

## Immunological Skin Reaction and Local Infection Due To Tick Bites

Kene ısırığına Bağlı Gelişen İmmünolojik Cilt Reaksiyonu ve Lokal Enfeksiyon  
Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji

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### Özet

Keneler, kemiriciler ve diğer küçük memelileri ara konak olarak kullanırlar. Bu nedenle kene ısırmasına bağlı hastalıklar ormanlık alanlarda yaşayanlar ve hayvancılık ile uğraşanlarda sık olarak görülür. Isırmanın ağrısız olması ve kenenin yapıştığı bölgede uzun süre kalabilmesi enfeksiyon riskini arttırmaktadır. İnsanlarda, ısırılma sonucu kenenin sekresyonları ile geçen mikroorganizmalar sistemik enfeksiyonlar yapabileceği gibi, ısırma yerindeki tahrişe bağlı olarak zeminde çoğalıp lokal cilt ve yumuşak doku enfeksiyonlarına neden olabilir. Olgumuzda kene ısırması ve kenenin uygunsuz koşullarda ehil olmayan kişilerce çıkarılması sonucu immünolojik cilt reaksiyonu ve sekonder cilt enfeksiyonu gelişmiştir. Kene ısırması şikayeti ile getirilen hastalar ve yakınları sadece sistemik hastalıkların bulguları değil aynı zamanda lokal cilt ve yumuşak doku enfeksiyonları yönünden de uyarılmalı ve hastaların klinik izlemi yapılmalıdır.

**Anahtar kelimeler:** *İmmünolojik reaksiyon, Lokal enfeksiyon Kene ısırması*

### Abstract

Immunological Skin Reaction and Local Infection Due to Tick Bites Ticks use rodents and other small mammals as intermediate hosts. Therefore, tick bite-related diseases are often seen in people living in forested areas and dealing with livestock. The risk of infection increases due to painless tick bites and long periods in the adherence area. In humans, microorganisms passed by thick secretions from bites may cause systemic infections. Further, due to damage at the bite site, microorganisms multiply and may cause local skin and soft tissue infections. In our case, immunological skin reaction and secondary cutaneous infections have developed from tick bites and tick removal in improper conditions by unskilled individuals. Patients with tick bite complaints, as well as their relatives, are warned not only of findings of systemic diseases but also of local skin and soft tissue infections. Clinical monitoring of patients should be performed.

**Keywords:** *Immunological reaction, Local infection Tick bite*

### Introduction

Ticks which are vectors of the rickettsial, spiroketals, bacterial and parasitic diseases are blood sucking ectoparasites. Ticks living in animals may cause to local and systemic diseases in both animals lived as a host and humans<sup>1</sup>. Microorganisms passed by thick secretions as a result of bite to the humans may cause systemic infections and also due to damage of the bite site they multiple on the ground and may cause local skin and soft tissue infections. Tick bites may be asymptomatic or may cause to aystemic diseases such as Crimean-Congo haemorrhagic fever (CCHF) which has local symptoms such as abscess and lymphadenopathy or causes serious morbidity and mortality, Lyme disease, tularemia, rocky mountain fever, babesiyoz, Colorado tick fever<sup>2,3</sup>. In our study a case with local skin complications caused by a tick bite has presented. Local complications may be overlooked due to the CCHF disease which comes to mind first because of the high mortality and are on the aeganda among the people. Our goal is to remind needs to be done in tick bites which are not very common and if neglected serious local complications could develop.

## Case Report

45 years old male patient referred to the emergency department with complaining of pain and swelling at the front left leg. In detailed anamnesis tick stuck his leg in the picnic area the day before and remove it by himself in the evening was learned. Lesion which was first itchy than watery was further grown in the morning hours. In the skin examination bullous lesion approximately 4x2 cm size was detected in front of the left tibia (Figure 1).



**Figure 1**

The bullous lesion in front of the left tibia due to tick bite

As laboratory findings; White blood cell count was  $12.300/\text{mm}^3$ , hemoglobin count 15 g/dl, platelet count  $315.000/\text{mm}^3$ , sedimentation rate 1 mm/hour, CRP 0.6 mg / dL, aspartat transaminaz (AST): 14 mg/dL, alanin transaminaz (ALT): 8 mg/dL, prothrombin time (PT): 12, partial tromboplastin time (PTT): 25.8, and INR was 1.05. The lesion was dressed with debridment. Antibiotic prophylaxis was started. Hospitalization for follow up was recommended to the patient consulted with the infectious disease department. First blood samples taken from patient do not want to hospitalize for CCHF differential diagnosis are normally reported. The patient was discharged with outpatient follow-up recommendations.

## Discussion

Infections due to tick bites is often seen in employees in forested areas, where ticks are frequent, children between the ages of 5-10 and people dealing with lumber bussiness or living in endemic areas. In our case there is a picnicking history in the forested area the day before. Tick injects a toxin which could cause lokal irritation during bite or moderate allergic reactions. However, many of the tick bites either give very symptoms or none at all<sup>2</sup>. To the host's skin they hold with a central punch element which has hooks called as hypostom. Some ticks secrete an adhesive to attach themselves to the host. In addition, Ixodes ticks secrete anticoagulant, immunosuppressive and antiinflammatory agents to the bite site. These substances allow blood absorbstion without noticing the host bacteria and also input other pathogens such as bacteria, spirochetes, rickettsia, protozoa, viruses, nematodes and toxins to the body<sup>4</sup>. When a tick attached to the human body prostaglandins passed through from salivary glands to skin. These prostaglandins reduce IL-1 and TNF-alpha production from macrophages and IL-2 and IFN-gamma secretion from T lymphocytes. This situation makes the suppressive effect of the local immune response of the host. Apyrase enzyme found in tick saliva allows blood flow to ticks stimulating vasodilatation and maintaining platelet aggregation. In addition in ticks saliva there are factors suppressing clotting cascade that increases blood flow to the lesion. These factors both increase tick feding with blood and facilitate passing infectious agent to the tick<sup>5</sup>. The toxins produced by ticks cause local irritation or medium level allergic reaction. After tick bite, host C5 is activated and lead to chemotactic agent secretion by activating neutrophil and as a result neutrophil mediated tissue damage occurs<sup>6</sup>. In our case 4x2 cm bullous lesion, depending on the tissue damage caused by a local irritation was present. Psödolenfamatöz reaction which occurs after the tick bite cases have also been reported<sup>7</sup>. Severity of infection depends on where the infection occurs and the type of organisms that cause infections. Causative pathogen is often Staphylococcus aureus or group A B-hemolytic streptococci. In addition, many other microorganisms like Staphylococcus epidermidis, Hemofilus influenza, gram-negative bacilli,

Korinebakteriums , Klostridium , Propionibakteriums and Pasturella multilocida can be isolated from skin infections as an agent. On the other hand granuloma which can not prevent by local exicion of ticks and tick bites has been reported <sup>8,9</sup>. In our case antibiogram could not be made because of hospitalization reject and therefore broad-spectrum antibiotics were started. Local wound debridement and dressing were made. The patient was informed about the possible clinical development and follow-up recommendations were reminded.

Ticks should be removed from skin by authorized personel, cultures should be done necessarily from skin region and appropriate antibiotics were given to the cultura antibiogram referances. As all skin injuries wound care due to tick bite, appropriate dressing perform is so important. Tick bite cases may present clinical manifestations of the serious systemic disease or lymphadenit which connected to a tick bite and abscess in the bite site. Local complications may be overlooked due to systemic manifestations and popularities of the diseases. The cases of tick bite, not only followed in terms of systemic symptoms but also followed for signs of local skin is required. Society education about the possible tick bite results and information about the importance of the removal of ticks from the sticking site in the appropriate conditions is so important in terms of public health.

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## Information Presentation

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