



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

Available online at: <http://www.iajps.com>

Research Article

AN OVERVIEW PROPER PHARMACOLOGICAL TREATMENT OF IMPETIGO

¹Ola Hisham Ojaimi, ²Haifa khalid Aljuhani, ³Azzah Saleh Shabaan, ⁴Rawan Sami Alharbi,
⁵Mariyam Mohammed Qaed, ⁶Reham Ahmad Alemam, ⁷Manar Mohammad Allahaibi,
⁸Amwaj Faisal Ageeli, ⁹Nada Adel Bogis, ¹⁰Ghaida Siraj Mubarak

¹Pharmacist, Heraa General Hospital, ²Pharmacist, Heraa General Hospital, ³Pharmacist, Heraa General Hospital, ⁴Pharmacist, Heraa General Hospital, ⁵Pharmacist, Heraa General Hospital, ⁶Pharmacist, Heraa General Hospital, ⁷Pharmacist, Heraa General Hospital, ⁸Pharmacist, Heraa General Hospital, ⁹Pharmacist, Heraa General Hospital, ¹⁰Pharmacist, Heraa General Hospital,

Article Received: November 2022

Accepted: November 2022

Published: November 2022

Abstract:

Impetigo is a highly contagious illness of the superficial epidermis that typically affects children between the ages of two and five, but can affect anybody. Currently affects around 162 million children worldwide. Lack of agreement on the most effective treatment strategy for impetigo and rising antibiotic resistance continue to motivate research into novel and alternative treatments. We combed PubMed, MEDLINE via EBSCOhost, CINAHL via EBSCOhost, Web of Science, and Embase via Scopus for studies published by February 29, 2022. There is no conventional treatment for impetigo, and there are numerous potential choices. Mupirocin and fusidic acid are efficient topical antibiotics that may be superior to oral antibiotics. Patients with significant illness should be considered for oral antibiotic therapy.

Corresponding author:

Ola Hisham Ojaimi,
 Pharmacist, Heraa General Hospital

QR code



Please cite this article in press Ola Hisham Ojaimi et al, *An Overview Proper Pharmacological Treatment Of Impetigo*, Indo Am. J. P. Sci, 2022; 09(11).

INTRODUCTION:

Impetigo is a highly contagious, superficial bacterial skin infection that primarily affects children aged 2 to 5 years old due to a compromised cutaneous barrier. Primary infection with direct bacterial invasion or secondary infection (eg, in association with scabies or eczema). Impetigo manifests clinically as a bullous or nonbullous form [1,2]. The most frequent form of impetigo is nonbullous impetigo, which is caused by *Staphylococcus aureus* in 80% of cases and group A - hemolytic *Streptococcus* alone or in conjunction with *S aureus* in the remaining 20%. Nearly all cases of bullous impetigo are caused by *S aureus*. Globally, an estimated 162 million children are affected by impetigo at any given moment. Indigenous Australian children exhibit a disproportionately high incidence [3,4]. Approximately 16,000 Aboriginal children in the northern parts of Australia have impetigo at any given time, accounting for nearly half of all cases. Before their first birthday, roughly two-thirds of these youngsters are treated for impetigo. Impetigo risk factors include youth, crowding, intimate contact, and warm, humid weather. When left untreated, impetigo can cause severe skin, soft tissue, and bone infections, as well as sepsis, which contribute to a case fatality rate of 5 to 10 percent. Impetigo also results in serious complications, such as glomerulonephritis, acute rheumatic fever, and rheumatic heart disease [5]. The management of impetigo varies based on whether the condition is localized or widespread, the resistance patterns to the causative agents, and the established standards. Bullous or nonbullous impetigo with few lesions is commonly treated with topical antibiotics, such as mupirocin or retapamulin [6,7]. Oral (such as dicloxacillin, cephalexin, and trimethoprim sulfamethoxazole) or intramuscular (benzathine penicillin G) antibiotics (such as dicloxacillin, cephalexin, and trimethoprim sulfamethoxazole) are advised when impetigo is accompanied by multiple lesions [5,8]. Emergence and spread of antibiotic-resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* (MRSA), pose grave hazards to public health. The rise of antimicrobial resistance to topical mupirocin and fusidic acid has had negative effects on individuals and communities, demanding the development of novel treatment options or initiatives to encourage the prudent use of existing medications. There are numerous treatments with differing levels of evidence for impetigo, including topical and oral antibiotics, disinfectants, and herbal remedies [9].

The previous comprehensive systematic review of impetigo therapies was published by Koning et al. [10] in 2012 and included papers published up through

2011. The evaluation indicated that topical mupirocin and fusidic acid are as effective as or more successful than oral treatment and emphasized the lack of evidence supporting disinfection for impetigo control [10]. Another focused review published in 2019 examined treatment strategies for commonly encountered infectious skin conditions, including impetigo in endemic settings, and covered a wide range of interventions, such as complementary or alternative therapies, hand washing and hygiene practices, and other public health interventions [11,12].

DISCUSSION:

Impetigo is typically a self-limiting condition, although complications are uncommon. These include nonbullous cellulitis, septicemia, osteomyelitis, septic arthritis, lymphangitis, lymphadenitis, guttate psoriasis, staphylococcal scalded skin syndrome, and acute poststreptococcal glomerulonephritis [13]. The number of potential causes, incidence, and clinical severity of acute poststreptococcal glomerulonephritis have decreased since *S. aureus* has replaced *S. pyogenes* as the causative organism of impetigo [13]. In the United States, the majority of cases of poststreptococcal glomerulonephritis are associated with pharyngitis. It is believed that the strains of *S. pyogenes* associated with impetigo have minimal nephritogenic potential. There is no evidence that antibiotic treatment of impetigo prevents the development of acute poststreptococcal glomerulonephritis, which can occur in up to 5% of nonbullous impetigo patients [14,15]. It does not appear that rheumatic fever is a complication of impetigo [16].

Some types of bacteria, such as *S. pyogenes* and *S. aureus*, intermittently colonize the nasal, axillary, pharyngeal, and perineal regions [17]. These bacteria are capable of infecting skin that is susceptible. Other risk factors for impetigo include skin trauma, hot, humid climates, poor hygiene, day care settings, overcrowding, malnutrition, and diabetes or other medical complications [18]. Autoinoculation through the use of fingers, towels, or clothing frequently results in the development of satellite lesions in adjacent areas. The highly contagious nature of impetigo also allows for its transmission to close contacts of patients. Although impetigo is regarded as a self-limiting infection, antibiotic treatment is frequently initiated for a speedier recovery and to prevent its spread [17,18]. This can reduce the number of missed school and work days. Infection can be prevented through hygienic practices such as cleaning

minor wounds with soap and water, handwashing, regular bathing, and avoiding contact with infected children [18].

NONBULLOUS IMPETIGO:

Nonbullous impetigo is the most prevalent form, accounting for 70% of cases. Nonbullous impetigo can be further classified as either the primary or secondary (more prevalent) form. Primary impetigo is a bacterial invasion of healthy, intact skin [10,19]. Secondary (common) impetigo is a bacterial skin infection caused by trauma, eczema, insect bites, scabies, herpetic outbreaks, and other diseases. Diabetes and other

underlying systemic disorders also increase susceptibility [18]. Impetigo begins as maculopapular lesions that transform into thin-walled vesicles that rapidly rupture, leaving honey-colored crusts covering superficial, sometimes pruritic or painful erosions. If left untreated, an infection can last two to three weeks [10]. After the crust has dried, the remaining wound will heal without scarring. Extremities and exposed facial skin (e.g., nares, perioral region) are the most common sites of infection. There may be regional lymphadenitis, but systemic symptoms are unlikely. *S. aureus* is typically responsible for nonbullous impetigo, but *S. pyogenes* can also be involved, particularly in warmer, more humid climates [19].



Figure 1: Honey-colored crust of nonbullous impetigo.

BULLOUS IMPETIGO:

Only *S. aureus* can produce bullous impetigo, which is characterized by big, fragile, flaccid bullae that can rupture and exude yellow fluid (**Figure 2**). It typically resolves without scarring within two to three weeks. After the bullae break, a pathognomonic collarette of

scales develops on its periphery, leaving a thin, dark crust on the surviving erosions. These bigger bullae arise due to *S. aureus* strains' exfoliative toxins, which cause loss of cell adhesion in the superficial epidermis. Typically, bullous impetigo affects the trunk, axilla, extremities, and intertriginous (diaper) regions. It is

the most prevalent cause of an ulcerative rash on newborns' buttocks. Systemic symptoms are uncommon, but may consist of fever, diarrhea, and weakness [10,17,19].

Pharmacological management:

In addition to the use of medication to reduce recovery time or manage problems, effective care depends on the adoption of habits that reduce the risk of transmission and promote recovery.

Typically, management involves either topical or systemic medication. Patients who exhibit evidence of a systemic illness are often the only ones to receive oral treatment.

Topical therapy

Localized nonbullous impetigo should be treated topically [20]. The topical treatment is used after the affected crusts have been removed with soap and water. The administration of topical treatment may be difficult if lesions are especially broad, and it cannot eliminate organisms from the respiratory tract.

The National Institute for Health and Care Excellence (NICE) recommends 1% hydrogen peroxide cream (used two to three times daily for five days) as the first-line treatment for simple, nonbullous impetigo [20,21]. Hydrogen peroxide is equally efficient as topical antibiotics, with fewer side effects, such as irritation and whitening of the skin, and a low incidence of resistance development compared to topical antibiotics [20,21].

Fusidic acid 2% cream (used three times daily for five days) may be used if hydrogen peroxide is unsuccessful or inappropriate (e.g., if lesions are located near the eyes) [22]. Community pharmacists may dispense this medication for the treatment of impetigo in children two years of age and older in response to a local Patient Group Direction[23]. Noting that substantial resistance rates have been documented with the usage of fusidic acid, its application should be controlled [

If fusidic acid resistance is suspected or verified, mupirocin 2% cream (used three times a day for five days) is suggested.

In cases of more widespread infection, the duration of all three treatments may be extended to seven days; however, topical fusidic acid should not be used for longer than ten days to prevent the development of sensitization and resistance [20,22].

It is essential to encourage patients to wash their hands before and after using creams or ointments, and to

finish the prescribed course of treatment even if their symptoms have improved. Even if the illness appears to be gone, it is important to continue taking the medication for the duration of the course.

Systemic antimicrobial therapy

Patients with systemic illness, such as those with swollen lymph nodes and glands, fever, and diarrhea, require these [21]. Oral antibiotics with gram-positive bacterial coverage are prescribed for systemic infections, illnesses that are extensive (e.g., bullous impetigo), complicated (as described above), or recurring [20,23]. As impetigo is very contagious, advise patients to contact their primary care physician first, as an in-person appointment may not be necessary and may assist prevent the disease's spread. In addition, if a patient shows at the pharmacy, they should be informed that the condition is communicable and that they should exercise general hygiene and refrain from visiting the pharmacy or doctor. Following the consultation, the pharmacy staff should wash their hands and disinfect any surfaces the patient has touched.

In penicillin-allergic patients, flucloxacillin or a macrolide (such as clarithromycin or erythromycin) would be an appropriate choice of oral antibiotics. Generally, a five-day course of treatment is sufficient. Depending on clinical judgment and the severity and quantity of lesions, the duration of the therapy might be expanded to seven days if necessary [23].

If symptoms persist or worsen after seven days, the patient should be reviewed to rule out the above-mentioned differential diagnosis.

Before administering topical or oral antibiotic therapy, any recent antimicrobial treatment the patient may have received should be considered. A combination of oral and topical antibiotics should be avoided due to the possibility of resistance development [23].

If the illness is recurring and a nasal swab identifies MRSA, local microbiology should be consulted as therapy will rely on local resistance patterns[20]. As an anti-MRSA medication, mupirocin nasal ointment or neomycin nasal cream may be administered. Ensure that the patient is not allergic to peanut oil before administering neomycin cream. In order to detect and remove carriers and reinfections, members of the same home may also be swabbed [23].

Recent studies indicate that the incidence of MRSA-related skin and soft tissue infections may be lowering [24]. No studies have revealed an issue with MRSA-

related impetigo in adults or children, however cultures may be useful in certain situations. If MRSA infection is suspected, early therapy is advised with trimethoprim/sulfamethoxazole, clindamycin, or a tetracycline (doxycycline or minocycline [Minocin]) [25]. Although trimethoprim/sulfamethoxazole is effective against *S. aureus* infections, including the majority of MRSA infections, low coverage of streptococcal bacteria limits its use for impetigo. If MRSA infection is suspected, oral clindamycin penetrates skin and skin structures and should be examined. Due to the rising risk of pseudomembranous colitis, clindamycin should be reserved for penicillin-allergic patients or for infections that do not respond to alternative treatments. Tetracyclines can be used to treat infections caused by susceptible MRSA, however they should be avoided in children younger than eight years old. Because of their limited staphylococcal activity and probable connection with tendinopathy and arthropathies [24,25], oral fluoroquinolones are not chosen.

CONCLUSION:

The goals of treatment include alleviating pain and improving the visual appearance of the lesions, preventing the infection from spreading further within the patient and to others, and preventing recurrence. Treatments should ideally be effective, affordable, and have few adverse effects. Topical antibiotics offer the benefit of being applied locally, hence minimizing systemic side effects. However, several topical antibiotics may cause sensitivity of the skin in sensitive individuals. Evidence supports the use of topical ozenoxacin or retapamulin for the treatment of impetigo in nonendemic settings, whereas evidence supports the use of systemic antibiotics in endemic settings. Rapid growth of antibiotic-resistant bacteria around the globe threatens the clinical efficacy of antimicrobials and emphasizes the need for prudent use of existing antimicrobials and the development of novel medicines. Although the advent of medications such as ozenoxacin for the treatment of impetigo in nonendemic areas is a positive development, the findings highlight the evident need for more investigation into the development of palatable and effective alternative treatments. Although additional verification is required

REFERENCES:

1. Nardi NM, Schaefer TJ. Impetigo. USA: StatPearls; 2017

2. Thomas J, Christenson J, Walker E, Baby K, Peterson G. Scabies-An ancient itch that is still rampant today. *J Clin Pharm Ther.* 2017;42:793.
3. Hartman-Adams H, Banvard C, Juckett G. Impetigo: diagnosis and treatment. *Am Fam Physician.* 2014;90:229–235.
4. Bowen AC, Mahé A, Hay RJ, et al. The Global Epidemiology of Impetigo: A Systematic Review of the Population Prevalence of Impetigo and Pyoderma. *PloS one.* 2015;10.
5. Aung PTZ, Cuningham W, Hwang K, et al. Scabies and risk of skin sores in remote Australian Aboriginal communities: A self-controlled case series study. *PLoS Negl Trop Dis.* 2018;12.
6. Pereira LB. Impetigo - review. *An Bras Dermatol.* 2014;89:293–299.
7. Bowen A, May P, Carapetis J, Tong S, Andrews R, Currie B. National Healthy Skin Guideline for the Prevention, Treatment and Public Health Control of Impetigo, Scabies, Crusted Scabies and Tinea for Indigenous Populations and Communities in Australia. 1st edition; 2018.
8. Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clin Infect Dis.* 2014;59:e10–e52.
9. Bowen AC, Tong SY, Andrews RM, et al. Short-course oral co-trimoxazole versus intramuscular benzathine benzylpenicillin for impetigo in a highly endemic region: an open-label, randomised, controlled, non-inferiority trial. *Lancet.* 2014;384:2132–2140.
10. Koning S, van der Sande R, Verhagen AP, et al. Interventions for impetigo. *The Cochrane Catabase Syst Rev.* 2012;1.
11. Geria AN, Schwartz RA. Impetigo update: new challenges in the era of methicillin resistance. *Cutis.* 2010;85:65–70.
12. Antonov NK, Garzon MC, Morel KD, Whittier S, Planet PJ, Lauren CT. High prevalence of mupirocin resistance in *Staphylococcus aureus* isolates from a pediatric population. *Antimicrob Agents Chemother.* 2015;59:3350–3356.
13. Ilyas M, Tolaymat A. Changing epidemiology of acute post-streptococcal glomerulonephritis in Northeast Florida: a comparative study. *Pediatr Nephrol.* 2008;23(7):1101–1106.
14. Weinberg JM, Tying SK. Retapamulin: an antibacterial with a novel mode of action in an age of emerging resistance to *Staphylococcus aureus*. *J Drugs Dermatol.* 2010;9(10):1198–1204.
15. Stevens DL, Bisno AL, Chambers HF, et al.; Infectious Diseases Society of America. Practice

- guidelines for the diagnosis and management of skin and soft-tissue infections [published corrections appear in Clin Infect Dis. 2006;42(8):1219 and Clin Infect Dis. 2005;41(12):1830]. Clin Infect Dis. 2005;41(10):1373-1406.
16. Bisno AL, Stevens DL. Streptococcal infections of skin and soft tissues. N Engl J Med. 1996;334(4):240-245.
 17. Feaster T, Singer JI. Topical therapies for impetigo. *Pediatr Emerg Care*. 2010;26(3):222-227, quiz 228-231.
 18. Bangert S, Levy M, Hebert AA. Bacterial resistance and impetigo treatment trends: a review. *Pediatr Dermatol*. 2012;29(3):243-248.
 19. Cole C, Gazewood J. Diagnosis and treatment of impetigo. *Am Fam Physician*. 2007;75(6):859-864.
 20. National Institute for Health and Care Excellence. Impetigo: antimicrobial prescribing. NICE guideline [NG153]. 2020. Available at: <https://www.nice.org.uk/guidance/ng153>
 21. National Institute for Health and Care Excellence. Impetigo. Clinical Knowledge Summary. 2020. Available at: <https://cks.nice.org.uk/impetigo>
 22. BMJ Group and Pharmaceutical Press. Joint Formulary Committee. British National Formulary (online). Available at: <http://www.medicinescomplete.com>
 23. Davis EC & Callender VD. Postinflammatory hyperpigmentation: a review of the epidemiology, clinical features, and treatment options in skin of color. *Clin Aesthet Dermatol* 2010;3(7):20-31.
 24. Bangert S, Levy M, Hebert AA. Bacterial resistance and impetigo treatment trends: a review. *Pediatr Dermatol*. 2012;29(3):243-248.
 25. Hochedez P, Canestri A, Lecso M, Valin N, Bricaire F, Caumes E. Skin and soft tissue infections in returning travelers. *Am J Trop Med Hyg*. 2009;80(3):431-434.