

## The Research of Nail Findings in Patients With Essential Hypertension

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Published: *J Turk Acad Dermatol* 2018; **12** (4): 18124a1.

This article is available from: <http://www.jtad.org/2018/4/jtad18124a1.pdf>

**Keywords:** Essential hypertension, Nail

### Abstract

**Background:** Essential hypertension is a public health problem with high mortality and morbidity. The majority of the follow-up and treatment of patients can be conducted in primary care health institutions. Nail is the skin extension, which can be examined easily and in a practical way. We aimed to research the nail findings in patients with hypertension, as essential hypertension can also uptake small arteries and their findings can be seen on the nails.

**Material methods:** 152 patients who use and do not use medication and 61 healthy controls were included in the study.

**Results:** Splinter hemorrhage was significantly higher in the patients with hypertension compared to the healthy group. We detected that splinter hemorrhage, total leukonychia and onychomycosis were decreased with medication use.

**Conclusion:** As a result, we think that the nail examination is inexpensive and practical method for detecting the peripheral uptake of the disease in the patients with essential hypertension and that it can be used in the follow-up of the treatment.

### Introduction

When systemic arterial pressure is above 140/90 mmHg and no disorder that may cause this detected, this condition is called essential (primary, idiopathic) hypertension [1]. Hypertension is one of the most important risk factors of coronary artery diseases and cerebrovascular conditions which are the leading causes of annual mortality. As social information about hypertension, increases admission to physician for this reason and therefore, the number of patients with hypertension annually increases [1]. Epidemiologi-

cal data shows that the prevalence of hypertension which is between 20 - 25% in the third decade shows a significant increase with age and increases up to 50% in the sixth decade and older [2]. The symptoms that make the patient apply to physician are more related to the disorders that occur in the target organs (such as heart, brain, kidney, peripheral veins, and eye) [3]. The most important determinant in the therapeutic approach for the patient is patient's total cardiovascular risk level [2]. In order to determine the patient's risk group correctly, phy-

sical examination and history are required and to determine the organ damage, routine methods are required, also advanced examinations are recommended, if needed [4,5].

Changes in nail can be seen in various dermatological diseases and can be a guide in diagnosis of specific dermatoses. In addition, nail disorders may occur in many systemic diseases. Observation of some nail changes can be specific for certain disease groups, but they may also occur in more than one disease. Sometimes, more than one nail change can be seen in a disease, separately or together. Nail changes that can be observed in systemic diseases play an important role in early diagnosis of diseases and guide the physician. [6,7]. Here, we aimed to research the importance of nail changes in patients with essential hypertension and whether these changes have a role in the follow-up of the disease and treatment.

### Material and Method

Sixty patients who do not use medication and 123 who use medication and were admitted to the Cardiology outpatient clinic of Kahramanmaraş City Hospital with the diagnosis of essential hypertension and 61 healthy controls were included in the study. Hypertension durations, stages, duration of medication use, complete blood count, blood biochemistry and nail findings of all patients were recorded. According to the ESH / ESC hypertension guidelines; these are the blood pressure values accepted; Stage 1 hypertension systolic blood pressure: 140-159 mmHg, diastolic blood pressure 90-99 mmHg; Stage 2 hypertension systolic blood pressure: 160-179 mmHg, diastolic blood pressure: 100-109 mmHg; Stage 3 hypertension systolic blood pressure  $\geq 180$  mmHg and diastolic blood pressure  $\geq 110$  mmHg.

Patients with secondary hypertension, those with systemic disease other than hypertension, those with skin disease, those who take vitamins and receives antioxidant treatment and those who have abnormalities in their laboratory data (other than hospital normal values) were excluded from the study.

### Statistical Analysis

Statistical analysis of all data was performed with SPSS program (15.0 version). Descriptive values were submitted as ratio, mean and

standard deviation. Compliance of values pertaining to continuous variables to normal distribution was evaluated by Kolmogorow-Smirnov test. One way anova, Student's t-test were used for the statistical analysis of the between group differences and Pearson correlation analysis was used for correlation.  $p < 0.05$  was considered statistically significant.

### Results

Sixty patients with essential hypertension who do not receive treatment and 92 patients with essential hypertension who use medication (31 patients with abnormality in laboratory results and 31 patients with positivity in systemic disease screening were excluded from the study) and 61 healthy individuals as control group completed the study.

There was no significant difference between the patients and the control group in terms of age and gender ( $p > 0.5$ ).

The duration of medication usage in the group that takes medication was  $3.46 \pm 1.96$  (min, max: 1.10) years. Most patients were receiving combined antihypertensive therapy and blood pressures of all were under control with medication.

In the one-way anova test, where three groups were compared, splinter hemorrhage was found to be significantly higher in the patient group ( $p < 0.05$ ).

When the patients who do not use medication and healthy control group were compared in terms of nail findings; splinter hemorrhage, longitudinal line formation, absence of lunula, total leukonychia, onychomycosis were found statistically higher ( $p < 0.05$ ) in patients.

In the comparison of the medication-using group and the healthy control group, splinter hemorrhage, absence of lunula, total leukonychia, Terry nail were found statistically significant in the patient group; ( $p < 0.05$ ).

When the nail findings of the medication using group and the group not using medication were compared, splinter hemorrhage, longitudinal line formation, total leukonychia and onychomycosis were found to be higher than the group that do not use medication ( $p < 0.05$ ).

In the correlation analysis performed; splinter hemorrhage was found positively correlated with duration and stage of hypertension ( $p < 0$ ).

05). The correlation analysis performed is shown in the table (Table 1)

**Discussion**

The aim of detecting and treating high blood pressure is to reduce morbidity and mortality associated with cardiovascular diseases. The risk for cardiovascular diseases is not only associated with blood pressure, but also with target organ involvement. Therefore, the patient should be evaluated as a whole. Nail is an anatomical region where specific or nonspecific findings of systemic diseases are observed. In this study examining the nail findings in hypertension, we investigated the importance of nail examination which is an easy method and its association with the disease and its treatment. Splinter hemorrhage being observed only in hypertensive group, and some of the findings disappearing with treatment made us think that nail findings can also be used in follow up of the treatment and the disease.

Since there is no study in the literature examining the nail findings in hypertensive patients, our study is first one to do so and it was not possible to make a comparison.

Splinter hemorrhages are asymptomatic thin linear, reddish-brown lesions measuring 1 mm in diameter that are observed under the nail plate. They move together with nail extension. It is most frequently observed on the hand fingernails. In patients who experienced trauma, they are usually located on the distal; in patients with systemic disease, the localization is rather proximal and in more fingers than one [8]. In our cases, the lesions were also localized in multiple fingers and in more proximal (Table 2). It is reported in the literature to be associated with systemic diseases involving vessel wall such as livedo re-

ticularis, distal cutaneous ischemia, superficial skin necrosis, superficial thrombophlebitis [9,10]. Quenneville and Gossard [11]. reported that splinter hemorrhage is an early and beneficial finding as a symptom of arterial involvement in patients with thromboangiitis obliterans. In our study, splinter hemorrhage was significantly higher in hypertensive patients who use or do not use medication. Splinter hemorrhage may be a finding that shows peripheral involvement of hypertension. However, when the patients were compared in terms of treatment, splinter hemorrhage being observed more in the non-treated group can suggest that this finding may be useful in evaluating the effect of treatment and in patient follow-up.

Splinter hemorrhage being found positively correlated with hypertension stage and duration suggests that splinter hemorrhage is an important finding for hypertensive patients. Conducting other studies on this subject will provide a clearer interpretation of the results.

Normally, the nail surface is smooth. Increased longitudinal line formations are observed due to changing turnover of matrix cells in senile nails [12,13]. Considering that one of the determinants of this turnover is matrix blood supply, it may be thought that matrix blood supply will be disrupted due to peripheral small vessel uptake and longitudinal lines may form in patients with hypertension. In our study, when group that does not use medication was compared with the healthy group, longitudinal line formation was increased. Another point that stands out is that also in patients who do not receive treatment, longitudinal line formation was increased compared to the ones who receive treatment. This may suggest that the treatment decrea-

**Table 1.** Demographic Data of all Patients and Control Groups are Shown in

	Patient who do not use medication (n:60)	Patient who use medication (n:92)	Control (n:61)	P
Age (year) mean±SD (min,max)	53±1.12 (35.81)	55±1.48 (46.86)	53±9.08	>0.5
Gender M/F (%)	32/28 (53.3/47.7)	47/45 (51.08/48.92)	36/30(54.5/45.5)	>0.5
Duration (year) mean±SD (min,max)	1.33±1.87 (1-7)	5±2.91 (1.25)		

**Table 2.** Correlation Analysis of Hypertension and Nail Findings

	Age	Hypertension Stage	Hypertension Duration	Splinter hemorrhage	Onychomycosis	Half Nail	Longitudinal line formation	Koilonychia	Flattening	Total leukonychia	Punctate leukonychia
Age	1	,051	,489**	,058	,304*	,261	,346*	,189	-,074	,019	-,240
Hypertension Stage	,051	1	,094	,746**	,355**	,382**	-,145	,055	-,076	-,157	,218
Hypertension Duration	,489*	,094	1	,266**	,092	,090	,114	,328*	-,063	,172	-,030
Splinter Hemorrhage	,058	,746**	,266**	1	,270*	,322*	,00	,322*	-,07	,000	,322**
Onychomycosis	,304*	,335**	,092	,270*	1	,222	,037	,222	-,047	-,097	-,067
Half Nail	,261	,382**	,090	,322*	,222	1	-,066	-,034	-,024	-,050	-,034
Longitudinal line formation	,346*	-,145	,114	,00	,037	-,066	1	,131	-,184	-,378**	-,066
Koilonychia	,189	,055	,328*	,322*	,222	-,034	,131	1	-,024	-,050	-,034
Flattening	-,074	-,076	-,063	-,075	-,047	-,024	-,184	-,024	1	-,035	-,024
Total leukonychia	,019	-,157	,172	,000	-,097	-,050	-,378**	-,050	-,035	1	-,050
Punctate leukonychia	-,240	,218	-,030	,322**	-,067	-,034	-,066	-,034	-,024	-,050	1

ses the longitudinal line formation due to the matrix blood supply.

Lunula is the white region in the form of peninsula observed in the proximal part of the nail and absence of lunula is identified in many diseases such as atherosclerosis, rheumatoid arthritis and renal insufficiency[14]. In our study, significantly higher absence of lunula was detected in the patients who were not taking medication compared to the control group. It was considered that atherosclerosis may also be present in small arterioles in hypertension and therefore absence of lunula may be an indicator of endorgan invol-

vement of atherosclerosis. Other studies on this subject may provide clearer impressions.

Leukonychia totalis is a rare condition characterized by milk, chalk or porcelain white color on nails.

It can be hereditary and it was also reported to be observed together with peptic ulcer, cholelithiasis, renal insufficiency and hypoparathyroidism, congestive heart failure and ischemic heart disease [15,16]. In our study, total leukonychia was found to be high in patient groups. This finding, which is observed more in heart diseases in the literature, being also high in hypertension and decreasing with medication use, suggested that it can occur

with similar mechanism and it can be used in treatment follow-up.

Terry nail is the nail change characterized with the white, distal 1-2 mm portion of the proximal part of the nail bed being pink in color. It has been reported to be associated with cirrhosis, chronic congestive heart failure, type 2 diabetes mellitus (DM) and hematological disorders [14]. In our study, it was found quite high in the treatment group compared to healthy control group. Similar to total leukonychia; Terry nail formation may be caused by impairment of peripheral supply in hypertension, as well as congenital heart failure

Onychomycosis is the fungal infection of the nail. The incidence increases day by day due to endogenous and exogenous predisposing risk factors[17]. In a study, it is reported that onychomycosis may be increased as a symptom of subclinical atherosclerosis in diabetic patients [18]. In another study, they reported an increase in the frequency of onychomycosis in peripheral arterial diseases [19]. In our study, it was also suggested that onychomycosis may be associated with peripheral involvement of hypertension, because onychomycosis was observed to be high in group who does not use medication compared to healthy control group and onychomycosis was observed less in the group who do not use medication.

As a result; hypertension is a disease with high morbidity and mortality. Examination of the nails is an easy and inexpensive examination method and it can be a guide in the early diagnosis, even treatment follow-up of peripheral artery involvement of hypertension with careful examination of hypertensive patients. Extensive studies with larger numbers of patients are required in this subject.

## References

- Öngen Z. Esansiyel hipertansiyon kliniği. Sistemik Arter Hipertansiyonu Sempozyumu. 1997; 9-17.
- Büyüköztürk K, İlerigelen B, Kabakçı G, Koylan N, Kozan Ö. Türkiyedeki Hipertansiyon Hastalarının Risk Profillerinin Belirlenmesine Yönelik Geniş Ölçekli Bir Çalışma: I.C.E.B.E.R.G. Çalışması. Türk Kardiyol Dern Arş 2004; 32: 344-349.
- Dunn FG, Burns JM, Hornung RS. Left ventricular hypertrophy in hypertension. Am Heart J 1991; 122: 312-315. PMID: 1828935
- Bots ML, Dijk JM, Oren A, Grobbee DE. Carotid intima-media thickness, arterial stiffness and risk of cardiovascular disease: current evidence. J Hypertens 2002; 20: 2317-2325 PMID: 12473847
- Yikona J, Wallis EJ, Ramsay LE, Jackson PR. Coronary and cardiovascular risk estimation in uncomplicated mild hypertension. A comparison of risk assessment methods. J Hypertens 2002; 20: 2173-2182. PMID: 12409955
- Karaman G. Sistemik Hastalıklarda Tırnak Bulguları. Türkiye Klinikleri J Dermatol-Special Topics 2016; 9: 38-42.
- Aktaş A, Geçer E. Yaşlılarda Tırnak Değişiklikleri. Türkiye Klinikleri J Dermatol-Special Topics 2009; 2: 69-71.
- Haber R, Khoury R, Kechichian E, Tomb R. Splinter hemorrhages of the nails: a systematic review of clinical features and associated conditions. Int J Dermatol 2016; 55: 1304-1310. PMID: 27420914
- Garcia-Carrasco M, Galarza C, Gómez-Ponce M, et al. Antiphospholipid syndrome in Latin American patients: clinical and immunologic characteristics and comparison with European patients. Lupus 2007; 16: 366-373. PMID: 17576741
- Kriseman YL, Nash JW, Hsu S. Criteria for the diagnosis of antiphospholipid syndrome in patients presenting with dermatologic symptoms. J Am Acad Dermatol 2007; 57: 112-115. PMID: 17467850
- Quenneville JG, Gossard D. Subungual-splinter hemorrhage an early sign of thromboangiitis obliterans. Angiology 1981; 32: 424-432. PMID: 7235312
- Tosti A, Jorizzo M, Piraccini BM, Starace M. The nail in systemic diseases. Dermatol Clin 2006; 24: 341-347. PMID: 16798431
- Fawcett RS, Linford S. Nail Abnormalities: Clues to Systemic Disease. Am Fam Phy 2004; 69: 1417-1424. PMID: 15053406
- Öztürk P, Dokur N, Kurutaş E. et al. Hemodiyaliz Tedavisi Alan Kronik Böbrek Yetmezlikli Hastalarda Tırnak Bulgularının İncelenmesi. Turk J Dermatol 2012; 6: 35-38.
- Serdaroğlu S, Küçüktaş M. Lökonişiler. Türkiye Klinikleri J Int Med Sci 2007; 3: 33-36.
- Zaiac MN, Walker A. Nail abnormalities associated with systemic pathologies. Clin Dermatol 2013; 31627-31649. PMID: 24079592
- Papini M, Piraccini BM, Difonzo E, Brunoro A. Epidemiology of onychomycosis in Italy: prevalence data and risk factor identification. Mycoses 2015; 58: 659-664. PMID: 26412300
- Onalan O, Adar A, Keles H, et al. Onychomycosis is associated with subclinical atherosclerosis in patients with diabetes. Vasa 2015; 44: 59-64. PMID: 25537059
- Fukunaga A, Washio K, Ogura K, et al. Onychomycosis as a warning sign for peripheral arterial disease. Acta Derm Venereol 2013; 93: 747-748. PMID: 23529206