



## Peripheral arterial disease presented with skin necrosis after diuretic use

Diüretik kullanımı sonrası deri nekrozu ile prezente olan staz dermatit

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### ABSTRACT

Despite significant progress in the treatment of cardiovascular diseases, peripheral arterial disease (PAD) is of importance with acute arterial occlusions, ischemia that threatens the extremity and loss of function in the vital organs. The cause of peripheral artery disease is atherosclerosis. Stasis dermatitis is the most common form of the clinical manifestations of chronic venous insufficiency of the lower extremities. In our case, we presented the development of skin lesion in the form of stasis dermatitis at the beginning and then skin necrosis due to peripheral arterial disease after intensive diuretic therapy in a patient with a diagnosis of decompensated heart failure. We aimed to draw attention to the importance of early diagnosis by screening for PAH, improving the prognosis of patients, and careful use of diuretics in patients with risk factors, even if they are asymptomatic.

**Keywords:** dermatitis; diuretics; heart failure; peripheral arterial disease; venous insufficiency

### ÖZET

Kardiyovasküler hastalıkların tedavisinde önemli ilerlemeler kaydedilmesine rağmen periferik arter hastalığı (PAH) akut arteriyel tıkanmalar, ekstremiteleri tehdit eden iskemi ve vital organlarda fonksiyon kaybı meydana getirmesiyle önemini korumaktadır. Periferik arter hastalığının nedeni aterosklerozdur. Staz dermatiti, alt ekstremitelerde kronik venöz yetmezliğinin en yaygın klinik şeklidir. Vakamızda dekompanse kalp yetmezliği tanılı hastada yoğun diüretik tedavi sonrası başlangıçta staz dermatiti şeklinde cilt lezyonu olan ve sonrasında periferik arter hastalığına bağlı deri nekrozu gelişimini sunduk. Risk faktörleri olan ileri yaş grubundaki hastalarda asemptomatik olsalar da PAH açısından tarama yapılarak erken tanıya ulaşmanın, hastaların prognozunu iyileştirmenin ve bu hastalarda dikkatli diüretik kullanımının önemine dikkat çekmeyi amaçladık.

**Anahtar kelimeler:** dermatit; diüretikler; kalp yetmezliği; periferik arter hastalığı; venöz yetmezlik

### Introduction

There have been significant advances in follow-up and treatment of peripheral arterial disease (PAD) in recent years (Signorelli, Marino & Di Raimondo, 2020). However, it is particularly important that it causes acute arterial occlusion and severe organ dysfunction, which particularly threatens the extremity. Primary pathology in atherosclerosis is atherosclerosis (Signorelli et al., 2020). The most common clinical finding of chronic venous insufficiency is stasis dermatitis (Sundaresan, Migden & Silapunt 2017). In heart failure, edema that occurs with the accumulation of blood, especially in the lower extremities, causes an increase in intravascular pressure, and as a result, protein and fluid leakage into the extravascular area. Fibrinogen escaping into the extravascular space causes proliferative changes in the skin and the fibrin to accumulate on the capillary wall. This also leads to tissue impairment and tissue fragility (Signorelli et al., 2020). In our case, we presented a patient with decompensated heart failure who initially had skin lesions in the form of stasis dermatitis after intensive diuretic therapy, but subsequently developed skin necrosis due to an underlying and unknown peripheral arterial disease. We aimed to draw attention to the importance of early diagnosis, improving the prognosis of patients, and careful use of diuretics in these patients by screening for PAH in elderly patients with risk factors.

### Case Report

An 82-year-old man with congestive heart failure and chronic renal damage was admitted to our emergency department with shortness of breath and swelling in both lower extremities. The patient diagnosed with acute renal failure, pneumonia and decompensated heart failure were interned in our service for follow-up and treatment. In physical examination, general condition was moderate-bad, conscious-open, non-oriented non-coopered, there was no pathology in the head and neck examination, S1 (+) S2 (+) rhythmic, no additional sound, 2/6 systolic murmur on cardiovascular system examination. There were crepitant rales heard up to the bilateral middle zone in the lung. There was no pathology in the gastrointestinal system, urinary system and neurological examination. Bilateral lower extremity ++ / ++ pretibial edema and stasis dermatitis were present. Blood pressure was 152/72 mmHg, pulse rate was 92/ min and regular, fever was 37.0 C<sup>0</sup>. Electrocardiography was normal sinus rhythm with minimal ST depression and T wave negativity in v3 v4 v5 leads. The patient's treatment was ordered, and the patient was followed closely. In the echocardiography, the left ventricular ejection fraction of the patient was 20%. Because of the serious overload findings, infusion of 30 mg/hr/24hr furosemide was started to the patient. Pretibial edema tended to regress at the 48th hour of the treatment, and the patient was consulted with dermatology because of the development of erythematous, edematous, locally desquamated and irregularly shaped

necrotic ulcers in both lower extremities (Figure 1, 2, 3). Cellulitis and PAH were considered in the patient. It was recommended to start fusidic acid 3\*1 topical and hamamelis virginiana topical 3\*1 and consult the patient with cardiovascular surgery. The patient with renal failure (creatinine clearance 19mL/min/1.73m<sup>2</sup>) could not undergo angiography. Therefore, bilateral lower extremity arterial and venous color doppler ultrasonography was performed on the patient. All venous systems examined were open and collapsed by compression, but extensive wall thickening in the bilateral lower extremity arterial system followed by atherosclerotic plaques and biphasic and locally monophasic flow in bilateral common femoral artery and superior femoral artery and distal arterial systems were detected. Patient without known PAD diagnosis was consigned to cardiovascular surgeon. Enoxaparin sodium 0.6 x subcutaneously 1x1 and iloprost trometamol 2.5 mcg /hr infusion were recommended.



Figure 1. Patient's necrotic skin lesions

## Discussion

Peripheral arterial disease is a progressive vascular disease that occurs as a result of atherosclerosis and is characterized by narrowing and/or occlusion of peripheral arteries distal to the bifurcation of the abdominal aorta (Signorelli et al., 2020). PAH is a condition that has an increasing incidence, especially in the middle and elderly population, and reduces the quality of life. The treatment process, the costs it brings, the complications it causes, and the increasing prevalence in recent years constitute an important social problem both in our country and in the world (Signorelli et al., 2020). The presence of the disease alone is a poor prognostic indicator, and the survival of these patients is shorter than many malignancy types. For this reason, it is important to determine the risk factors of the disease, to follow the people at risk and to make an early diagnosis. Although the actual frequency is unknown, it is estimated to be more than 10% in the geriatric population, since it can show symptoms with asymptomatic or atypical symptoms. In developed countries, it is reported that the symptomatic PAD frequency is 5% in the 55-74 age group (Campia, Gerhard-Herman, Piazza & Goldhaber, 2019). Risk factors are age, smoking, diabetes, hypertension, hyperhomocysteinemia and hypercholesterolemia, which are like coronary artery disease and cerebrovascular disease risk factors (Signorelli et al., 2020). Therefore, correctable risk factors such as smoking, hypertension, hyperlipidemia and hyperglycemia are important for the prevention of the disease.

Since PAD is often asymptomatic, patients with a risk factor should be checked for lower extremity pulses during physical examination. However, this may not be possible in patients with severe lower extremity edema as in our case. Therefore, in patients with high risk, measurement of ankle brachial index, a noninvasive method, helps the clinician in assessing peripheral vascular disease (Firnhaber & Powell, 2019). Medical treatment is the first choice in the treatment of PAD, but surgical intervention is inevitable in advanced cases (Firnhaber & Powell, 2019).

Stasis dermatitis is a skin lesion seen in patients with heart failure, especially those with chronic venous insufficiency and venous hypertension. In geriatric patients, vascular pathology in the arterial system also contributes to the formation of stasis dermatitis. In the clinic, confrontation occurs with repetitive foot and leg swellings. Cyanotic erythematous lesions develop in lower extremity. Lesions are usually borderline indeterminate, erythematous, often itchy, painless, and rarely squamous. It can become ulcerated when not treated. Stasis ulcers in geriatric patients cause immobilization and an increase in the length of hospital stay. Treatment of stasis dermatitis is difficult as long as the underlying disease is not treated. Skin care and dressing, elevation of extremity, compression stockings and antibiotics are the basis of treatment (Sundaresan et al., 2017).

Heart failure is an important public problem that is very common in our country as it is in the world. Although it can be prevented by early diagnosis and treatment and progression can be stopped, the level of consciousness in many cases does not allow this. Heart failure is a common and complex clinical syndrome characterized by impaired ventricular filling or the need for the body to be characterized by systemic circulatory pumping, structural or functional malformation of the heart. The most important cause of the disease is ischemic heart disease. Depending on the cardiac systolic and diastolic deterioration, fluid may accumulate throughout the body, including the extremities. Patients are often confronted with findings of fluid retention in the character of dyspnea, exercise intolerance, fatigue, and peripheral edema (Kurmani & Squire, 2017). There are approximately 5.1 million cases of heart failure in the United States, and this figure is expected to reach 8 million by 2030 (Heidenreich et al., 2013). According to the HAPPY study, there are about 2 million patients with heart failure in Turkey (Degertekin et al., 2012).



Figure 2. Patient's necrotic skin lesions

The aims of treatment of heart failure are to control symptoms and provide a more comfortable life, to reduce the incidence of the malfunctioning of the heartbeat injection capacity, to stop or increase the surge (Kurmani & Squire, 2017). Diuretics are the most commonly used agents in the treatment of heart failure. It reduces both the peripheral and pulmonary congestion associated edema. It effectively reduces blood pressure and reduces hypertension-related morbidity and mortality (Dworzynski, Roberts, Ludman & Mant 2014). The most commonly used diuretic is furosemide in the treatment of heart failure (Ellison, 2019). Furosemide initial dose is 20 to 40 mg and recommended total daily dose is 400 mg, but it is stated that this dose can be increased according to the patient's situation (Carone et al., 2016). Since our patient had severe hypervolemia findings, we preferred parenteral furosemide as 30 mg/hr/24hr infusion. The side effects of diuretics are quite heterogeneous. In patients using diuretics, dose amount, dose frequency, concomitant drugs, blood pressure, presence of additional chronic disease and most importantly cardiac function capacity are important. Diuretics should be used in the minimum effective dose, with careful monitoring of electrolyte and fluid balance (Ellison, 2019). In our patient with stasis dermatitis and underlying peripheral arterial disease, intensive diuretic therapy caused a sudden decrease in intravascular volume, resulting in increased ischemia in the bilateral lower extremities and formation of necrotic lesions. This is our own hypothesis. There is no data on this subject in the literature.

### Conclusion

As a result, the absence of symptoms or the presence of atypical symptoms leads to the missed diagnosis of PAD. Even if they are asymptomatic in patients with risk factors and advanced age group, screening for PAH should be aimed at reaching early diagnosis and correcting the prognosis of patients. Identification, prevention, and treatment of risk factors in these patients will also reduce morbidity and mortality. Most congestive heart failure is due to ischemic heart disease and the incidence of peripheral arterial disease is high due to common risk factors in these patients. In these patients, more care should be taken in the use of diuretics, which is the cornerstone of treatment. We are of the opinion that excessive diuresis can be as harmful as insufficient diuresis.



Figure 3. Patient's necrotic skin lesions

### Conflict of Interest

There is no conflict of interest.

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### Informed Consent

The patient and his relative were informed, and informed consent form was obtained from his relative.

### Peer-review

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### Author Contributions

R.S.: Data Collection, Literature Review and Writing

E.Y.: Data Collection, Literature Review and Writing

S.U.B.: Literature Review and Supervisor

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