

# Clinical Presentation and Laboratory Characteristics in Acute and Recurrent Erysipelas

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## Abstract

**Citation:** Brishkoska-Boshkovski V, Dimitrovska I, Kondova-Topuzovska I. Clinical Presentation and Laboratory Characteristics in Acute and Recurrent Erysipelas. Open Access Maced J Med Sci. 2019 Mar 15; 7(5):771-774. <https://doi.org/10.3889/oamjms.2019.213>

**Keywords:** Erysipelas; Recurrent erysipelas; Lower leg

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**Received:** 15-Feb-2019; **Revised:** 12-Mar-2019; **Accepted:** 13-Mar-2019; **Online first:** 14-Mar-2019

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**Funding:** This research did not receive any financial support

**Competing Interests:** The authors have declared that no competing interests exist

**AIM:** Typical feature of erysipelas, especially on the lower limbs, is the tendency to reoccur. The study aimed to identify clinical and laboratory characteristics of acute and recurrent erysipelas.

**MATERIAL AND METHODS:** We prospectively included patients diagnosed with erysipelas on the lower limbs in the period from January 2016 to December 2017. Patients were divided into two groups: patients with the first episode and recurrent erysipelas. The groups were compared by their demographics, clinical and laboratory characteristics.

**RESULTS:** The study included 187 patients with the first episode of erysipelas and 126 patients with recurrent erysipelas. Both groups were homogeneous in terms of demographic characteristics, gender and age. Mean age of patients with the first episode of erysipelas was  $64.18 \pm 12.5$  years; patients with recurrent erysipelas were inconsiderably mean younger ( $62.98 \pm 12.5$  years). Patients in both groups had a significantly different anatomical localisation of skin infection ( $p = 0.008$ ). Tibial localisation was more frequent in patients with the first episode of erysipelas 77% vs 62.7%, while recurrent erysipelas was more frequent on the foot 36.5% vs 23%. No significant difference was found, about the affected side of the limb ( $p = 0.95$ ). Patients with recurrent erysipelas had a pronounced inflammatory response, seen through significantly higher values of C reactive protein ( $p = 0.02$ ), granulocytes ( $p = 0.03$ ), fibrinogen ( $p < 0.0001$ ), and higher body temperature, ( $37.22 \pm 0.97$   $p = 0.006$ ). Length of hospital stay was increased in the recurrent group.

**CONCLUSION:** Erysipelas is more frequent in older people; it has seasonal character and tendency to reoccur. Identifying clinical and laboratories characteristics of those at risk may prevent recurrence and long term comorbidities.

## Introduction

Erysipelas is an infectious disease caused most often by  $\beta$  – hemolytic streptococci group A (*Streptococcus pyogenes*), rarely by streptococci groups B, C, G and occasionally Staphylococci [1]. It's a common condition, characterised with a warm, painful well-demarcated area of erythema – oedema, with prominent lymphatic involvement [2]. Systemic manifestation such as fever chills regional lymphadenopathy and leukocytosis are sometimes present and may occur hours before the skin abnormalities appear [3]. The diagnosis of soft tissue

infections relies basically on the clinical picture [3]. Studies have shown that erysipelas is a potentially serious infection often resulting in recurrence, long-term morbidity and prolonged hospital stay. The most common site of erysipelas is lower legs [4], [5], although any area of the body can be affected. Its presentation on the lower legs, usually is unilaterally [6]. Predisposing factors include chronic oedema/lymphoedema, chronic venous insufficiency, obesity, any disruption of cutaneous barrier as possible sites of bacterial colonisation, previous episode of erysipelas, diabetes and immune suppression [5], [6], [7]. Complications occur in nearly 31% of cases [8] and generally present as recurrent

erysipelas, abscesses, necrotising fasciitis, phlegmon, deep venous thrombosis, skin ulcers and bacteremia [9]. Recurrence is a common complication, the percentage of recurrence is around 12-29% [4], [10]. The mainstay of the treatment is systemic antibiotics. In recurrent cases, long term antibiotic prophylaxis is recommended [3], [11] but also a vigorous control of the risk factors can reduce the rate of reoccurrence. The aim of the study was a prospective analysis and comparison of patients with acute and recurrent erysipelas, with particular consideration of demographic, clinical and laboratory characteristics in both studied groups.

## Material and Methods

All patients  $\geq 18$  years of age both hospitalised and outpatients, diagnosed with erysipelas on lower legs were recruited in the study, between January 2016 and December 2017 in the dermatology department in General Hospital in Skopje. The diagnosis was clinical, made by the investigator.

The patients were divided into two cohorts. First cohort – patients with a first and single episode of erysipelas (no recurrence group – NR). Second cohort – patients with recurrent erysipelas (RE). NR – in this group erysipelas was defined as diffuse, superficial skin infection, which causes acute erythema, swelling and pain [3]. RE included patients with second/multiple episodes of erysipelas that meets the criteria of the first episode, at the same anatomical localisation, at least 1 month to one year from the initial diagnosis. In this group patients with anamnestic or medical records for recurrence in or outside the study were also included. The required data for all recruited patients were obtained through clinical examination and patient interview, as well as medical documentation.

The analysed data included demographic characteristic (age, sex), the season of erysipelas occurrence, clinical characteristic of erysipelas, length of hospitalisation, initial values of laboratory parameters. These two groups will be compared based on their demographic characteristics, clinical manifestations, laboratory findings. For the statistical analysis, the necessary percentages were computed and linear regression analyses performed. For continuous variables that were normally distributed the mean and standard deviations were presented. For non-continuous data, the median was presented. Categorical variables were tested with chi-square and logistic regression. The statistical significance was defined at  $p < 0.05$ .

## Results

### Comparison of demographic, clinical and laboratory characteristics between the two cohort

The study included 187 with a first/single episode of erysipelas (NR group) and 126 with recurrent erysipelas (RE). Both groups were homogeneous in terms of demographic characteristics sex and age ( $p = 0.64$ ,  $p = 0.4$  consecutive) (Table 1). Male patients were insignificantly more frequently presented in the RE group-52.4% (66), 46.5% (87), while female patients were insignificantly more common in the NR-53.5% (100) and 47.6% (60).

**Table 1: Comparison of demographic and clinical features in both cohorts**

Variable	NR group Patients with the first episode of erysipelas	RE group Patients with recurrent erysipelas	P-value
Age n (%)			
Mean $\pm$ SD	64.18 $\pm$ 12.5	62.98 $\pm$ 12.5	<sup>B</sup> $p = 0.4$
Min - max	26 – 86	33 – 88	
Gender n (%)			
Male	87 (46.52)	66 (52.38)	<sup>A</sup> $p = 0.64$
Female	100 (53.48)	60 (47.62)	
Patient included in the study n (%)			
Hospitalized	152 (81.28)	105 (83.33)	<sup>A</sup> $p = 0.64$
Outpatient	35 (18.72)	21 (16.67)	
Length of hospital stays (LOS) n (%)			
Mean $\pm$ SD	7.43 $\pm$ 4.3	8.35 $\pm$ 5.0	<sup>B</sup> $p = 0.12$
Min - max	1 – 28	2 – 30	
Febrility n (%)			
Mean $\pm$ SD	36.94 $\pm$ 0.78	37.22 $\pm$ 0.97	<sup>B</sup> $p = 0.006$
Min - max	36 – 40	36 – 40.2	
Anatomical localisation of erysipelas (%)			
Tibial	144 (77.01)	79 (62.7)	<sup>A</sup> $p = 0.008$
Foot	43 (22.99)	46 (36.51)	
Femoral region	0	1 (0.79)	
The side of affected extremity (%)			
Right	77 (41.18)	54 (42.86)	<sup>A</sup> $p = 0.95$
Left	91 (48.66)	59 (46.83)	
Bilateral	19 (10.16)	13 (10.32)	

The mean age of patients with the first episode of erysipelas was  $64.18 \pm 12.5$  years, and patients with recurrent erysipelas were insignificantly younger ( $62.98 \pm 12.5$  years).

Most patients in both groups were hospitalized-81.3% (152) patients in NR group and 83.3% (105) patients with RE ( $p = 0.64$ ) (Table 1). The length of hospitalisation was significantly lower in the NR group ( $7.43 \pm 4.3$  vs  $8.35 \pm 5.0$ ,  $p = 0.12$ ). Recurrent erysipelas located in the lower extremities, the high temperature on admission, increased markers of inflammation, significantly prolonged the hospital stay.

Recruited patients from both groups (Table 1) had a significantly different anatomical localisation of erysipelas ( $p = 0.008$ ). In NR group 77% vs 62.7% of patients had tibial localisation, while in patients with RE the infection was more often localised on foot - 36.5% vs 23%. One patient had erysipelas in the femoral region, and it was recurrent. About 10% of patients in both groups had bilateral erysipelas. More frequent was the unilateral left-sided localisation of the disease in both groups-48.7% (91) all 46.8% (59). No statistically significant difference was found between

both groups, regarding the affected side of the limb ( $p = 0.95$ ). Patients with RE had a significantly higher value for the febrility, compared with NR group ( $37.22 \pm 60.97$  vs  $36.94 \pm 0.78$ ,  $p = 0.006$ ).

**Table 2: Comparison of laboratories parameters / inflammatory markers in both cohorts**

Variable	NR group Patients with the first episode of erysipelas	RE group Patients with recurrent erysipelas	P-value
C reactive protein			
Mean $\pm$ SD	41.94 $\pm$ 51.9	56.83 $\pm$ 61.9	<sup>b</sup> $p = 0.02$
Min - max	3.02 - 203	3.02 - 203	
Leucocytes			
Mean $\pm$ SD	9.61 $\pm$ 3.7	10.44 $\pm$ 4.4	<sup>b</sup> $p = 0.08$
Min - max	2.1 - 28.5	2.2 - 27.86	
Granulocytes			
Mean $\pm$ SD	7.05 $\pm$ 3.5	7.98 $\pm$ 4.1	<sup>b</sup> $p = 0.03$
Min - max	0.9 - 26.8	1.1 - 25.18	
Sedimentation rate			
Mean $\pm$ SD	123.48 $\pm$ 21.3	126.24 $\pm$ 20.5	<sup>b</sup> $p = 0.25$
Min - max	20 - 175	101 - 173	
Antistreptolysin O (ASO) titer			
Mean $\pm$ SD	195.82 $\pm$ 289.3	224.31 $\pm$ 316.5	<sup>c</sup> $p = 0.064$
Min - max	68.3 (50.9-209)	103 (52.5-227)	
Fibrinogen			
Mean $\pm$ SD	4.48 $\pm$ 2.1	5.66 $\pm$ 3.7	<sup>c</sup> $p < 0.0001$
Min - max	4 (3.5-5.1)	5.3 (3.9-6.7)	
D dimers			
Mean $\pm$ SD	19.35 $\pm$ 192.6	12.45 $\pm$ 125.5	<sup>c</sup> $p = 0.42$
Min - max	0.62 (0.33-1.33)	0.72 (0.35-1.39)	

Most of the patient – 72.2% had erythematous erysipelas (226 patients), vesiculobullous and hemorrhagic erysipelas in the form of ecchymoses or purpuras was observed in 27.8% (87) of patients.

Comparative analysis of the two groups of patients in relation to certain laboratory parameters (Table 2) showed that patients with RE had significantly higher values of C reactive protein (CRP) ( $p = 0.02$ ), granulocytes ( $p = 0.03$ ), and fibrinogen ( $p < 0.0001$ ), and had a insignificantly higher serum leukocyte values ( $p = 0.08$ ), Sedimentation rate ( $p = 0.25$ ), Antistreptolysin O (ASO) titer ( $p = 0.064$ ), and D dimers ( $p = 0.42$ ). CRP in serum had an average value of  $41.94 \pm 51.9$  in the NR group and  $56.83 \pm 61.9$  in the RE group. The granulocyte values were on average  $7.05 \pm 3.5$  in the NE group, and  $7.98 \pm 4.1$  in the RE group. The mean and median values of fibrinogen in the NR group were  $4.48 \pm 2.1$ , 4, and in the RE  $5.66 \pm 3.7$ , 5.

Figure 1 illustrates the percentage of erysipelas cases of admissions per season. The greatest prevalence of cases admissions (in and outpatients) was observed in summer (29.7%) and spring (26.8%); for autumn, the prevalence was 24.6% and lowest in the winter 18.8% ( $p = 0.9$ ). The peak in the summer has been previously reported [7].

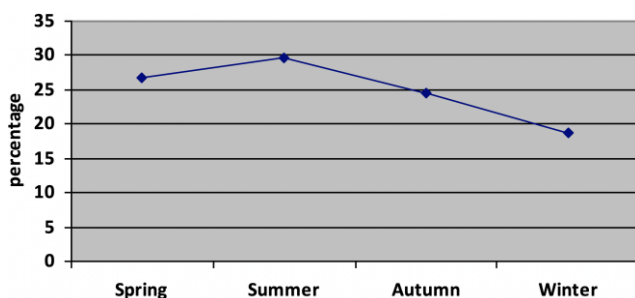


Figure 1: Percentage of erysipelas cases admissions per season

## Discussion

The study confirmed that recurrent erysipelas is more common in the elderly population. The mean age in both cohorts patients has no significant difference, and no significant gender predomination has been established, which is consistent with other studies [6]. The greatest prevalence of erysipelas was found in > 60-year-old patients (more than 60% of the cases), and the mean age was  $64.18 \pm 12.5$  year in the NR group and  $62.98 \pm 12.5$  years in RE. Recent studies have reported a similar mean age [5], [6].

Regarding the anatomical localisation, tibial localisation was more common with patients with the first episode of erysipelas, while patients with recurrent erysipelas had more frequent foot location. We noted that the latter is in line with other results obtained regarding RE-obesity, insulin-dependent diabetes and neuropathy (not included in this paper). The feet are prone to chronic swelling, especially in obese patients, with diabetes where diabetic neuropathy and angiopathy may be present. Injuries to the feet, especially in neuropathy and dermatomycosis, are the point of entry of the infection.

Patients with RE had a stronger inflammatory response, which is evident from the higher initial values of the C reactive protein, the granulocytes, fibrinogen. They also have a longer hospital stay compared to the NE group, which is consistent with other studies [12]. In conclusion, erysipelas is more frequent in older people; it has a seasonal character with the highest peak in summer. Patients with recurrent erysipelas, located in the lower extremities, especially foot, with high temperature on admission, increased markers of inflammation, seem to be risk factors of prolonged hospital stay.

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