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Management of Impetigo in Children: A Review Article

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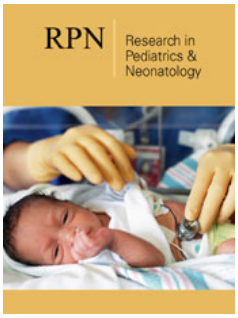

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Abstract

Introduction: Impetigo is a pyoderma, which is a skin infection caused by Staphylococcus aureus in the epidermis below the stratum corneum or in the hair follicles. Impetigo is an infectious skin disease most commonly found in children aged two to five years, but can also occur at any age. This disease can heal completely without scarring even without treatment. The cause of impetigo is a gram-positive bacterial infection, most commonly Staphylococcus aureus, but it can also be caused by Streptococcus pyogenes either as a single infection or in combination with S. aureus. It is most occur in children aged 2-5 years and incidence is during summer and fall. Bullous impetigo is more common in infants. Children younger than two had 90% of cases of impetigo. Apart from direct contact with an infected child, sharing tools or items that can transmit the infection can also spread impetigo. The incidence of impetigo increases in areas that are densely populated and with poor hygiene. Other risk factors include trauma to the skin, a hot and humid climate, malnutrition, diabetes mellitus, and several other medical conditions.

Discussion: Impetigo is usually a self-limited condition, and although rare, complications can occur. These include cellulitis (nonbullous form), septicemia, osteomyelitis, septic arthritis, lymphangitis, lymphadenitis, guttate psoriasis, staphylococcal scalded skin syndrome, and acute poststreptococcal glomerulonephritis, with poststreptococcal glomerulonephritis being the most serious. Keeping skin clean can help prevent impetigo. Kids should wash their hands well and often and take baths or showers regularly. Pay special attention to skin injuries (cuts, scrapes, bug bites, etc.), areas of eczema, and rashes such as poison ivy. Keep these areas clean and covered. The goal of impetigo therapy is to relieve discomfort and improve appearance/aesthetics, prevent the wider spread of infection both to the patient and to others, and prevent recurrences. Therapy should ideally be effective, affordable, and minimal side effects.

Conclusion: Based on research and some literature, impetigo can heal by itself without leaving a sequel within two weeks if left untreated. However, healing takes longer time and complications can occur in some cases. One of the complications that can be caused is post streptococcal acute Glomerulonephritis (GNAPS), sepsis, osteomyelitis, septic arthritis, endocarditis, pneumonia, cellulitis, lymphangitis or lymphadenitis, gutate psoriasis, toxic shock syndrome, and staphylococcal scalded skin syndrome.

Keywords: Impetigo; Children; Management

Introduction

Impetigo is a pyoderma, which is a skin infection caused by *Staphylococcus aureus* in the epidermis below the stratum corneum or in the hair follicles. Impetigo is an infectious skin disease most commonly found in children aged two to five years, but can also occur at any age. This disease can heal completely without scarring even without treatment [1]. The cause of impetigo is a gram-positive bacterial infection, most commonly *Staphylococcus aureus*, but it can also be caused by *Streptococcus* pyogenes either as a single infection or in combination with *S.aureus*. It is most occur in children aged 2-5 years and incidence is during summer and fall. Bullous impetigo is more common in infants. Children younger than two had 90% of cases of impetigo [2]. Impetigo is the most common bacterial skin infection in

children and there are two types of impetigo. First is nonbullous (more frequent) and bullous. Nonbullous impetigo, or impetigo contagiosa, is caused by *S.Aureus* characterized by honey-colored crusts on the face and extremities. Impetigo primarily affects the skin or secondarily infects insect bites, eczema, or herpetic lesions [2]. Impetigo is often transmitted through direct contact. Patients can spread the infection more widely by scratching the infected area (autoinoculation). This infection can also easily spread in schools and child care centers. Apart from direct contact with an infected child, sharing tools or items that can transmit the infection can also spread impetigo. The incidence of impetigo increases in areas that are densely populated and with poor hygiene. Other risk factors include trauma to the skin, a hot and humid climate, malnutrition, diabetes mellitus, and several other medical conditions [3].

Discussion

Classification and diagnosis

Impetigo is generally classified into 2 types, namely bullous impetigo (30% of cases) and crustous/ nonbulous impetigo (70% of cases) [4]:

Bullous impetigo

Bullous impetigo often occurs in neonates but can also occur in children and adults. Bullous impetigo is caused by the toxin-producing *S.aureus* and is a localized form of staphylococcal scalded skin syndrome. Bullous impetigo has a clinical feature of multiple vesicles that expand rapidly to form a well-defined, flaccid bullae without surrounding erythema. When the bullae rupture, yellowish crusts will appear. Bullous impetigo is often found in moist folds, such as the diaper area, axilla and neck creases. This disease can heal on its own in a few weeks without scarring [2] Figure 1.

Figure 1. Bullous impetigo: It appears that there are multiple vesicles to a flaccid bullae in which there is a yellowish fluid [2].

Crustous impetigo/non bullosa/contangiosa

Crustous impetigo occurs as a result of infection with *Streptococcus* pyogenes either alone or in combination with *S.aureus*. Crustous impetigo begins with the appearance of a single, reddish macule or papule that quickly turns into a vesicle. These vesicles then easily rupture and cause an erosion, which results in golden brown crusts that cause itching. Impetigo spreads by autoinoculation, which often appears to traumatized areas such as the extremities or face. This condition can heal itself without causing scars [5] Figure 2.

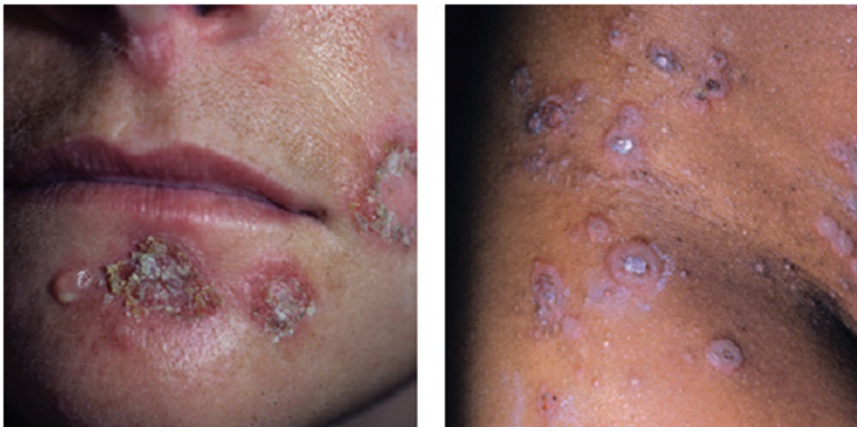


Figure 2. Impetigo Krustosa. There were golden brown vesicles and crusts with multiple blackish crusts. A) crustous impetigo of the face; B) impetigo crustosa in the groin [2].

In making a diagnosis of impetigo, it is necessary to carry out several stages, including [1,6]:

A. History

With symptoms that are often complained of in the form of itching and pain in the vesicle area. The history of contact with impetigo sufferers and other risk factors also needs to be explored.

B. Clinical features

The clinical picture of impetigo is typical, namely the presence of vesicles or bullae accompanied by crusts that break and easily spread, with crusts that are brownish yellow like honey, sometimes accompanied by black crusts that are often found in crustous impetigo.

C. Supporting examination

Pus culture and gram stain and antibiotic sensitivity test if needed. Differential diagnosis of impetigo for bullous type is Bullous erythema multiforme, Bullous fixed drug eruption, Bullous lupus erythematosus, Thermal burns, Insect bites, Contact dermatitis, Necrotizing fasciitis. DD for non-bullous type is Atopic dermatitis, bockhart impetigo, Herpes simplex virus, Varicella zoster virus, Sweet syndrome (acute febrile neutrophilic dermatosis), Scabies and Pediculosis (lice) [3,7]. Impetigo is usually a self-limited condition, and although rare, complications can occur. These include cellulitis (nonbullous form), septicemia, osteomyelitis, septic arthritis, lymphangitis, lymphadenitis, guttate psoriasis, staphylococcal scalded skin syndrome, and acute poststreptococcal glomerulonephritis, with poststreptococcal glomerulonephritis being the most serious [8]. Keeping skin clean can help prevent impetigo. Kids should wash their hands well and often and take baths or showers regularly. Pay special attention to skin injuries (cuts, scrapes, bug bites, etc.), areas of eczema, and rashes such as poison ivy. Keep these areas clean and covered. Anyone in your family with impetigo should keep their fingernails cut short and the impetigo sores covered with gauze and tape. To prevent impetigo from spreading among family members, make sure everyone uses their own clothing, sheets, razors, soaps, and towels. Separate the bed linens, towels, and clothing of anyone with impetigo, and wash them in hot water. Keep the surfaces of your kitchen and household clean [3,9].

Management of Impetigo in Children

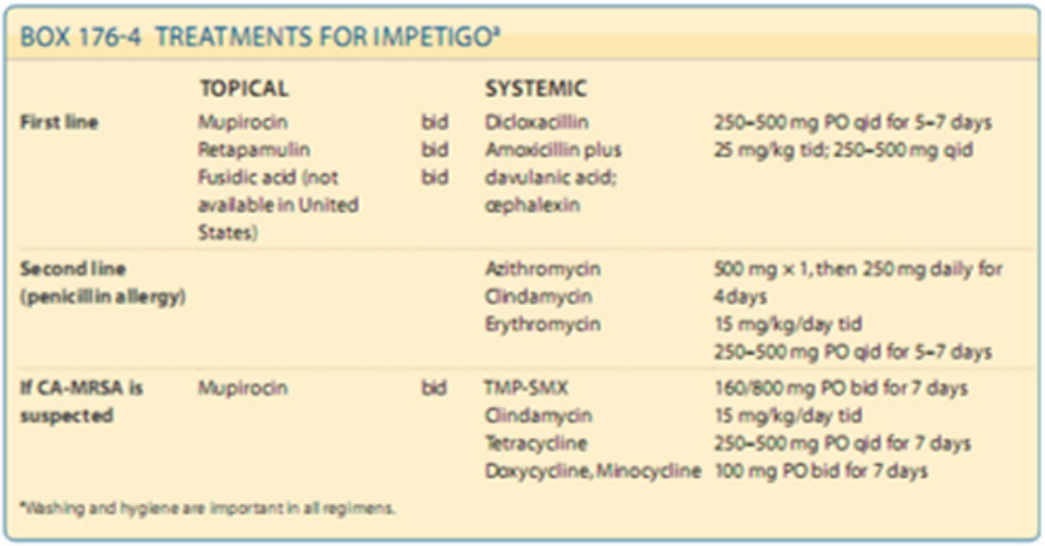
The goal of impetigo therapy is to relieve discomfort and improve appearance/aesthetics, prevent the wider spread of infection both to the patient and to others, and prevent recurrences. Therapy should ideally be effective, affordable, and minimal side effects [10,11] Figure 3. Therapy that can be used includes both topical and oral antibiotics. As a supportive therapy, compress the wound with disinfectant or isotonic saline and improve personal hygiene. Topical antibiotics have the advantage of applying only when needed, which minimizes antibiotic resistance and reduces the likelihood of systemic side effects. The duration of topical antibiotic therapy varied, however, seven days of administration showed more effective results. However, some topical antibiotics can cause both skin sensitization and allergies in susceptible patients [12]. Oral antibiotics are recommended in patients who cannot be given topical antibiotics and in patients with systemic symptoms such as fever and in extensive lesions. The choice of antibiotics that can be used in cases of impetigo is summarized in Figure 4 [13,14]. In several studies, topical antibiotics such as mupirocin have the same effectiveness as some oral antibiotics such as dicloxacillin, cephalosporins, and ampicillin.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
Topical antibiotics such as mupirocin (Bactroban) and fusidic acid (not available in the United States) are the preferred first-line therapy for impetigo involving limited body surface area.	A	4, 8
Oral antibiotics (e.g., antistaphylococcal penicillins, amoxicillin/clavulanate [Augmentin], cephalosporins, macrolides) are effective for the treatment of impetigo; erythromycin is less effective.	A	4, 8
Oral antibiotics should be considered for patients with impetigo who have more extensive disease and for disease associated with systemic symptoms.	C	4, 8
Oral penicillin V, amoxicillin, topical bacitracin, and neomycin are not recommended for the treatment of impetigo.	B	4, 8
Topical disinfectants such as hydrogen peroxide should not be used in the treatment of impetigo.	B	4, 8

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 789 or http://www.aafp.org/afpsort.xml.

Figure 3. Clinical recommendations for the management of impetigo [2,11].



BOX 176-4 TREATMENTS FOR IMPETIGO*

	TOPICAL		SYSTEMIC	
First line	Mupirocin	bid	Dicloxacillin	250–500 mg PO qid for 5–7 days
	Retapamulin	bid	Amoxicillin plus clavulanic acid; cephalexin	25 mg/kg tid; 250–500 mg qid
	Fusidic acid (not available in United States)	bid		
Second line (penicillin allergy)			Azithromycin	500 mg × 1, then 250 mg daily for 4 days
			Clindamycin	15 mg/kg/day tid
			Erythromycin	250–500 mg PO qid for 5–7 days
If CA-MRSA is suspected	Mupirocin	bid	TMP-SMX	160/800 mg PO bid for 7 days
			Clindamycin	15 mg/kg/day tid
			Tetracycline	250–500 mg PO qid for 7 days
			Doxycycline, Minocycline	100 mg PO bid for 7 days

*Washing and hygiene are important in all regimens.

Figure 4. First-line and second-line treatment of impetigo [1].

Conclusion

Based on research and some literature, impetigo can heal by itself without leaving a sequel within two weeks if left untreated. However, healing takes longer time and complications can occur in some cases. One of the complications that can be caused is post streptococcal acute Glomerulonephritis (GNAPS), sepsis, osteomyelitis, septic arthritis, endocarditis, pneumonia, cellulitis, lymphangitis or lymphadenitis, gutate psoriasis, toxic shock syndrome, and staphylococcal scalded skin syndrome.

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