ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/medsci.2022-94516

Dermoscopic Findings in the Diagnosis of Pigmented Purpuric Dermatosis: Descriptive Research

Pigmente Purpurik Dermatozun Tanısında Dermoskopik Bulgular: Tanımlayıcı Araştırma

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This study was presented as a poster at the Congress of 28th European Academy Dermatology and Venereology, October 9-13, 2019, Madrid, Spain.

ABSTRACT Objective: Pigmented purpuric dermatoses (PPD) are a group of disorders characterized by chronic and relapsing petechial and pigmented lesions. Our study aims to find out whether dermoscopy can be used in the differential diagnosis of these diseases. **Material and Methods:** This study enrolled patients who visited the Dermatology Department of Kocaeli University and were diagnosed with PPD by clinical presentation and histopathologic examination. Lesions were examined with handheld dermoscope and dermoscopic images of some patients were also recorded using a videodermoscope. **Results:** The dermoscopic examination was performed in total of 58 lesions located in different anatomic regions of 30 patients who were enrolled in our study. The most common finding was red round-oval globules, which were found in 55 (94.8%) of 58 lesions examined. The other findings were diffuse brownish-orange pigmentation in the background (65.5%, n=38), red dots (60.3%, n=35), red patches (20.6%, n=12), brown network (18.9%, n=11), twisted red loops (18.9%, n=11) and linear vessels (15.5%, n=9). When different anatomic regions (feet, legs, thighs) were evaluated separately; red globules, diffuse brownish-orange background, and red spots were the most frequently detected findings amongst all. Brown network rate was higher in the feet than in other regions, but it was not statistically significant. **Conclusion:** Red round-oval globules, brownish-orange background and red spots were the most common dermoscopic findings in our study. But these were not considered as spesific features for PPD. Dermoscopy is a practical, non-invasive and rapid method that can be used in the differential diagnosis of the patinets presenting with purpura.

Keywords: Dermoscopy; pigmented purpuric dermatosis; Schamberg disease; red globules

ÖZET Amaç: Pigmente purpurik dermatozlar (PPD), kronik ve tekrarlayan peteşiyal ve pigmente lezyonlarla karakterize bir hastalık grubudur. Çalışmamızda, dermoskopinin bu hastalıkların ayırıcı tanısında kullanılıp kullanılamayacağının araştırılması amaçlanmıştır. **Gereç ve Yöntemler:** Bu çalışmaya Kocaeli Üniversitesi Dermatoloji Ana Bilim Dalına başvuran, klinik bulgular ve histopatolojik inceleme ile PPD tanısı konulan hastalar alındı. Lezyonlar el dermoskopları ile incelendi ve bazı hastaların dermoskopik görüntüleri videodermoskop ile de kaydedildi. **Bulgular:** Çalışmamıza alınan 30 hastanın farklı anatomik bölgelerinde yer alan toplam 58 lezyona dermoskopik inceleme yapıldı. İncelenen 58 lezyonun 55'inde (%94,8) en sık rastlanan bulgu kırmızı yuvarlak-oval globüllerdi. Diğer bulgular ise zeminde yaygın kahverengimsi turuncu pigmentasyon (%65,5, n=38), kırmızı noktalar (%60,3, n=35), kırmızı yamalar (%20,6, n=12), kahverengi ağ (%18,9, n=11), bükülmüş kırmızı halkalar (%18,9, n=11) ve lineer damarlardı (%15,5, n=9). Farklı anatomik bölgeler (ayak, bacak, uyluk) ayrı ayrı değerlendirildiğinde, hepsinde en sık saptanan bulgular kırmızı globüller, yaygın kahverengimsi-turuncu zemin ve kırmızı noktalardı. Kahverengi ağ görülme oranı ayaklarda diğer bölgelere göre daha yüksekti, ancak istatistiksel olarak anlamlı değildi. **Sonuç:** Kırmızı yuvarlak oval globüller, kahverengimsi-turuncu zemin ve kırmızı benekler çalışmamızda en sık görülen dermoskopik bulgulardı. Ancak bunlar PPD'lere spesifik özellikler olarak kabul edilmedi. Dermoskop; purpura ile başvuran hastalarda ayırıcı tanıda kullanılabilecek pratik, noninvaziv ve hızlı bir yöntemdir.

Anahtar Kelimeler: Dermoskopi; pigmente purpurik dermatoz; Schamberg hastalığı; kırmızı globüller

Pigmented purpuric dermatoses (PPD) are a group of disorders of unknown etiology characterized by chronic and relapsing petechiae and pigmented macules, usually symmetrically distributed over the lower extremities. Clinical findings occur due to erythrocyte extravasation and hemosiderin accumulation in the skin.[1]

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Peer review under responsibility of Turkiye Klinikleri Journal of Medical Sciences.

Received: 25 Nov 2022 ***Received in revised form:*** 15 Aug 2023 ***Accepted:*** 22 Aug 2023 ***Available online:*** 06 Sep 2023

Although the diagnosis is easily made by clinical findings in most of the cases, if there is doubt, histopathological examination is the most appropriate method for diagnosis. However, due to its invasive nature and delayed results, a non-invasive, fast, and easy diagnostic method is needed. In this study, we aimed to reveal whether dermoscopy as a non-invasive method can be used in the differential diagnosis of PPD and to reveal its specific dermoscopic findings if there are any. Apart from case reports, there are a few studies with a small number of patients in the literature on this subject.[2-4] Unlike those studies, in our study we also compared the dermoscopic findings of lesions located in different anatomical regions of the same patient.

MATERIAL AND METHODS

This study was carried out in Kocaeli University, Department of Dermatology with the decision of Kocaeli University Faculty of Medicine Ethics Committee (date: October 04, 2017, no: 2017/8.11). Our study was conducted in accordance with the principles of the Declaration of Helsinki. Patients who applied to the outpatient clinic between 2017 and 2018 and whose clinical findings were compatible with PPD were included in the study. Histopathological examination was also performed in some of the patients.

Written informed consent was obtained after the patients were verbally informed about the dermoscopy method. Detailed dermatological examination of the patients who accepted dermoscopy was performed and the localization, number, and clinical types of the lesions were recorded on the forms. Then, characteristical lesions selected from different anatomical regions were evaluated by two different researchers, one of whom was experienced, with a handheld dermoscope (Dermlite DL3, DermLite LLC, USA). Dermoscopic images of some patients were recorded using a videodermoscope (Fotofinder computerized dermoscope, FotoFinder Systems GmbH, Germany). In dermoscopic examination, round-oval red globules, diffuse brownish-orange background, red spots, red patches, gray spots, brown-gray network, and other findings were evaluated.

Statistical analysis was performed with the IBM SPSS 20.0 (SPSS Inc., Chicago, IL, USA) package program. Normal distribution was evaluated with the Shapiro-Wilk test. Numerical variables that did not show normal distribution were given as median (25^{th}-75^{th} percentile), and categorical variables were given as frequency (%). The difference of categorical variables according to the groups was evaluated with Monte Carlo chi-square analysis. For testing of two-sided hypotheses, p value <0.05 was considered sufficient for statistical significance.

RESULTS

Of the 30 patients who made up the study group, 15 were male (50%) and 15 were female (50%). The age range was between 16 and 84 years and the median age was 57.50 years.

The diagnosis of PPD was made by clinical findings and histopathological examination in 23 patients,

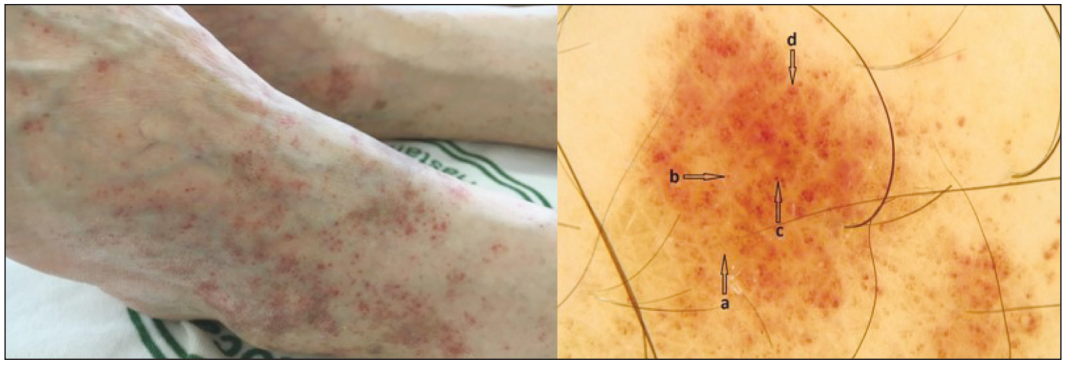

FIGURE 1: a) The lesions on the foot and ankle of a patient with Schamberg disease. **b)** Brownish-orange background **(a)**, red dot **(b)**, red globule **(c)**, red patch **(d)** revealed on the dermoscopic examination of Schamberg disease.

and it was made only by clinical findings in 7 patients. Among the 30 patients enrolled in our study 23 (67.7%) was diagnosed with Schamberg disease, 5 (16.7%) with lichen aureus, and 2 (6.7%) with Majocchi disease (Figure 1). Disease duration ranged from 5 to 360 months, and the mean disease duration was calculated as 36 months.

DERMOSCOPIC FINDINGS OF THE PPD LESIONS

Dermoscopic examination was performed on a total of 58 lesions located in different anatomical regions of 30 patients included in the study. Among these lesions 28 (49.1%) were located on the leg, 12 (21.0%) were located on the foot, 11 (19.3%) were located on the thigh, 3 (5.2%) were located on the trunk, 2 (3.5%) were located on the gluteal region and 2 (3.5%) were located on the arm (3.5%) (Table 1). The most common finding was red globule and it was observed in 55 (94.8%) of the 58 lesions in dermoscopic examination. We observed diffuse brownish-orange background in 38 lesions (65.5%), red spots in 35 lesions (60.3%), red patches in 12 lesions (20.6%), brown pigment networks in 11 lesions (18.9%), twisted red loops in 11 lesions (18.9%), linear vessels in 9 lesions (15.5%), other lesions (comma-like vessels, brown patches and network of vessels) in 4 lesions (10.3%) (Table 1). Red globules, diffuse brownish-orange background, red dots, and red patches observed in the dermoscopic examination are shown in Figure 2.

When evaluated separately according to the anatomical regions, in the dermoscopic examination of 28 lesions of the leg, red globules were detected in 27 lesions (96.4%), diffuse brownish-orange background in 18 lesions (64.2%), red dots in 15 lesions (53.6%), brown pigmented network structures in 5 lesions (17.8%), red patches in 9 lesions (32.1%), linear vessels in 6 lesions (21.4%), twisted red loops in 5 lesions (17.8%), and the other findings like comma-like vessels, brown patches, and a network of vessels in 4 lesions (14.3%).

The dermoscopic examination of 12 lesions of the foot revealed red globules in 11 lesions (91.7%), diffuse brownish-orange background in 9 lesions (75.0%), red spots in 8 lesions (66.7%), brown pigmented network in 5 lesions (41.0%), red twisted loops in 4 lesions (33.3%) and other findings in 2 lesions (16.6%).

In the dermoscopic examination of 11 lesions in the thigh, we detected red globules in 10 lesions (90.9%), diffuse brownish-orange background in 4 lesions (36.3%), red dots in 6 lesions (54.5%), red patches in 3 lesions (27.3%), and brown pigmented network and vascular structure respectively in 1 lesion (9.0%).

TABLE 1: Distribution of the dermoscopic findings according to anatomical regions of the patients with pigmented purpuric dermatosis.

Anatomical region and number of the lesions (n)	Red globules	Diffuse brownish-orange background	Red dots	Brown pigmented network	Red patch	Twisted red loops	Linear vessels	Others*
Leg n=28 (49.1%)	27 (96.4%)	18 (64.2%)	15 (53.6%)	5 (17.8%)	9 (32.1%)	5 (17.8%)	6 (21.4%)	4 (14.3%)
Foot n=12 (21.0%)	11 (91.7%)	9 (75.0%)	8 (66.7%)	5 (41.0%)	0	4 (33.3%)	0	2 (16.6%)
Thigh n=11 (19.3%)	10 (90.9%)	4 (36.3%)	6 (54.5%)	1 (9.0%)	3 (27.3%)	0	1 (9.0%)	0
Trunk n=3 (5.2%)	3 (100%)	3 (100%)	3 (100%)	0	0	1 (33.3%)	1 (33.3%)	0
Gluteal region n=2 (3.5%)	2 (100%)	2 (100%)	2 (100%)	0	0	1 (50.0%)	0	0
Arm n=2 (3.5%)	2 (100%)	2 (100%)	1 (50.0%)	0	0	0	1 (50.0%)	0
Total lesion n=58 (100%)	55 (94.8%)	38 (65.5%)	35 (60.3%)	11 (18.9%)	12 (20.6%)	11 (18.9%)	9 (15.5%)	6 (10.3%)
	p=0.739[a]	p=0.133[a]	p=0.749[a]	p=0.184[a]	p=0,094[a]			

*Other: Brown patch, network of vessels, comma-like vessels; [a]Trunk, gluteal region and arms excluded for statistical analysis due to insufficient lesion number.

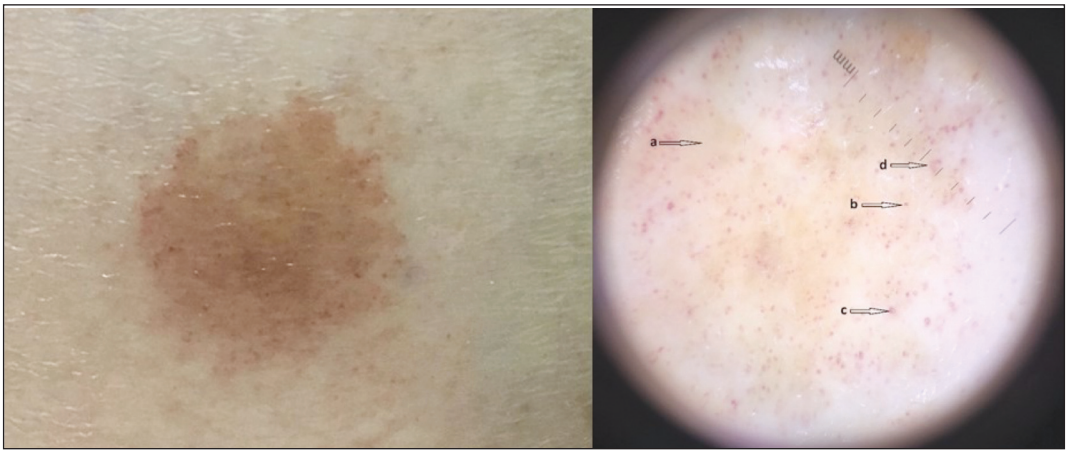

FIGURE 2: a) The lesion of a patient with lichen aureus **b)** Brownish-orange background **(a)**, red dot **(b)**, red globule **(c)**, red patch **(d)** revealed on the dermoscopic examination of lichen aureus.

The detection rate of red globules, diffuse brownish-orange background, red spots, brown pigmented networks, and red patches in feet, legs, and thighs was evaluated statistically by Monte Carlo chi-square test and for red globules p=0.739, for diffuse brownish-orange background p=0.133, for red dots p=0.749, for brown pigmented network p=0.184, for red patches p=0.094 was calculated, and no statistically significant difference was found in dermoscopic findings according to anatomical regions. The distribution of 58 PPD lesions in 30 patients in our study group according to anatomical regions and the dermoscopic findings detected are shown in Table 1.

DISCUSSION

PPD are a rare group of disorders presenting with chronic and recurrent purpuric eruptions.[1] Although it can be easily diagnosed due to its typical clinical appearance, the histopathological examination may sometimes be necessary to exclude other diseases or to confirm the diagnosis. We aimed to determine whether dermoscopy, which is a non-invasive, rapid and relatively easy diagnostic method, can be used in the differential diagnosis of PPD and to determine its specific findings if any.

In the literature, we encountered 4 studies related to dermoscopic findings in PPDs.[2-5] Our biggest difficulty when comparing these studies with each other was the lack of standard (universally accepted) definitions for the findings. The most common finding in 58 lesions of 30 patients with PPD included in our study was red globules, and they were observed in 55 (94.8%) of 58 lesions examined. Dermoscopic findings detected in our study and different studies performed in patients with PPD are shown in Table 2.

While the rate of red globules in our study was 94.8%, it was reported as 75%, 100%, 92.9%, and 100% in the studies of Ozkaya et al., Çakmak et al., Suh et al., and Metin et al., respectively.[2-5] While the red spots were detected at a rate of 60.3% in our study, 69% in the study of Ozkaya et al. and 100% in the studies of Çakmak et al. and Metin et al. Suh et al. did not mention about this finding.[2-5] Although the red patches were detected at a rate of 100% in the study of Çakmak et al. it was detected at a rate of 20.6% in our study and 34% in the study of Ozkaya et al.[2,3] Red patches are not mentioned in the studies of Suh et al. and Metin et al.[4,5] Due to the lack of standardization in the definition of red globules, red dots, and red patches in these studies, there may be differences in the incidence of red lesions. For example, Suh et al. may have collected all red lesions in the red globule category in their study, or Metin et al. may have evaluated the red patches in the red globule category.[4,5] In our study, we considered small-sized punctate lesions as dots, relatively large round-oval lesions as globules, and non-round or oval-shaped larger homogeneous vascular structures as patches (Figure 2). Red globules, dots, and patches are

TABLE 2: Dermoscopic findings detected in different studies performed in patients with pigmented purpuric dermatosis.

Findings	Our study *n=58	Ozkaya et al.[2] **n=32	Çakmak et al.[3] **n=18	Suh et al.[4] **n=14	Metin et al.[5] **n=25
Red globules	55 (94.8%)	24 (75%)	18 (100%)	13 (92.9%)	25 (100%)
Diffuse brownish-orange background	38 (65.5%)	31 (97%)	18 (100%)	14 (100%)	72%
Red dots	35 (60.3%)	22 (69%)	18 (100%)	0	100%
Red patch	2 (20.6%)	11 (34%)	18 (100%)	0	0%
Pigmented network	11 (18.9%)	11 (34%)	8 (44.4%)	9 (64.3%)	40%
Twisted red loops	11 (18.9%)	0	5 (27.7%)	0	8 (32%)
Linear vessels	9 (15.5%)	7 (22%)	9 (50%)	0	1 (4%)

*n=Number of lesions evaluated in 30 patients; **n=Number of patients included in the study.

thought to histopathologically correspond to erythrocyte extravasation, increased vascularization, and vascular enlargement.[6] Red globule is a finding that can also be detected in intraepidermal carcinoma, basal cell carcinoma, and psoriasis.[7] Pointed vascular structures that can be seen in Spitz nevus, melanoma, psoriasis, and warts are the findings that can be confused with red dots.[2] However, the aforementioned entities can be easily distinguished from PPDs with their specific clinical appearance.

The diffuse brownish-orange background rate was 65.5% in our study, 97% (coppery-red pigmentation) in Ozkaya et al.'s study, 100% (coppery-brown background) in Çakmak et al.'s study, and 100% in Suh et al.'s study (coppery-brown background) and in the study of Metin et al. (coppery-brown background) it was reported at a rate of 72%.[2-5] The coppery-brown pigmentation seen on dermoscopic examination is thought to be due to dermal lymphohistiocytic infiltration, erythrocyte extravasation, and hemosiderin accumulation in histiocytes, which are histopathologically typical for PPDs.[6] We think it would be appropriate to name this color which has been described by different names in different studies as brownish-orange. Compared to other studies, this finding was found at a lower rate in our study, but it was reported at a rate close to ours in the study of Metin et al.[2-5] We think that this may be related to the age of the lesions or to the fact that we evaluated different anatomical regions.

The dermoscopic findings of PPDs, red round-oval globules on a brown-reddish background, red dots, and a network formed by linear vessels are also reported among the dermoscopic findings of urticarial vasculitis.[8] So urticarial vasculitis may be confused with PPDs, but clinical findings may be distinctive. In non-inflammatory purpura such as senile and steroid purpura and/or bleeding diathesis, large, homogeneous, structureless purpuric areas are mentioned in dermoscopic examination. In the dermoscopic examination of leukocytoclastic vasculitis, which is another disease with purpura; small, mottled, blurry purpuric spots without a coppery-brownish background have been reported.[9]

Although the reticular network changing from brown to gray was reported at a rate of 64.3% in the study of Suh et al. it was 18.9% in our study, 34% in the study of Ozkaya et al., 44.4% in the study of Çakmak et al. and in the study of Metin et al. it was reported as "brown lines reticular" at a rate of 40%.[2-5] Histopathologically, the reticular network is thought to be associated with hyperpigmentation in the basal cell layer and pigment incontinence in the superficial dermis.[6] The presence of a pigment network generally indicates that the lesion is melanocytic and is used to distinguish it from non-melanocytic lesions, but it can also be seen in some non-melanocytic lesions such as solar lentigo, dermatofibroma, ink-spot lentigo, seborrheic keratosis, accessory nipple, cutaneous mastocytosis, and also in normal skin.[2] Among these lesions, PPD can be easily differentiated by both its location and clinical appearance.

Twisted red loops, which were detected at a rate of 18.9% in our study and 27.7% in the study of Çakmak et al., were not reported in the studies of Suh et al. and Ozkaya et al. Metin et al. reported that they observed red ring structures in 6 (32%) of 19 Schamberg patients and 2 (33%) of 6 patients with lichen

aureus, a total of 8 (32%) patients, and they named it "dilated coiled vessels".[2-5] Although linear vessels were detected at a rate of 50% in the study of Çakmak et al., 15.5% in our study and 22% in the study of Ozkaya et al., they were not detected at all in the study of Suh et al. This finding is thought to be related to increased or enlarged vascularity.[2-4,6] The red twisted loops are a sign of psoriasis and seborrheic dermatitis; linear vessels are structures that can be detected on dermoscopic examination of Merkel cell carcinoma, actinic keratosis, and amelanotic melanoma.[7] We think PPDs can be easily distinguished from these lesions.

Brown spots, brown globules, linear brown lines, follicular openings, gray spots and rosette structures, which were reported at different rates in dermoscopic examination in the 4 studies mentioned above, were not detected in our study.[2-5]

Although their positions in the sequence change, in the studies of Ozkaya et al., Çakmak et al., and Metin et al., together with our study, the three most common findings in PPDs were reported as red globules, brownish-orange background, and red dots.[2,3,5] In the study of Suh et al., the 3 most common findings were coppery-orange background, red round-oval globules, and brown to gray web.[4]

Compared to other studies in the literature, more lesions were evaluated in our study and also the lesions in different anatomical regions were compared. Accordingly, when the feet, legs, and thighs were evaluated separately, red globules, brownish-orange background, and red dots were the most common findings in all three regions, but there was no statistically significant difference when their detection rates were compared with the Monte Carlo chi-square analysis. The brown pigment network structure, which is detected in the fourth frequency in all three regions, is observed more frequently in the foot region. This may be due to stasis or can be explained by the fact that the lesions in the foot region are older than the other regions and therefore the pigment incontinence is more prominent.

CONCLUSION

We think that the 3 most common findings in dermoscopic examination (red round-oval globules, brownish-orange background, and red spots) in our study and other studies on this subject, although not specific for PPDs, may help in distinguishing them from other diseases with a purpuric component. Along with these findings, the detection of brown-gray web structures, red patches, and twisted red loops are also supportive. The dermoscopic examination will reduce the number of patients for whom we will refer to biopsy as a screening method among patients presenting with purpura.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ürfan Maviş, Nilgün Sayman****; Design:*** *Nilgün Sayman, Ürfan Maviş, Aysun Şikar Aktürk;* ***Control/Supervision:*** *Evren Odyakmaz Demirsoy, Canan Baydemir, Nilgün Saymaz;* ***Data Collection and/or Processing:*** *Ürfan Maviş;* ***Analysis and/or Interpretation:*** *Ürfan Maviş, Nilgün Sayman, Canan Baydemir;* ***Literature Review:*** *Ürfan Maviş;* ***Writing the Article:*** *Ürfan Maviş, Nilgün Sayman, Aysun Şikar Aktürk;* ***Critical Review:*** *Ürfan Maviş, Nilgün Sayman, Aysun Şikar Aktürk, Evren Odyakmaz Demirsoy, Canan Baydemir;* ***References and Fundings:*** *Ürfan Maviş, Nilgün Sayman;* ***Materials:*** *Ürfan Maviş, Nilgün Sayman.*

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