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COMPARATIVE STUDY OF EFFICACY AND SAFETY OF ORAL VS. TOPICAL ANTIBIOTICS IN THE TREATMENT OF IMPETIGO

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Abstract

Background: Impetigo is a common superficial bacterial skin infection, primarily affecting children. Treatment typically involves topical or oral antibiotics, but their comparative effectiveness and safety remain a subject of clinical interest.
Objectives: To compare the efficacy, safety, and patient satisfaction of topical versus oral antibiotics in the treatment of impetigo.
Methods: A prospective, comparative study was conducted over 12 months at Sri Siddhartha Medical College involving 100 patients clinically diagnosed with impetigo. Patients were randomized into two groups: Group A received topical antibiotics (e.g., mupirocin or fusidic acid) and Group B received oral antibiotics (e.g., cephalexin or azithromycin), each for 7 days. Outcomes were assessed on Day 3, Day 7, and Day 14 based on clinical improvement, adverse effects, recurrence, and patient-reported satisfaction.
Results: Non-bullous impetigo was the predominant type (82%). Excellent clinical response was observed in 70% of the topical group and 64% of the oral group (p = 0.52). Adverse effects were fewer in the topical group (6%) compared to the oral group (16%). Recurrence was low and comparable in both groups (4% vs. 6%). Patient satisfaction was higher in the topical group.
Conclusion: Topical antibiotics are as effective as oral antibiotics for treating mild to moderate impetigo, with fewer side effects and greater patient satisfaction. They should be considered the preferred first-line treatment in uncomplicated cases.

Keywords: Impetigo, Topical antibiotics, Oral antibiotics, Mupirocin, Cephalexin, Efficacy, Safety

INTRODUCTION

Impetigo is a highly contagious superficial bacterial skin infection that primarily affects children but can also occur in adults. It is classified into two main types: non-bullous (impetigo contagiosa) and bullous impetigo. The non-bullous type accounts for more than 70% of cases and is typically caused by *Staphylococcus aureus* or *Streptococcus pyogenes* [1]. Bullous impetigo, though less common, is generally caused by strains of *S. aureus* that produce exfoliative toxins [2].
Management of impetigo is essential not only for symptom resolution but also for preventing transmission and complications. Treatment options include both topical and systemic antibiotics. Topical antibiotics, such as mupirocin and fusidic acid, are generally recommended for localized or mild infections due to their effectiveness and minimal systemic side effects [3,4]. Oral antibiotics are usually reserved for widespread lesions, systemic symptoms, or when topical therapy is impractical [5].
While both treatment modalities are effective, the choice of therapy often depends on the extent of disease, patient compliance, potential adverse effects, and the risk of antimicrobial resistance [6]. The emergence of antibiotic resistance, especially in community-acquired *S. aureus* strains, has raised concerns over the indiscriminate use of systemic antibiotics [7].
Several studies have evaluated the comparative efficacy of topical vs. oral antibiotics in impetigo. Some findings suggest that topical antibiotics are as effective as oral antibiotics for localized disease, with fewer adverse effects [8,9]. However, conflicting results exist regarding recurrence rates and patient satisfaction, warranting further research.
This study was designed to compare the efficacy, safety, and patient satisfaction of topical versus oral antibiotics in treating impetigo in a South Indian population, with a focus on clinical improvement, side effects, and recurrence.

MATERIALS AND METHODS

Study Design and Setting:

This was a prospective, comparative, interventional study conducted over 12 months at the Department of Dermatology, Sri Siddhartha Medical College and Research Centre.

Study Population:

A total of 100 patients clinically diagnosed with impetigo were enrolled in the study. Participants were selected from patients attending the dermatology outpatient department.

Inclusion Criteria:

- Patients of either sex, aged 2 years and above.
- Clinical diagnosis of primary or secondary impetigo.
- Patients who provided written informed consent (or assent from guardians in case of minors).

Exclusion Criteria:

1. Patients with systemic infections requiring hospitalization.
2. Known hypersensitivity to study drugs.
3. Immunocompromised individuals (e.g., HIV, steroid therapy).
4. Patients who had received antibiotics in the previous 7 days.
5. Pregnant and lactating women.

Sample Size:

A total of 100 patients were included, with 50 patients in each treatment group.

Study Groups:

- Group A (Topical Group): 50 patients received topical antibiotic therapy (e.g., 2% mupirocin ointment or fusidic acid cream) applied thrice daily for 7 days.
- Group B (Oral Group): 50 patients received oral antibiotic therapy (e.g., oral cephalexin 25–50 mg/kg/day in divided doses or azithromycin) for 7 days.

Randomization:

Patients were randomized into two groups using a computer-generated random number table to minimize selection bias.

Baseline Assessment:

All enrolled patients underwent a thorough clinical examination. Lesions were assessed for number, size, type (bullous or non-bullous), and presence of secondary infection. Demographic details and relevant history were recorded.

Follow-Up and Outcome Measures:

Patients were evaluated on Day 0 (baseline), Day 3, and Day 7 for:

- Clinical Efficacy: Reduction in lesion number, erythema, crusting, and symptom resolution.
- Microbiological Clearance (if culture was done): Bacterial clearance from lesion swab (optional).
- Adverse Events: Any local (for topical) or systemic (for oral) side effects were documented.

Outcome Assessment:

Efficacy was graded as:

- Excellent: Complete resolution of lesions with no recurrence by Day 7.
- Good: >75% improvement in symptoms and lesions.
- Poor: <50% improvement or worsening.

Data Analysis:

Data were entered into Microsoft Excel and analyzed using SPSS software (version 21). Categorical variables were expressed as frequency and percentage; continuous variables as mean ± standard deviation. Chi-square test and t-test were used to compare outcomes between groups. A p-value of <0.05 was considered statistically significant.

Ethical Considerations:
The Institutional Ethics Committee of Sri Siddhartha Medical College and Research Centre approved the study. Written informed consent was obtained from all participants or guardians before enrollment.

RESULTS AND OBSERVATIONS
The present study was conducted on 100 clinically diagnosed impetigo patients, divided into two groups:

- Group A (Topical antibiotics): 50 patients
- Group B (Oral antibiotics): 50 patients

Table 1: Age and Gender Distribution

Age Group (years)	Topical (n = 50)	Oral (n = 50)	Total (n = 100)
2–10	22 (44%)	20 (40%)	42 (42%)
11–20	15 (30%)	14 (28%)	29 (29%)
21–30	8 (16%)	9 (18%)	17 (17%)
>30	5 (10%)	7 (14%)	12 (12%)
Mean Age	14.2 ± 6.4 yrs	15.1 ± 6.8 yrs	—
Gender	Topical (n = 50)	Oral (n = 50)	Total (n = 100)
Male	28 (56%)	30 (60%)	58 (58%)
Female	22 (44%)	20 (40%)	42 (42%)

Table 2: Type of Impetigo

Type of Impetigo	Topical (n = 50)	Oral (n = 50)	Total (n = 100)
Non-bullous	40 (80%)	42 (84%)	82 (82%)
Bullous	10 (20%)	8 (16%)	18 (18%)

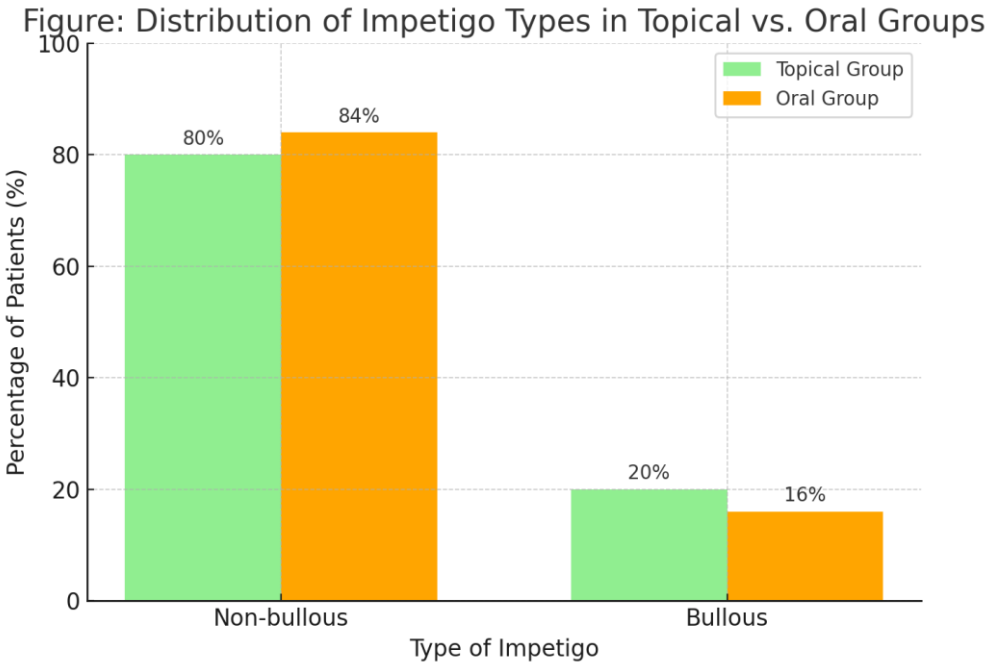

Figure 1: Distribution of Impetigo in Topical vs. Oral Groups

Table 3: Clinical Response on Day 7

Clinical Outcome	Topical Group (n = 50)	Oral Group (n = 50)	*p*-value
Excellent Response	35 (70%)	32 (64%)	0.52 (NS)
Good Response	12 (24%)	14 (28%)	
Poor Response	3 (6%)	4 (8%)	

Table 4: Adverse Effects Observed

Adverse Effects	Topical Group (n = 50)	Oral Group (n = 50)
Local irritation	3 (6%)	0 (0%)
Nausea	0 (0%)	5 (10%)
Diarrhea	0 (0%)	3 (6%)
No adverse effect	47 (94%)	42 (84%)

Table 5: Recurrence on Follow-Up (Day 14)

Recurrence	Topical Group (n = 50)	Oral Group (n = 50)	Total
Yes	2 (4%)	3 (6%)	5
No	48 (96%)	47 (94%)	95

Table 6: Duration of Lesions Before Treatment Initiation

Duration of Lesions	Topical Group (n = 50)	Oral Group (n = 50)	Total (n = 100)
< 3 days	20 (40%)	18 (36%)	38 (38%)
3–5 days	22 (44%)	24 (48%)	46 (46%)
>5 days	8 (16%)	8 (16%)	16 (16%)

Table 7: Number of Lesions at Baseline

Lesion Count	Topical Group (n = 50)	Oral Group (n = 50)	Total
1–5 lesions	28 (56%)	26 (52%)	54
6–10 lesions	14 (28%)	16 (32%)	30
>10 lesions	8 (16%)	8 (16%)	16

Table 8: Site of Lesion Involvement

Body Site	Topical Group (n = 50)	Oral Group (n = 50)	Total (n = 100)
Face	20 (40%)	22 (44%)	42 (42%)
Arms/Hands	12 (24%)	10 (20%)	22 (22%)
Legs/Feet	10 (20%)	12 (24%)	22 (22%)
Trunk	8 (16%)	6 (12%)	14 (14%)

Table 9: Time to Symptom Relief (e.g., itching, pain)

Time to Relief (days)	Topical Group (n = 50)	Oral Group (n = 50)
≤2 days	22 (44%)	20 (40%)
3–4 days	20 (40%)	22 (44%)
>4 days	8 (16%)	8 (16%)

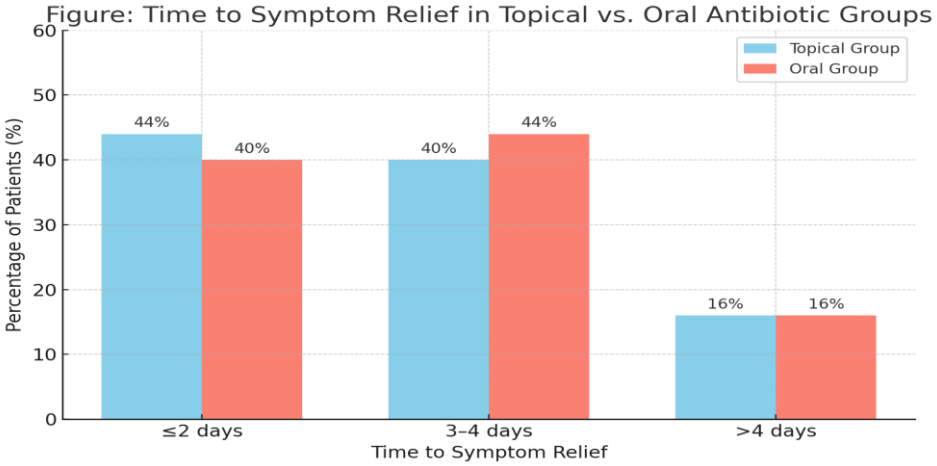

Figure 2: Time to Symptom relief in Topical vs. Oral Antibiotic Groups

Table 10: Patient Satisfaction Score on Day 7 (Self-Reported)
(*Scale: 1 = Very Dissatisfied; 5 = Very Satisfied*)

Satisfaction Score	Topical Group (n = 50)	Oral Group (n = 50)
1	0 (0%)	1 (2%)
2	2 (4%)	3 (6%)
3	5 (10%)	8 (16%)
4	15 (30%)	17 (34%)
5	28 (56%)	21 (42%)

DISCUSSION

Impetigo remains one of the most common pediatric dermatoses worldwide, especially in resource-limited settings with poor hygiene, hot climates, and overcrowding [1]. The present study aimed to compare the efficacy and safety of topical versus oral antibiotics in the treatment of impetigo among 100 patients at Sri Siddhartha Medical College and Research Centre.

Our study observed that the majority of impetigo cases were non-bullous (82%), aligning with the global epidemiological pattern where non-bullous impetigo is more common than bullous forms [2]. Both topical and oral treatment groups had a comparable distribution of lesion types, sites of involvement, and baseline lesion counts, supporting the internal validity of comparative analysis.

In terms of clinical response, 70% of patients in the topical group and 64% in the oral group achieved excellent response by day 7. Though the difference was not statistically significant ($p = 0.52$), it supports findings from earlier trials suggesting similar efficacy of topical agents such as mupirocin or fusidic acid compared to oral antibiotics like cephalexin or azithromycin for mild to moderate disease [3,4].

The safety profile also favored topical therapy. Local irritation was reported in only 6% of patients using topical antibiotics, whereas oral antibiotics were associated with gastrointestinal side effects like nausea (10%) and diarrhea (6%). These observations corroborate with previous studies indicating that topical agents are associated with fewer systemic side effects and better tolerability [5,6].

Time to symptom relief was similar in both groups, with most patients reporting improvement within 2–4 days. Patient satisfaction was marginally higher in the topical group (56% gave a score of 5/5) compared to the oral group (42%). These findings reflect patient preferences for non-invasive, locally applied treatments when disease severity permits, as also noted in prior literature [7].

Regarding recurrence, both groups had low and comparable recurrence rates by Day 14 (4% in topical group vs. 6% in oral group), suggesting that both treatment modalities were effective in long-term resolution. This is consistent with studies by Oranje et al. and Thomas et al., which demonstrated similar recurrence outcomes in patients treated with either approach [8,9].

From a public health and antimicrobial stewardship perspective, topical antibiotics are often preferred for localized infections to reduce the risk of developing systemic resistance and to preserve oral antibiotic options for more serious infections [10]. However, the emergence of mupirocin and fusidic acid resistance, especially in regions with over-the-counter availability, must be monitored closely [11].

One limitation of this study is the lack of microbiological culture confirmation in all patients, which might have provided more specific insights into antibiotic sensitivity. Additionally, longer follow-up could help better assess recurrence rates and resistance patterns.

CONCLUSION

Both topical and oral antibiotics were effective in managing impetigo, with no significant difference in clinical response or recurrence. However, topical antibiotics had a better safety profile and higher patient satisfaction. Therefore, topical antibiotics are recommended as the first-line treatment for mild to moderate impetigo, reserving oral therapy for extensive or systemic cases.

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