

# The Potential Role of Thyme in the Treatment of Pyodermia in Newborn Infants – a Retrospective Analysis

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## Key Words

Neonatology · Newborn · Pyodermia · Thyme · Thymol

## Introduction

Searches in the databases of Cochrane, EMBASE, NCCAM, NLM, DIMDI, CAMbase, and Medline and in the archives of Karger, Kluwer, Thieme, Springer, and the Merkurstab reveal only few specific data on skin infections in the neonatal period [1–3]. Knowledge about the treatment of these skin infections partly derives from the treatment of contagious impetigo of the older child [4–6]. The national and international research literature [7, 8] offers either only vague [9] or no recommendations at all [10]. A specific guideline for newborns does not exist [11].

On the other hand, there are numerous publications on the antimicrobial effect of thyme (*Thymus vulgaris*) [5, 12, 13], some of them representing popular medical opinions, others a long tradition of empirical use [14]. The disinfectant effect of thyme is supposed to be caused by essential oils, particularly thymol, carvacrol, and tannic acids. Based on traditional experience and the existing scientific literature, thyme has been used for many years as a concentrated tea for the treatment of superficial skin infections in the department of pediatrics, Gemeinschaftskrankenhaus Herdecke, [15, 16], usually supplementarily to systemic antibiotic therapy.

The aim of this article is the systematic presentation of our therapeutic procedures for pyodermia in newborns. The focus lies on the documentation of desired and undesired effects as well as complications during the course of therapy.

## Methods

### Analysis of Patient Records

Inclusion criteria: age at diagnosis 0–28 days (ICD Z38.0, Z38.3); microbiologically proven bacterial infection of the skin (ICD P39.4, L08.8, B95.6); precise documentation.

Main endpoints: therapy regimen: systemic antibiotic therapy, local therapy with thyme tea, other local therapy; therapeutic effects; adverse effects.

Additionally collected information: significant other diagnosis; germ identification; signs of systemic inflammation, defined as fever >38 °C, CrP > 2 mg/dl, leucocytosis > 15,000/μl, leukopenia < 6,000/μl, result of blood culture; follow-up information if available (e.g. relapse).

### Preparation and Application of Thyme Tea

Thyme tea for local application was prepared as follows: ¼ tea spoon of thyme leaves per 150 ml, pour boiling water over tea leaves, leave for 2 min to draw, dab the concerned skin area 6–8 times a day with the infusion, leave skin area uncovered afterwards or cover with a sterile compress [14].

### Statistics

Descriptive analysis of the distribution of the usage of thyme tea, antibiotics, and other topic disinfectants, side effects or complications.

## Results

In the evaluation period (admission date, August 1 to December 31, 2003) there were 36 patient records with a diagnosis of pyodermia, 14 of which fulfilled the inclusion criteria (table 1). 4 patients received systemic intravenous antibiotic therapy alone; 5 patients were treated with systemic antibiotic therapy in combination with local application of thyme tea; 3 patients were treated with local application of thyme tea, only; 2 were treated with a combination of local disinfection and thyme tea

**Table 1.** Patient characteristics

| Patient | Important other or main diagnosis | Microbiological result of skin swab (all used antibiotics sensible) | Fever or CrP > 2 mg/dl or leukocytosis / -penia; hemoculture if done | Therapy                     | Duration of therapy                | Follow up  |
|---------|-----------------------------------|---|--|-----------------------------|------------------------------------|--|
| 1       | –                                 | Staphylococcus aureus   | –  | thyme + eosin + antibiotics | 3 d thyme + eosin + 6d antibiotics | relapse after 2 d, readmission and antibiotics for 6 d |
| 2       | suspected infection               | E. coli, Enterococcus sp.   | –  | antibiotics                 | 5 d                                | –  |
| 3       | preterm                           | Staphylococcus aureus   | –; hemoculture sterile   | thyme                       | 5 d                                | –  |
| 4       | preterm                           | Staphylococcus aureus   | –, hemoculture sterile   | thyme                       | 5 d                                | –  |
| 5       | –                                 | Staphylococcus aureus, E. coli, Enterococcus                        | –  | antibiotics + thyme         | 7 d                                | –  |
| 6       | suspected infection               | group B – Streptococcus   | –; hemoculture sterile   | antibiotics                 | 7 d                                | –  |
| 7       | suspected infection               | Staphylococcus aureus   | –  | antibiotics                 | 5 d                                | –  |
| 8       | –                                 | Staphylococcus aureus   | –  | antibiotics + thyme         | 4 d                                | –  |
| 9       | preterm                           | Staphylococcus aureus, Enterococcus sp.                             | –  | antibiotics                 | 5 d                                | –  |
| 10      | –                                 | Staphylococcus aureus   | –; hemoculture sterile   | antibiotics + thyme         | 5 d                                | –  |
| 11      | –                                 | Staphylococcus aureus   | –; hemoculture sterile   | antibiotics + thyme         | 5 d                                | –  |
| 12      | omphalitis                        | Staphylococcus aureus   | –  | antibiotics + thyme         | 7 d                                | 3 d normal   |
| 13      | –                                 | Staphylococcus aureus   | –  | thyme                       | 7 d                                | 5 d normal   |
| 14      | omphalitis                        | Staphylococcus aureus   | –  | thyme + gentiana            | 9 d                                | –  |

application. Thus, all in all, 10 of 14 patients were treated with thyme tea. The treatment duration ranged from 4 to 9 days with an average of 5 days. In all cases, complete healing of the skin lesions was observed, and neither side effects nor complications, neither locally nor systemically were observed in any of the treatments.

## Discussion

Less than half of the cases found (14/36) fulfilled the study criteria. The most frequent reason for a misinterpretation is probably neonatal exanthema, which can look very similar to a bacterial skin infection [1, 17].

Due to the fact that the newborn's skin lacks of defense mechanisms there is a high risk for systemic dissemination and serious complications if local therapies in neonates are used alone. For this reason, a systemic antibiotic treatment was started right away, especially in the 2 premature babies who had developed a suspicious efflorescence of the skin after 7 days. The use of systemic antibiotics is essential and a standard procedure with only very few exceptions in our department. The course of recovering did not differ between the three groups. Other local antimicrobial therapy options are rarely used. Thus, it is not possible to draw any conclusions about these from the existing data. Data on the use of local disinfectants in the neonatal period are availa-

ble [2, 6], but local therapy with antiseptic staining dyes is no longer favored [18, 19]. The Robert Koch Institute (RKI) recommendations for premature newborns cite experience with chlorhexidine [18, 19]. If antiseptic skin cleaning is desired, polihexanide, the antiseptic of choice for chronic wounds, is recommended [18, 19]. A specific guideline for the treatment of pyoderma, however, is not included in this recommendation.

The absence of side effects or complications, particularly under local application of thyme tea [11], suggests that this therapy is safe with regard to side-effects.

To our knowledge, this retrospective evaluation is the first one to examine therapy concepts including thyme tea for pyoderma in newborn infants. Regardless of the small number of cases included and the methodical problems of retrospective analyses, our data give reason to reflect on current treatment concepts.

## Conclusion

For this small group of patients our main questions may be answered retrospectively as follows: There were no side effects or complications under any of the therapies. The therapy options applied did not differ regarding duration and effectiveness. Local application of thyme tea is a beneficial add-on therapy to systemic antibiotic therapy.

Yet, data are not sufficient to make further statements or even to give treatment recommendations.

A comparative investigation of thyme tea with other antiseptics like chlorhexidine, mupirocin, fusidic acid, or polyhexanide in combination with a systemic antibiotic could be a useful approach in future studies.

## Disclosure Statement

There is no potential conflict of interest relevant to this article by any of the authors.

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