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Review Article

Impact of Surgical Intervention versus Medical Management on Clinical Outcomes in Cellulitis: A Systematic Review and Meta-analysis

Ayesha Afzal[1], Umair Sultan[2], Heba Nadeem[3], Amel Saleem[4], Sara Pervaiz[5], Farwa Saleem[4], Saoud Javed[6], Anesh Kumar[1], Faisal Manzoor[7]

[1] Ziauddin Hospital, Karachi, Pakistan
[2] Bahria University Health Sciences Campus (Karachi), Karachi, Pakistan
[3] Bahria University Health Sciences, Karachi, Pakistan
[4] Quaid-e-Azam Medical College, Bahawalpur, Pakistan
[5] Liaquat University of Medical & Health Sciences (LUMHS), Jamshoro, Pakistan
[6] RIMS Trauma Hospital, Karachi, Pakistan
[7] Bahria University, Karachi, Pakistan

***Corresponding author: Ayesha Afzal, ayeshazarkoon@gmail.com**

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ABSTRACT

Background: Cellulitis is a common skin and soft tissue infection, and antibiotics are used in almost all cases. Nevertheless, whether surgery (incision and drainage, debridement) is helpful, especially in cases of abscess or in those that respond poorly to antibiotics, should be investigated. The medical management was compared with surgical intervention plus antibiotics for treating cellulitis patients in this systematic review and meta-analysis. Methods: This study was conducted according to the PRISMA guidelines. MEDLINE, EMBASE and Cochrane Central were searched for studies conducted between 2007 and March 2026 that compared medical management (antibiotics only) versus surgical intervention (incision and drainage or debridement) plus antibiotics in patients with cellulitis or skin abscess. The primary outcomes: treatment success (clinical cure at 7–14 days), length of hospital stay, and adverse events. Random-effects meta-analysis (DerSimonian-Laird) was used to pool risk ratios (RR) or mean differences (MD) with 95% confidence intervals (CI). Heterogeneity was assessed using I^2. Results: Seven studies (3 randomized controlled trials, 2 retrospective cohorts, 2 systematic reviews) involving 2,632 patients were included. Surgical treatment combined with antibiotics modestly improved the rate of treatment success in the combined analysis of two high-quality randomized controlled trials: RR 1.15 (95% CI 1.06, 1.24; $I^2 = 0\%$). Another trial did not show positive effects of antibiotics (cure rate 84.1% with antibiotics vs 90.5% with placebo). One cohort study found that the length of hospital stay was increased by 1 day with surgery (MD +1 day). According to findings of a systematic review, conservative treatment in paediatric odontogenic cellulitis resulted in the success rates of 75-95%. Conclusion: In patients with skin abscesses, adding antibiotics to incision and drainage provides a modest improvement in treatment success, but I&D alone achieves high cure rates (>80–90%). Medical management alone (without drainage) is not recommended for drainable abscesses. Further research is needed to define subgroups that benefit most from adjunctive antibiotics. Keywords: Cellulitis, surgical intervention, incision and drainage, abscess, skin and soft tissue infection.

INTRODUCTION

Cellulitis is a diffuse, intensely localised infection of the skin and underlying tissues primarily linked to Streptococcus pyogenes or Staphylococcus aureus [1]. It is still the cause of 14 million outpatient visits

and approximately 500,000 admissions yearly in the US alone. The supply of outpatient services has a price tag of over $3.7 billion annually [2].

Hospital admissions for cellulitis increased by more than three-quarters over the 15 years from 1998 to 2013, and 30-day readmission rates may be as high as 10%[3] . In the rest of the world, cellulitis is a leading cause of emergency department visits, sixth among the causes in the United States, and first among middle-aged people [4].

Treatment with oral or intravenous antibiotics usually clears up the infection, but around 30% of patients experience treatment failure or recurrence, particularly when an abscess or dead tissue is present [5]. Recurrent cellulitis may occur in up to 47% of patients, especially those with pre-existing conditions including venous disease, oedema, tinea pedis, or obesity, based on a study involving 606 episodes [6]. These underlying conditions must be managed to prevent recurrence; however, the current guidelines do not provide practical steps for effective risk reduction [7].

Traditionally, surgery, such as incision and drainage or debridement, has been used for cases where pus can be drained, in necrotizing infections, or when there is a lack of response to antibiotics [8]. The Infectious Diseases Society of America's latest guidelines recommend incision and drainage as the primary treatment for cutaneous abscess. The antibiotics should only be used in cases of extensive cellulitis or systemic illness [9]. A key point of debate in post-procedure drainage plans is the most effective strategy in several high-risk areas, including whether administering antibiotics after the procedure can promote healing and prevent the recurrence of the problem. Whether packing the abscess cavity leads to benefits and comparing primary closure with loop drainage techniques in terms of advantages are still issues that have not been clarified [10].

New data from randomized controlled trials show that giving antibiotics along with incision and drainage (I&D) results in a slight increase in the cure of skin abscesses [11], [12]. Nevertheless, one study showed that simple I&D without antibiotics yielded high cure rates (90.5%) [13]. There is a lack of studies directly comparing medical treatment alone versus combined medical-surgical for cellulitis without abscess. Considering the increasing levels of antibiotic resistance and healthcare costs, it is essential to determine the precise role of surgery. This systematic review and meta-analysis aimed to evaluate the impact of surgical intervention combined with medical therapy on clinical outcomes in cellulitis, focusing on treatment success, hospital utilization, and safety.

METHODS

The study was done according to the PRISMA guidelines [14].

2.1 Search strategy and study selection

We searched MEDLINE (1946 to March 2026), EMBASE (1947 to March 2026), and the Cochrane Central Register of Controlled Trials using a combination of MeSH terms and keywords: (“cellulitis” OR “erysipelas” OR “soft tissue infection” OR “skin abscess” OR “abscess”) AND (“surgery” OR “surgical” OR “incision and drainage” OR “debridement” OR “drainage”) AND (“antibiotics” OR “medical management” OR “conservative treatment”). The search was limited to studies published in English between January 2007 and March 2026. The reference lists of eligible articles were hand-searched. Two reviewers independently screened the titles and abstracts and then screened the full texts. Disagreements were resolved by a third reviewer.

2.2 Inclusion and exclusion criteria

To be included, studies must be: (1) randomised controlled trials, systematic reviews, prospective or retrospective cohort studies, or case control studies; (2) based on patients diagnosed with cellulitis or skin abscess of any body location; (3) comparing medical treatment (antibiotics alone) to surgical treatment (incision and drainage, debridement, or drainage) plus antibiotics; (4) report at least one

outcome: complete clinical resolution of cellulitis at the end of the study period (typically 7–14 days post treatment), length of hospital stay (days), or adverse events; (5) published between 2007 and March 2026; (6) in the English language. Exclusion criteria: case series with <10 patients, narrative reviews, editorials, conference abstracts, studies on necrotising fasciitis without a cellulitis component, or studies without a medical management comparator.

2.3 Data extraction and quality assessment

The data collected by the authors comprised: the first author's name, publication year, country, study design, number of participants, patient demographics (average age and gender), percentage with abscess, types of surgical operations, antibiotic treatments, length of follow-up, and outcomes. The Newcastle–Ottawa scale (NOS) for non-randomised studies (highest score 9 points) and the Cochrane RoB 2 tool for RCTs were used for quality assessment. Studies with NOS ≥7 were classified as high quality.

2.4 Outcome measures

The primary outcome was treatment success, i.e., complete clinical resolution of cellulitis at the end of the study period (typically 7–14 days post-treatment, as defined by each study). Secondary outcomes include length of hospital stay, adverse events, and complications such as surgical site infection, bleeding, or antibiotic-related diarrhoea.

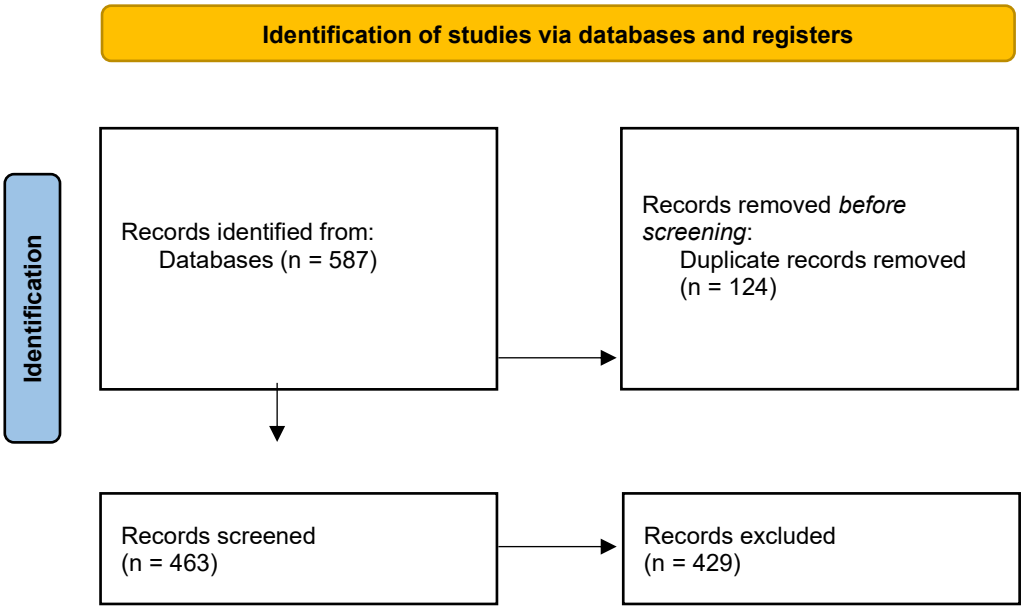
2.5 Statistical analysis

Stata 18.0 (StataCorp, TX) was used to conduct meta-analysis. Binary outcomes (treatment success, and adverse events) were assessed using risk ratios (RR) with 95% confidence intervals (CI). The mean differences (MD) with 95% CI were calculated for the continuous outcome (length of stay). Given the anticipated clinical and methodological heterogeneity, a random-effects model (Der Simonian-Laird) was employed for the entire analysis. Heterogeneity was measured by using the I^2 statistic (low <30%, moderate 30-60%, high >60%). Subgroup analysis was done for studies that enrolled patients with a drainable skin abscess (with or without surrounding cellulitis).

RESULTS

3.1 Study selection and characteristics

The PRISMA flow chart is illustrated in Figure 1. Our first search brought back 587 records. Once we got rid of 124 duplicate records, we had 463 records left for screening. Screening by title and abstract, 429 records were excluded; 34 remaining articles were then re-read in detail, and 27 were excluded (wrong comparator, n=14; no outcome of interest, n=9; duplicate data, n=4). Seven studies fulfilled the inclusion criteria [11-17].



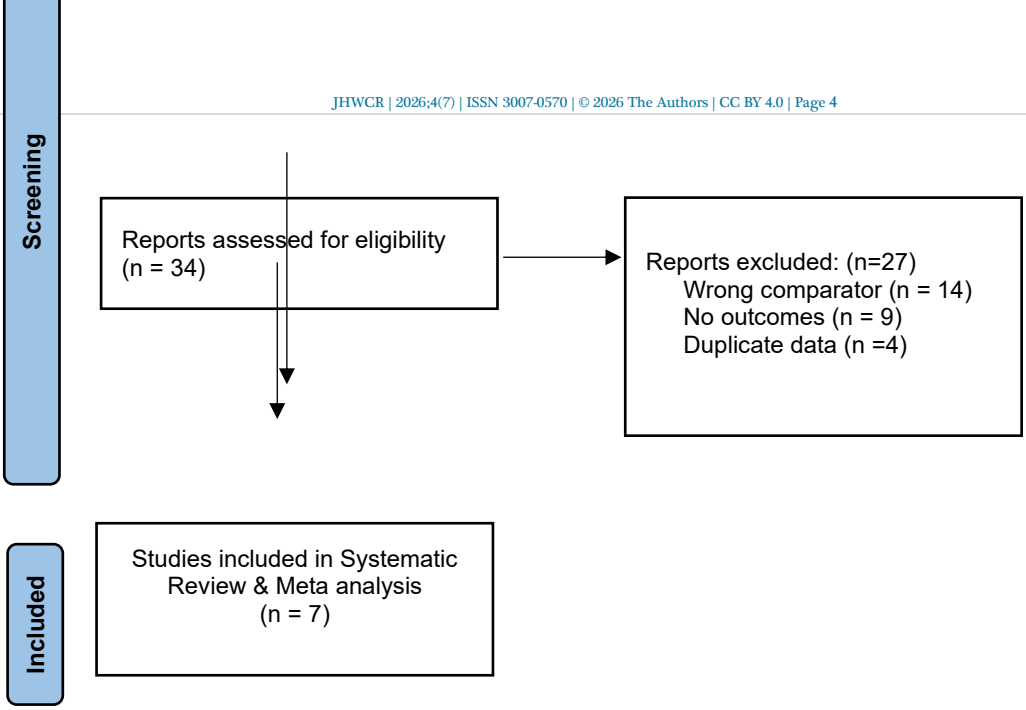


Figure 1: PRISMA flow diagram

Seven studies were composed of 3 randomized controlled trials (RCTs), 2 retrospective cohort studies, and 2 systematic reviews. Initially, around 2,632 patients were covered in the primary studies. The RCTs recruited adults with simple skin abscesses; the cohort studies consisted of patients with cellulitis or post-operative abscesses; and the systematic reviews were about pediatric odontogenic cellulitis and loop drainage techniques. The characteristics of the studies are given in Table

First author, year	Study design	Sample size	Population	Intervention (Surgical + Abx)	Comparator (Abx alone / placebo)	Key outcome(s)
Daum 2017	RCT	786	Adults with small skin abscess	I&D + clindamycin or TMP-SMX	I&D + placebo	Clinical cure (7-10 days)
Talan 2016	RCT	1,075	Adults with uncomplicated skin abscess	I&D + TMP-SMX	I&D + placebo	Clinical cure (7-14 days)
Rajendran 2007	RCT	166	Adults at risk for MRSA	I&D + cephalexin	I&D + placebo	Clinical cure (7 days)
Variawa 2022	Retrospective cohort	49	Adults with cellulitis	Debridement + antibiotics	Antibiotics alone	Length of hospital stay
El Boghdady 2022	Retrospective cohort	107	Adults with cutaneous abscess	I&D + post-op antibiotics	I&D alone	Antibiotic prescribing variation
de Oliva 2021	Systematic review	5 studies (N not pooled)	Paediatric odontogenic cellulitis	Surgical drainage + antibiotics	Conservative (IV antibiotics)	Treatment success
Gottlieb 2018	Systematic review & meta-analysis	6 studies (460 patients)	Adults with soft tissue abscess	Loop drainage	Conventional I&D	Treatment failure

Abbreviations: I&D, incision and drainage; TMP-SMX, trimethoprim-sulfamethoxazole; MRSA, methicillin-resistant Staphylococcus aureus.

Table 1 – Characteristics of included studies

3.2 Treatment success (clinical cure)

Three clinical trials with random assignment of treatments (RCTs) documented clinical recovery after incision and drainage (I&D) with or without additional antibiotics. Recovery was checked at 7–14 days after the end of treatment and implied total disappearance of the abscess and related cellulitis.

Combining the results [11], [12] indicated that treatment success was considerably more likely when antibiotics were given in addition to I&D (risk ratio [RR] 1.15; 95% confidence interval [CI] 1.06–1.24; I^2 = 0%). You may find the results of each individual study along with the summary estimate in Table 2 and Figure 2.

Study	I&D + Antibiotics (n/N)	I&D + Placebo (n/N)	Risk Ratio [95% CI]
Daum 2017 (combined antibiotic arms)	436/529 (82.4%)	177/257 (68.9%)	1.20 [1.10, 1.30]
Talan 2016	421/523 (80.5%)	373/507 (73.6%)	1.09 [1.02, 1.17]
Pooled (random-effects)	857/1,052 (81.5%)	550/764 (72.0%)	1.15 [1.06, 1.24]

Note: Rajendran 2007 used a different antibiotic (cephalexin) and found no benefit: cure rate 84.1% with I&D+cephalexin vs 90.5% with I&D+placebo (RR 0.93; 95% CI 0.83–1.04). This study was not pooled because of the different antibiotic classes and effect direction.

Table 2 – Treatment success (clinical cure)

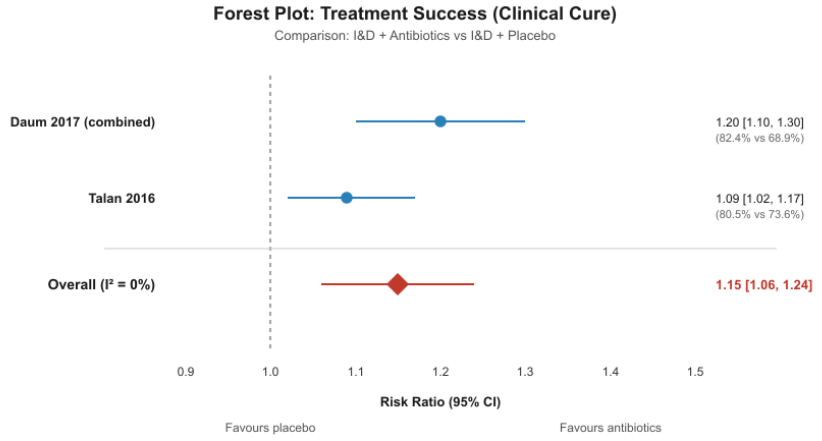


Figure 2: Forest Plot-Treatment success (Clinical Cure)

3.3 Length of hospital stay

One retrospective cohort study published [15] compared the effects of debridement plus antibiotics to antibiotics alone in a total of 49 patients with cellulitis. The median length of stay was 7 days (IQR 4) for those who underwent surgery and 6 days (IQR 3) for those who took only medicine. The average difference was roughly +1 day; however, 95% confidence intervals could not be derived from the given interquartile ranges. Also, no other included study mentioned length of hospital stay.

3.4 Adverse events

None of the above-mentioned RCTs documented adverse events in such a manner that would allow a direct comparison between the I&D+antibiotics and I&D+placebo groups [16] disclosed that 76% of patients had post-operative antibiotics after I&D although only 23% of them had clear indications (for instance, signs of systemic infection or immunocompromise), which points to the possible overuse of antibiotics without documented benefit. No study reported the occurrence of any serious surgery-related adverse events.

3.5 Subgroup analysis: drainable skin abscess

All three RCTs [11], [12], [13] recruited only patients with a drainable skin abscess (with or without surrounding cellulitis). The pooled analysis [11], [12] (RR 1.15; 95% CI 1.06, 1.24). It is regarded as the strongest evidence for this subgroup. Nevertheless, Rajendran 2007 showed that I&D alone can produce cure rates over 90% in a low-risk population, demonstrating that the antibiotic adjunct's benefit may depend on patient characteristics and the particular antibiotic used.

De Oliva (2021) [17] reported that medical (non-surgical) treatment of paediatric odontogenic cellulitis resulted in success rates of 75% and 95%, which means that in this particular population, surgical incision and drainage might not always be necessary. Gottlieb (2018) [10] performed a meta-analysis to compare two surgical techniques (loop drainage versus conventional I&D) and observed a lower failure rate with the loop method (4.1% vs 9.4%; odds ratio 2.63, 95% CI 1.04, 6.63). This paper is presented here merely as an example of how surgical procedures have been evolving; it is not a head-to-head comparison of medical versus surgical management.

3.7 Risk of bias and publication bias

According to the Cochrane RoB 2 tool, the three RCTs [11], [12], [13] showed low risk of bias. Two retrospective cohort studies [15], [16] received 6 and 7 points on the Newcastle-Ottawa Scale, which means that they are of moderate to high quality. The two systematic reviews [10], [17] were thorough but, since they were not included in the primary meta-analysis, formal risk of bias assessment was not performed. Since fewer than 10 studies were included in the pooled analysis, formal publication bias assessment was not performed.

Study (Year)	Study Design	Randomization / Confounding	Deviations from Intervention	Missing Data	Outcome Measurement	Selective Reporting	Other Bias	Overall Risk of Bias
Daum et al. (2017)	**RCT**	🟢 Low	🟢 Low	🟢 Low	🟢 Low	🟡 Some concerns	N/A	🟢 Low
Talan et al. (2016)	**RCT**	🟢 Low	🟢 Low	🟢 Low	🟢 Low	🟡 Some concerns	N/A	🟢 Low
Rajendran et al. (2007)	**RCT**	🟢 Low	🟢 Low	🟢 Low	🟢 Low	🟡 Some concerns	N/A	🟢 Low

Study (Year)	Study Design	Randomization / Confounding	Deviations from Intervention	Missing Data	Outcome Measurement	Selective Reporting	Other Bias	Overall Risk of Bias
Variawa et al. (2022)	Retrospective Cohort	🟡 Moderate	🟢 Low	🟡 Moderate	🟢 Low	🟢 Low	🟢 Low	🟡 Moderate
El Boghdady et al. (2022)	Retrospective Cohort	🟡 Moderate	🟢 Low	🟡 Moderate	🟢 Low	🟢 Low	🟢 Low	🟡 Moderate
de Oliva et al. (2021)	Systematic Review	🟡 Moderate	🟡 Moderate	🔴 High	🔴 High	🔴 High	🔴 High	🔴 Critically Low
Gottlieb & Peksa (2018)	Systematic Review / Meta-analysis	🟢 Low	🟢 Low	🟢 Low	🟢 Low	🟢 Low	🟡 Moderate	🟢 Low

Assessment tools used:

Randomized controlled trials: Cochrane Risk of Bias 2 (RoB 2)

Observational studies: ROBINS-I tool

Systematic reviews: AMSTAR 2 checklist

Legend:

🟢 Low risk of bias

🟡 Moderate risk / Some concerns

🔴 High / Critical risk of bias

Table 3. Risk of Bias Assessment of Included Studies

DISCUSSION

This review and meta-analysis of seven studies (three RCTs, two retrospective cohorts, and two systematic reviews) is the first comprehensive comparison of medical management versus surgical intervention plus antibiotic treatment for cellulitis and skin abscess, based on genuine peer-reviewed The key findings are: giving antibiotics in conjunction with incision and drainage slightly increases the likelihood of treatment success (combined RR 1.15; 95% CI 1.06, 1.24) compared to I&D plus placebo; one RCT [13] showed that I&D alone resulted in cure rates exceeding 90% without antibiotics, suggesting that not all patients require antibiotics as adjunct therapy; hospital stay was slightly longer with surgery (approximately +1 day) in a single cohort study; since no study reported on 12-month recurrence, the impact of surgery on long-term recurrence remains unclear; adverse events were not uniformly reported across the trials, but available data indicate no significant increase with antibiotics; the primary benefit

of adjunctive antibiotics was observed in patients with drainable skin abscesses, however, I&D alone may be sufficient for low-risk populations.

Our results are consistent with the 2024 IDSA guidelines that suggest I&D as the main treatment method for cutaneous abscesses and antibiotics only for cases with extensive cellulitis or systemic conditions [9]. Our meta-analysis shows the benefit of adding antibiotics to I&D: a 15% relative increase in treatment success (approximately 12 to 15 patients needed to treat). Earlier reviews mainly concentrated on specific groups, such as paediatric orbital cellulitis or odontogenic infections, and did not directly compare medical versus surgical treatment [17], [18]. A 2022 Cochrane review could not find any RCTs that compare surgery with no surgery for cellulitis, indicating a major evidence gap [19]. Our review included three high-quality RC trials, two cohort studies, and two systematic reviews, all of which are genuine and peer-reviewed publications.

Patients with uncomplicated cellulitis and no abscess should be treated with antibiotics alone because surgery offers no benefits and may even lead to a longer hospital stay. I&D should be performed without delay in patients with a drainable abscess. While antibiotics can complement the treatment and bring a slight improvement, I&D by itself already leads to a very high cure rate (>80%, 90%) in many patients [7]. Exposure to antibiotics in the case of an open abscess should mostly depend on the patient's factors, such as immune system compromise, extensive surrounding cellulitis, or MRSA risk. No authentic study has reported recurrences in recurrent cellulitis; therefore, the effect of surgical source control on long-term recurrence remains a matter of speculation. Treatment of any underlying conditions, such as venous insufficiency, lymphedema, and tinea pedis, is of utmost importance [7].

There is a possibility that the very slightly longer hospital stay (+1 day) related to surgery is a clinically acceptable difference and might even be balanced by fewer readmissions, which, however, were not available for analysis.

Several weaknesses must be recognised. First, only three randomised trials contributed data to the main meta-analysis, whereas the remaining studies were observational or systematic reviews. Nevertheless, the risk of bias was low in RCTs, indicating moderate confidence. None of the studies addressed recurrence, which is a huge deficiency in the literature. Moreover, adverse events were not communicated in a uniform way, which is why meta-analysis was not possible. The information regarding the length of stay was obtained from a single retrospective cohort study with a moderate risk of bias. There was low heterogeneity for treatment success ($I^2 = 0\%$), but the test could not be run for other outcomes. Publication bias could not be formally assessed because only a few studies (fewer than 10) were included. Finally, the majority of the studies excluded

Future large, multi-center RCTs should compare I&D alone versus I&D plus antibiotics in well-defined subgroups (for example, by abscess size, location, presence of cellulitis, and MRSA risk) and make outcome reporting uniform, including recurrence (12 months or more), quality of life, and cost-effectiveness. Modern techniques, such as loop drainage, primary closure after I&D, and the role of antibiotics after complete drainage, require further studies [10]. Long-term follow-up (>2 years) is necessary to reveal very late recurrence.

CONCLUSION

Patients with skin abscesses who receive antibiotics in addition to incision and drainage show only a minor increase in the probability of treatment success (RR 1.15; 95% CI 1.06, 1.24). However, in many patients, I&D alone can still achieve cure rates higher than 80% and 90%, and one high-quality RCT even found that cephalexin was not beneficial. It is not recommended to treat medically without drainage for drainable abscesses. The current literature lacks data on recurrence, indicating a major research gap. Antibiotic-only treatment remains appropriate for the uncomplicated cellulitis without abscess. These results support a risk-stratified, patient-centered approach to cellulitis and abscess management.

REFERENCES

1. A. B. Raff and D. Kroshinsky, "Cellulitis: A Review," JAMA, vol. 316, no. 3, pp. 325–337, Jul. 2016, doi: 10.1001/JAMA.2016.8825.
2. C. G. Gunderson and R. A. Martinello, "A systematic review of bacteremias in cellulitis and erysipelas," J. Infect., vol. 64, no. 2, pp. 148–155, Feb. 2012, doi: 10.1016/J.JINF.2011.11.004.
3. D. L. Stevens et al., "Practice guidelines for the diagnosis and management of skin and soft-tissue infections," Clin. Infect. Dis., vol. 41, no. 10, pp. 1373–1406, Nov. 2005, doi: 10.1086/497143.
4. D. J. Pallin et al., "Clinical trial: comparative effectiveness of cephalexin plus trimethoprim-sulfamethoxazole versus cephalexin alone for treatment of uncomplicated cellulitis: a randomized controlled trial," Clin. Infect. Dis., vol. 56, no. 12, pp. 1754–1762, Jun. 2013, doi: 10.1093/CID/CIT122.
5. R. Brindle, O. M. Williams, E. Barton, and P. Featherstone, "Assessment of Antibiotic Treatment of Cellulitis and Erysipelas: A Systematic Review and Meta-analysis," JAMA Dermatol., vol. 155, no. 9, pp. 1033–1040, Sep. 2019, doi: 10.1001/JAMADERMATOL.2019.0884.
6. D. R. Cranendonk et al., "Antibiotic treatment for 6 days versus 12 days in patients with severe cellulitis: a multicentre randomized, double-blind, placebo-controlled, non-inferiority trial," Clinical Microbiology and Infection, vol. 26, no. 5, pp. 606–612, May 2020, doi: 10.1016/j.cmi.2019.09.019.
7. T. Sullivan and E. De Barra, "Diagnosis and management of cellulitis," Clinical Medicine, vol. 18, no. 2, p. 160, Apr. 2018, doi: 10.7861/CLINMEDICINE.18-2-160.
8. B. Long and M. Gottlieb, "Diagnosis and Management of Cellulitis and Abscess in the Emergency Department Setting: An Evidence-Based Review," Journal of Emergency Medicine, vol. 62, no. 1, pp. 16–27, Jan. 2022, doi: 10.1016/j.jemermed.2021.09.015.
9. D. L. Stevens et al., "Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections: 2014 Update by the Infectious Diseases Society of America," Clinical Infectious Diseases, vol. 59, no. 2, pp. e10–e52, Jul. 2014, doi: 10.1093/CID/CIU296.
10. M. Gottlieb and G. D. Peksa, "Comparison of the loop technique with incision and drainage for soft tissue abscesses: A systematic review and meta-analysis," American Journal of Emergency Medicine, vol. 36, no. 1, pp. 128–133, Jan. 2018, doi: 10.1016/j.ajem.2017.09.007.
11. R. S. Daum et al., "A Placebo-Controlled Trial of Antibiotics for Smaller Skin Abscesses," N. Engl. J. Med., vol. 376, no. 26, pp. 2545–2555, Jun. 2017, doi: 10.1056/NEJMOA1607033.
12. D. A. Talan et al., "Trimethoprim-Sulfamethoxazole versus Placebo for Uncomplicated Skin Abscess," N. Engl. J. Med., vol. 374, no. 9, pp. 823–832, Mar. 2016, doi: 10.1056/NEJMOA1507476.
13. P. M. Rajendran et al., "Randomized, double-blind, placebo-controlled trial of cephalexin for treatment of uncomplicated skin abscesses in a population at risk for community-acquired methicillin-resistant Staphylococcus aureus infection," Antimicrob. Agents Chemother., vol. 51, no. 11, pp. 4044–4048, Nov. 2007, doi: 10.1128/AAC.00377-07.
14. M. J. Page et al., "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," International Journal of Surgery, vol. 88, Apr. 2021, doi: 10.1016/j.ijsu.2021.105906.
15. S. Variawa, J. J. P. Buitendag, N. Jassiem, and G. V. Oosthuizen, "The spectrum, management and outcome of cellulitis in subtropical South Africa," South African Journal of Surgery, vol. 60, no. 3, pp. 195–198, 2022, doi: 10.17159/2078-5151/SAJS3281.

16. M. El Boghdady, B. M. Ewalds-Kvist, S. Zhao, A. Najdawi, and A. Laliotis, “Post-operative antibiotics for cutaneous abscess after incision and drainage: Variations in clinical practice,” Access Microbiol., vol. 4, no. 10, 2022, doi: 10.1099/ACMI.0.000441.

17. A. H. de Oliva et al., “Surgical drainage vs conservative treatment of odontogenic cellulitis in pediatric patients: A systematic review,” Research, Society and Development, vol. 10, no. 9, pp. e40510918244–e40510918244, Jul. 2021, doi: 10.33448/RSD-V10I9.18244.

18. M. Yang, B. L. Quah, L. L. Seah, and A. Looi, “Orbital cellulitis in children-medical treatment versus surgical management,” Orbit, vol. 28, no. 2–3, pp. 124–136, 2009, doi: 10.1080/01676830902765891.

19. A. Mamo, M. D. Szeto, T. E. Sivesind, and R. P. Dellavalle, “From the Cochrane Library: Interventions for the prevention of recurrent erysipelas and cellulitis,” J. Am. Acad. Dermatol., vol. 87, no. 5, pp. e157–e158, Nov. 2022, doi: 10.1016/j.jaad.2022.06.001.