dress sparing the vault and is due to dyes, glues, fixing agents, and metal accessories.

3. How do you treat contact dermatitis?

Avoiding contact with suspected allergen and those that may be involved in allergic cross sensitivity is the most important step, then treat using topical and systemic steroids depending on the severity.

CASE 3

A 3-month-old baby with history of using disposable diapers presented with erythema, erosion over the convex surfaces of the buttocks, and sparing the folds **(Figs. 3A and B)**.



Figs. 3A and B: (A) Erythema, erosion over the convex surfaces of the buttocks; (B) Erythema on convex surfaces over the scrotum and thigh sparing the inguinal folds in diaper dermatitis.

1. What is the probable diagnosis and what are the causative factors?

This is the most common form of irritant CD occurring in infancy and is known as diaper dermatitis or nappy rash. It is due to prolonged contact with the ammonia in urine and feces, maceration, and occlusion leading on to enhanced enzymatic activation of fecal bacterial urease, protease, and lipase leading to further irritation. Use of antiseptics, deodorants, soaps, and oil also contributes. There is also a role for urea splitting *Bacillus proteus*, *Escherichia coli*, *Staphylococcus aureus*, and *Candida albicans*. It presents as erythema, edema, vesiculation, and erosion over the convex areas and sparing the folds. It has also been attributed to rubber (mercaptobenzothiazole) and glues (p-tert-butylphenol formaldehyde resin) in some diapers.

2. How do you treat diaper dermatitis?

Prevention of this irritant dermatitis is by changing the diapers frequently, washing with nonaggressive, perfume-free neutral pH

cleansers. Extra absorbent diapers containing absorbent gelling material (AGM) is found to be superior to cloth diapers. Barrier creams containing zinc oxide can be used before the use of diapers. Topical steroids are to be avoided as they can cause erythematous nodular lesions which is a reaction to overgrowth of *Candida* known as infantile gluteal granuloma and can also induce atrophy.

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IAP Case Based Reviews in

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- First ever Case Scenario-based book on Pediatric Allergy from India
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- Topics are wide ranged on allergy and includes less discussed subjects
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- The book has been designed with a practical approach to the allergic problems faced by treating pediatricians and postgraduate students
- The text has been kept in a simple, readable fashion supplemented by pictures wherever required.

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Krishna Mohan R after finishing his postgraduation in pediatrics from the Institute of Maternal and Child Health, Kozhikode, Kerala, India received specialized training in Pediatric Allergy from Christian Medical College, Vellore, Tamil Nadu, India. He is the Chief Editor of *Essentials of Pediatric Allergy, 2021* and Associate Editor of *Textbook of Pediatric Allergy and Applied Immunology* published by the Allergy Chapter of CIAP in 2020. He is also the Associate Editor of *IAP Standard Treatment Guidelines 2022*. He has published various chapters and articles in textbooks and peer-reviewed journals. He is a Faculty in DAAI, Kolkata, West Bengal, DPAA, New Delhi and various national and state academic events. At present, he is the Secretary of National Allergy and Applied Immunology Chapter, CIAP and the State Secretary of IAP Kerala. He received the Best Doctor Award at the state level instituted by Kerala Government Medical Officer's Association in 2019.

Neeraj Gupta is a trained Intensivist and Allergy Specialist, currently working as a Senior Consultant, Sir Ganga Ram Hospital, New Delhi, India since 2014. After completing his DCH, DNB (Pediatrics), he joined Great Ormond Street Hospital, UK as Pediatric Intensive Care Fellow. He also completed another Pediatric Intensive Care Fellowship by College of Pediatric Critical Care under Indian Academy of Pediatrics. Thereafter, he got trained in Allergy at Vallabhbhai Patel Chest Institute, New Delhi and Christian Medical College, Vellore, Tamil Nadu. He was invited as Guest Speaker at the University of Colorado, USA, to speak on Oscillometry, due to his special interest in the subject. Apart from nearly 100 national and international publications, he has authored a book *Allergy in a Nutshell: A Handbook*. He is currently the Director of 'Diploma in Pediatric Allergy and Asthma (DPAA)', the country's only training program for Pediatric Allergies, recognized by Sir Ganga Ram Hospital and International Asthma Services, USA.

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Printed in India

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Daryaganj, New Delhi - 110 002, INDIA
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ISBN 978-93-5465-989-8