Diyabetli Hastalarda Vasküler Patolojilerin Tedavisi

Dr Zahit Bolaman
Adnan Menderes Üniversitesi
Tıp Fakültesi

udais 2008
1. Ulusal
Diyabetik Ayak İnfeksiyonları
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TÜRK KLİNİK MİKROBİYOLOJİ VE İNFEKSİYON HAST. (KLİMİK) DERNEĞİ

Diyabetes Mellitus Vasküler Patolojiler

Makrovasküler

- İskemik kalp hastalığı
- İnme

Mikrovasküler

- Mikroalbuminüri
- Nöropati
- Retinopati
- Alt ekstremite ülserleri

Kannel WB, McGee DL. Diabetes and glucose tolerance as risk factors for cardiovascular disease: The Framingham study. Diabetes Care 1979;2:120-26.

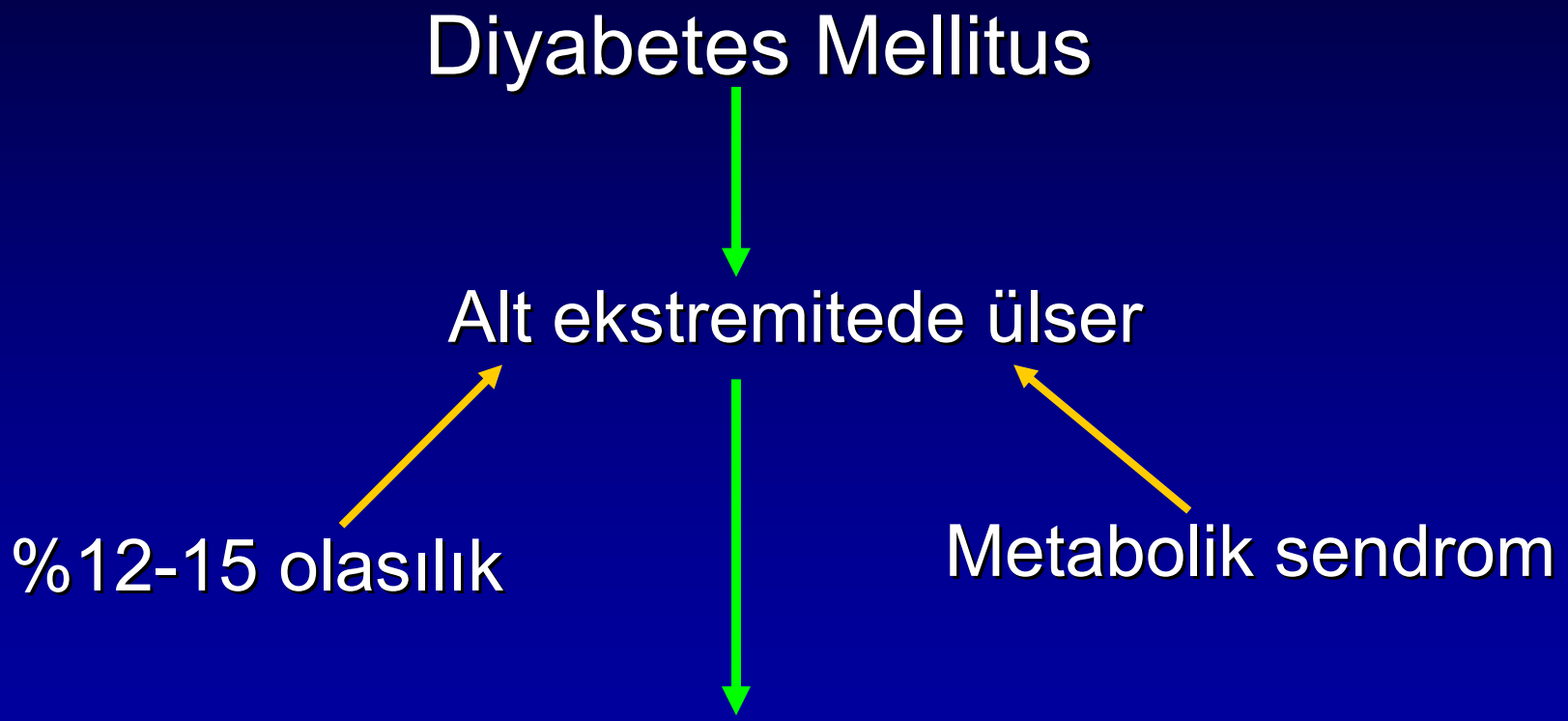
Diyabetes Mellitus Vasküler Patolojiler

Kronik ekstremite iskemisi ile

- 2 hafta veya daha fazla süre istirahat ağrısı
- Ayak bileği basıncı 50 mmHg veya daha fazla olan
- Ayakta ülser ya da gangren gelişimi

Kannel WB, McGee DL. Diabetes and glucose tolerance as risk factors for cardiovascular disease: the Framingham study. Diabetes Care 1979;2:120-26.

Diyabetes Mellitus
Vasküler Patolojiler



Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients with diabetes. JAMA 2005; 293: 217–28.

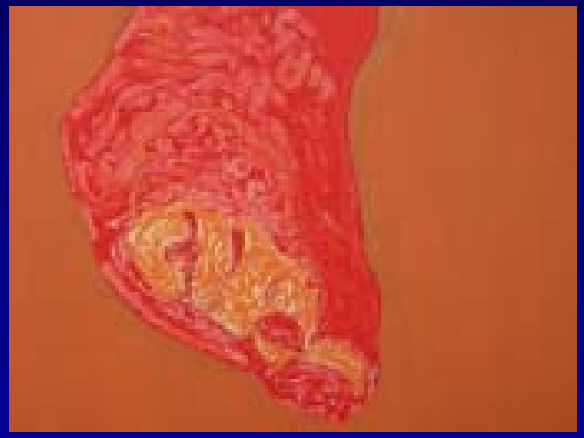
Diyabetes Mellitus
Alt Ekstremite Ülser Patogenezi

Nöropatik

İskemik

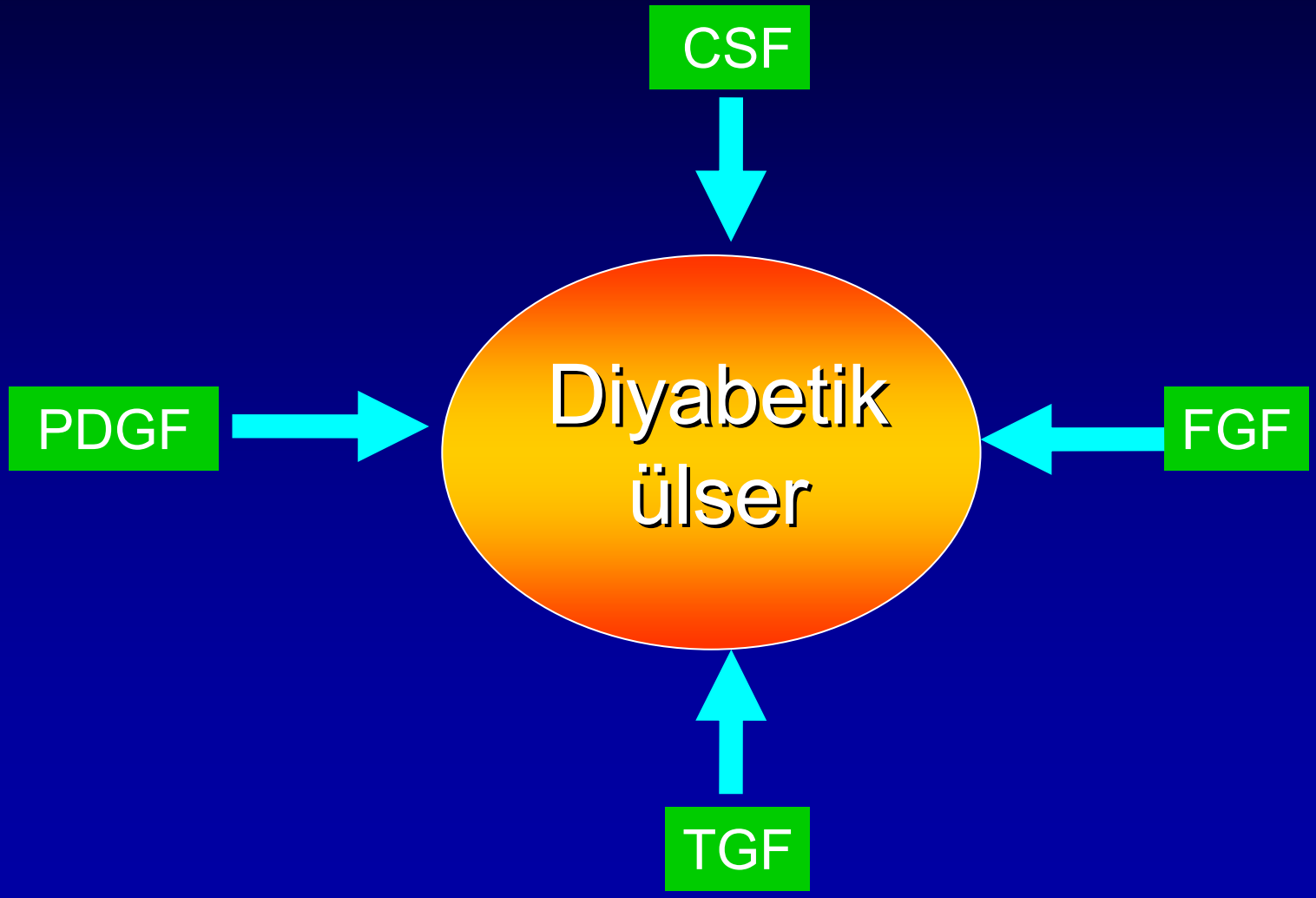
Nöro-iskemik

Katkıda bulunma



Motor ve otonomik defisitler

Diyabetik Ayak
Koloni Uyarıcı Ajanların Rolü



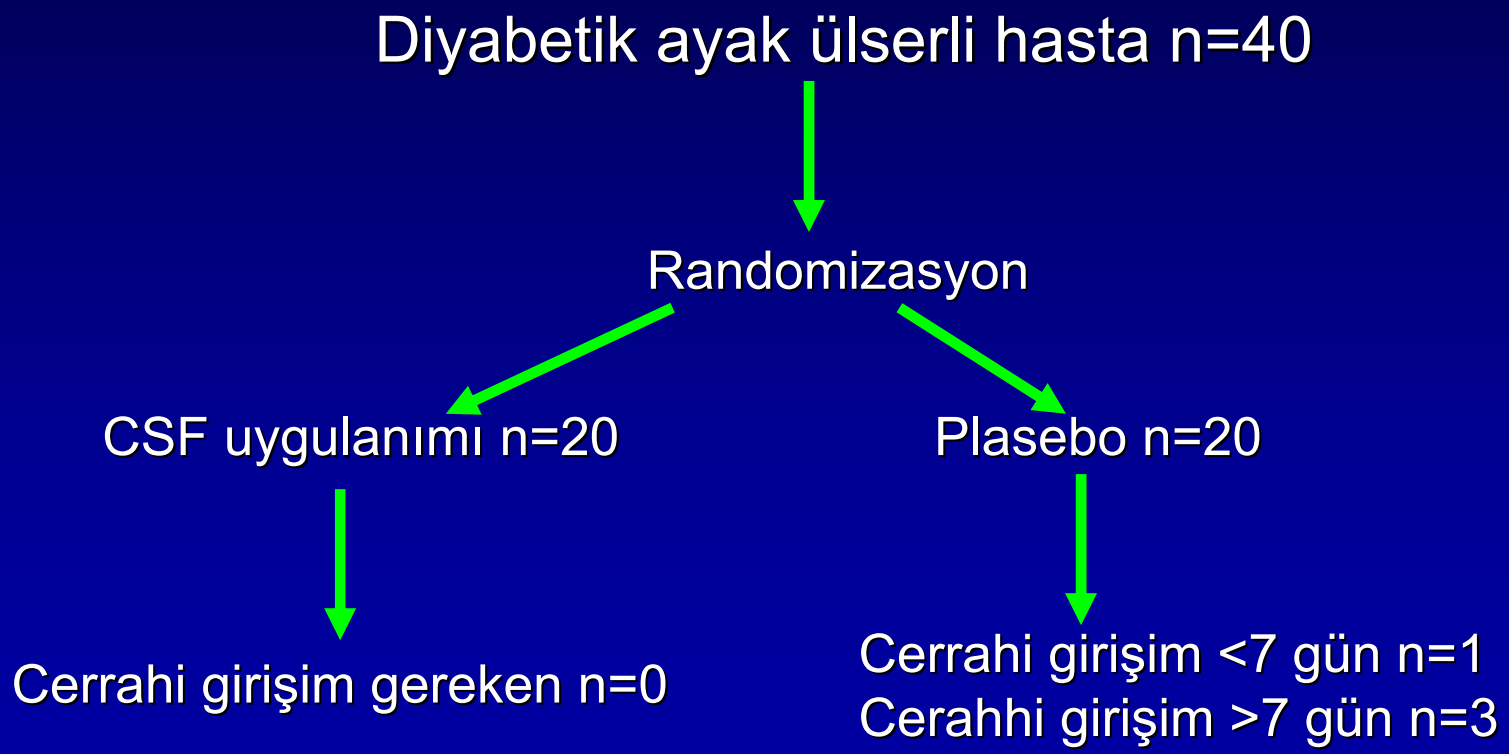
Diyabetik hastalarda yara oluşumu kolay olmaktadır

- Yara yerinde PDGF, βFGF, TGF-β ve CSF düzeyinde azalma
  - Perikapiller fibrinden zengin alanlarda tutulma
  - Metalloproteinaz enzimleri ile yıkılma
- Nötrofil süperoksidaz oluşumunda defekt
- Nötrofillerin bakterisidal aktivitelerinde bozulma

Purandare H, Supe A. Immunmodulatory role of tinospora cordifolia as an surgical treatment of diabetic foot ulcers: A prospective randomized controlled study. Indian J Med Sci 2007;61:347-55

Diyabetik Ayak
Koloni Uyarıcı Ajanların Rolü

Primer Amaç: Enfeksiyon sonlanımı, antibiyotik kullanım süresi, hastane süresi



Gough A,et al. Randomised placebo-controlled trial of granulocyte-colony stimulating factor in diabetic foot infection. Lancet 1997; 350: 855–59 , Lancet 1997; 350: 855–59

Diyabetik Ayak
Koloni Uyarıcı Ajanların Rolü

- Hastalarda sellülit var olacak
- CSF 7 gün süre ile subkutan
  - Doz 5 µgr; eğer 2 doz sonra BK>25.000 µl ise
    %50 doz azaltımı
- Dışlama kriteri
  - BK<1000 veya >50.000 µl
  - Malignite, HIV varlığı
  - Renal, hepatik fonksiyon bozukluğu, organ transplantasyonu varlığı, immunsupressif tedavi, gebelik, emzirme, organ yetmezliği, kritik bacak iskemisi

- Tüm hastalar antibiyotik tedavisi
  - Seftazidim, kinolon, Amoksosillin, metranidazol
- Glisemik kontrol
- Vasküler konum değerlendirme
  - Doppler USG
  - Anjiografi: Ankle-brakial index<0.8 ise
- Hastaneden taburcu kriteri sellülit yokluğu

Gough A,et al. Randomised placebo-controlled trial of granulocyte-colony stimulating factor in diabetic foot infection. Lancet 1997; 350: 855–59 , Lancet 1997; 350: 855–59

Diyabetik Ayak
Koloni Uyarıcı Ajanların Rolü

	G-CSF	Placebo	p
Median (range) time in days			
To hospital discharge	10 (7–31)	17·5 (9–100)	0·02
To resolution of cellulitis	7 (5–20)	12 (5–93)	0·03
To withdrawal of intravenous antibiotics	8·5 (5–30)	14·5 (8–63)	0·02
To negative swab culture*	4 (2–10)	8 (2–79)	0·02
Foot temperature difference (°C)			
Baseline	4·3 (1·4–11·2)	3·1 (0–9·1)	0·033
Day 7	1·1 (0·1–2·8)	2·1 (0·1–5·8)	0·011
Number of patients			
Surgery†	0	4 (20%)	0·114
Cellulitis resolved at day 7	11 (55%)	4 (20%)	0·05
Ulcer healed at day 7‡	4 (21%)	0	0·09
Glucose (mmol/L)	12·4 (3·0–27·2)	11·5 (2·7–24·4)	0·42
Insulin dose (U/kg daily)	0·58 (0·11–1·12)	0·48 (0·15–1·01)	0·38
Angiography			
Total	4	7	0·5
Percutaneous transluminal balloon angioplasty	2	3	
Vascular surgery	1	3	
No intervention	1	1	

*Time for positive wound swabs to become sterile (G-CSF n=16, placebo n=15).
†Debridement under general anaesthesia and/or ray amputation.
‡1 G-CSF patient cellulitis alone. Gough A,et al. Lancet 1997; 350: 855–59 , Lancet 1997; 350: 855–59

Mario Cruciani, md[1]
Benjamin A. Lipsky, md[2,3]
Carlo Mengoli, md[4]
Fausto de Lalla, md[5]

Are Granulocyte Colony–Stimulating Factors Beneficial in Treating Diabetic Foot Infections?

A meta-analysis

OBJECTIVE — To assess the value of granulocyte colony–stimulating factor (G-CSF) as adjunctive therapy for diabetic foot infections.

RESEARCH DESIGN AND METHODS — We systematically searched the medical literature (including Medline, Embase, LookSmart, and the Cochrane Library) for prospective randomized studies that used G-CSF as an adjunct to standard treatment for diabetic foot infections. Using a conventional meta-analysis, we pooled the relative risks (RRs) for outcomes of interest, including resolution of infection, wound healing, duration of antibiotic therapy, and need for various surgical interventions, using a fixed-effects model.

RESULTS — Five randomized trials, with a total of 167 patients, met our inclusion criteria. The methodological quality of the studies was satisfactory. The investigators administered various G-CSF preparations parenterally for between 3 and 21 days. The meta-analysis revealed that adding G-CSF did not significantly affect the resolution of infection or the healing of the wounds but was associated with a significantly reduced likelihood of lower extremity surgical interventions (RR 0.38 [95% CI 0.20–0.69], number of patients who needed to be treated: 4.5), including amputation (0.41 [0.17–0.95], number of patients who needed to be treated: 8.6). There was no evidence of heterogeneity among the studies or of publication bias, suggesting that these conclusions are reasonably generalizable and robust.

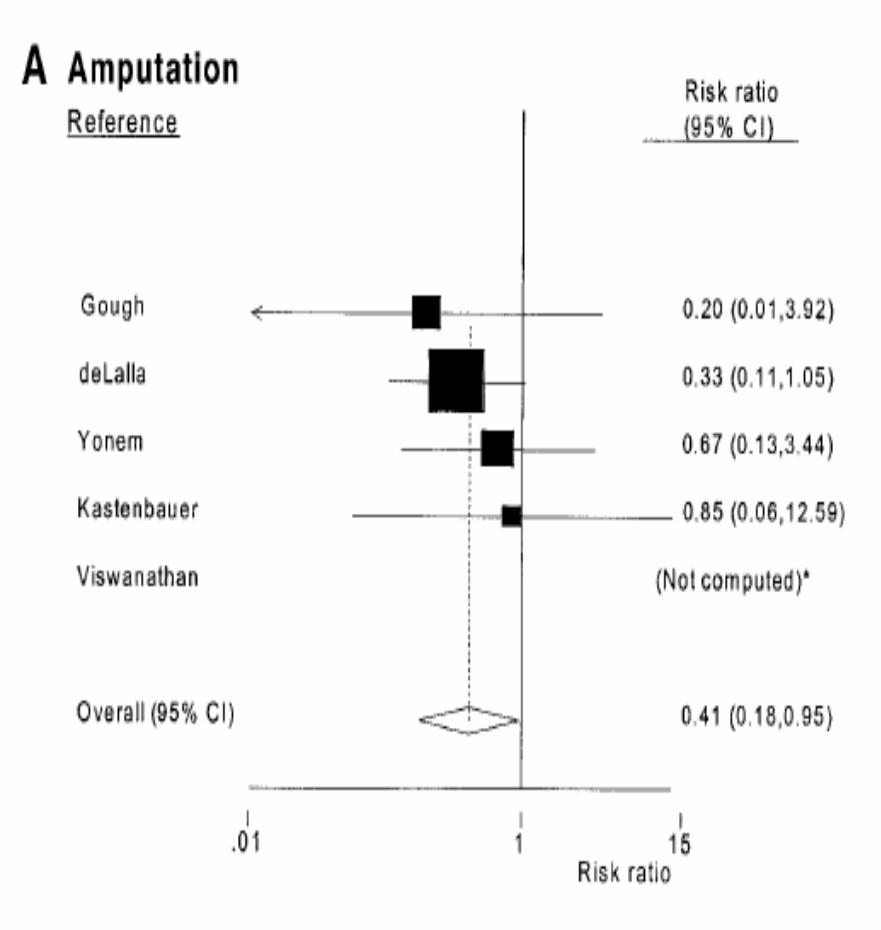
CONCLUSIONS — Adjunctive G-CSF treatment does not appear to hasten the clinical resolution of diabetic foot infection or ulceration but is associated with a reduced rate of amputation and other surgical procedures. The small number of patients who needed to be treated to gain these benefits suggests that using G-CSF should be considered, especially in patients with limb-threatening infections.

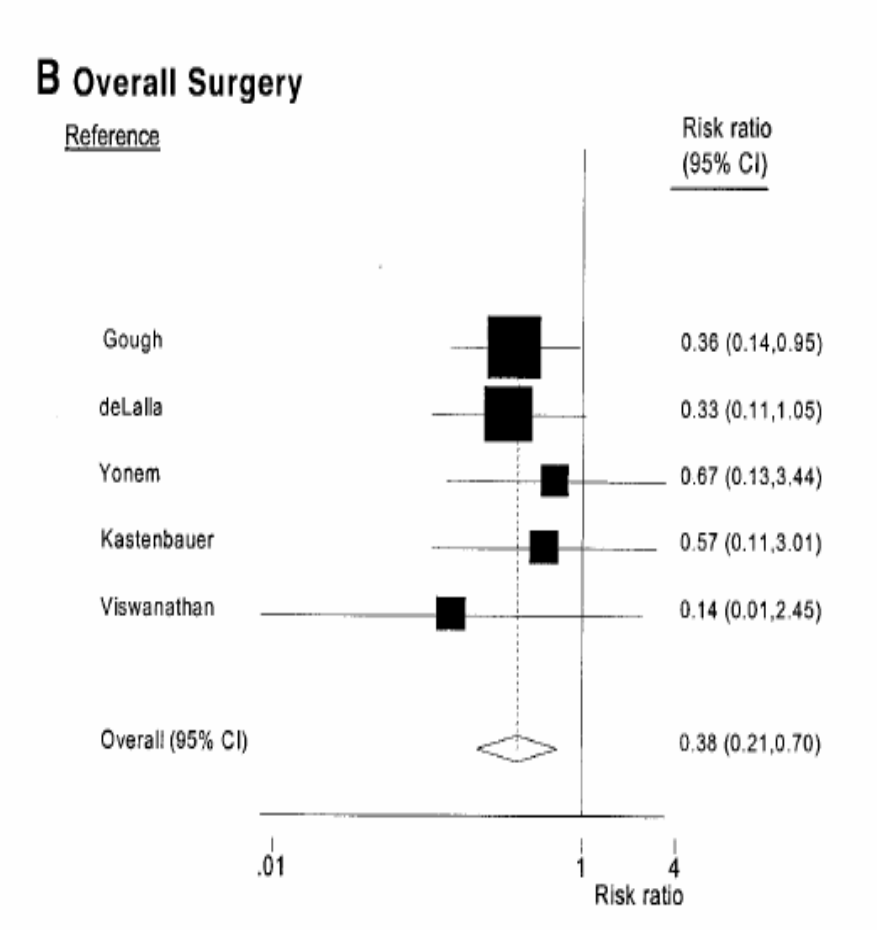
Diabetes Care 28:454–460, 2005

Diyabetik Ayak
CSF ile yapılan randomize çalışmalar

Reference [author (ref. no.), country]	Clinical presentation	Type of G-CSF therapy	Study design (randomized, plus)	Patients enrolled (*n*)	Main outcomes*	Comments
Gough (8), U.K.†‡	Extensive cellulitis	Filgrastim 5 μg/kg s.c. daily for 7 days	Double blind, placebo controlled	Screened 57, G 20, C 20	Inf: G 7, C 12, *P* = 0.02; Surg: G 0, C 4, *P* = NS; Hosp: G 10, C 18, *P* = 0.02	Other significantly improved outcomes with G-CSF§
de Lalla (35), Italy	Severe limb-threatening infection	Lenograstim 263 μg s.c. daily for 21 days	Evaluator blind, not placebo controlled	G 20, C 20	Inf: G 12, C 9, *P* = NS; Surg: G 3, C 9, *P* = 0.04	All had osteomyelitis. Similar rates of pathogen eradication
Yönem (36), Turkey	Pedal cellulitis or Wagner grade ≤2 lesion	Filgrastim 5 μg/kg s.c. daily for ≥3 days	Not blinded or placebo controlled	G 15, C 15	Inf: G 24, C 22, *P* = NS; Surg: G 2, C 3, *P* = NS; Hosp: G 27, C 28, *P* = NS	Duration of intravenous antibiotic NS
Kästenbauer (37), Austria†‡	Infected foot ulcer, Wagner grades 2–3	Filgrastim 5 μg/kg s.c. daily for 10 days	Patient blind, placebo controlled	Screened 73, G 20 (18), C 17 (16)¶	Inf: G 77%, C 66%, *P* = NS‖; Surg: G 1, C 1, *P* = NS	Number of vascular procedures and duration of intravenous antibiotics were similar.
Viswanathan (38), India‡	Extensive cellulitis, Wagner grades 2–3	Filgrastim 5 μg/kg i.v. daily for 7 days	Double blind, placebo controlled	G 10, C 10	Inf: G 9, C 3, *P* = NS#; Surg: G 0, C 3, *P* = NS; Hosp: G 7.4, C 8.8, *P* = 0.02	Most patients had peripheral vascular disease.

Diyabetik Ayak
CSF ile yapılan randomize çalışmalar





Cruciani M, Lipsky BA, Mengoli C, de Lalla F. Are Granulocyte Colony-Stimulating Factors Beneficial in Treating Diabetic Foot Infections? Diabetes Care 2005;28:454–60

Diyabetik Ayak
CSF ile yapılan randomize çalışmalar

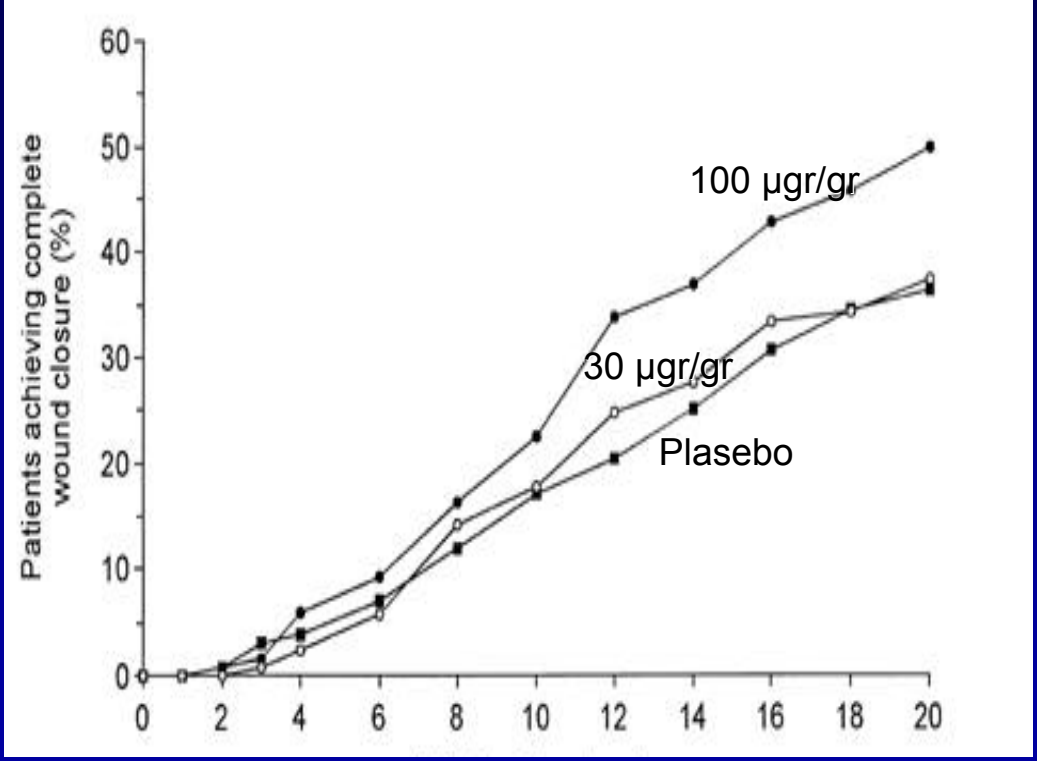
SONUÇ

1. Adjuvant G-CSF tedavisi diyabetik ayak ülser veya infeksiyonunda iyileşmeyi hızlandırmaz
2. Amputasyon veya diğer cerrahi girişim oranını azaltır
3. Ancak yaşamı tehdit eden enfeksiyonlarda kullanılabilir

Cruciani M, Lipsky BA, Mengoli C, de Lalla F. Are Granulocyte Colony-Stimulating Factors Beneficial in Treating Diabetic Foot Infections? Diabetes Care 2005;28:454–60

Diyabetik Ayak ve PDGF

- Jel formunda (Becaplermin)
- FDA onaylı
- 30 ve 100 µgr/gr
- Yara iyileşmesi üzerine olumlu etki
  - %35 karşılık %50



Margolis DJ, et al. Effectiveness of recombinant human platelet-derived growth factor for the treatment of diabetic neuropathic foot ulcers. Wound Repair Regen 2005;13:531-36.

Diyabetik Ayak ve Tinospora Cordofolia

- Sarmaşıktan elde edilen pürifiye ve standardize akuoz ektrakt
- Nötrofili
- Nötrofil-makrofajlarda fagositik, killing
- GM-CSF aktivitesini artırma

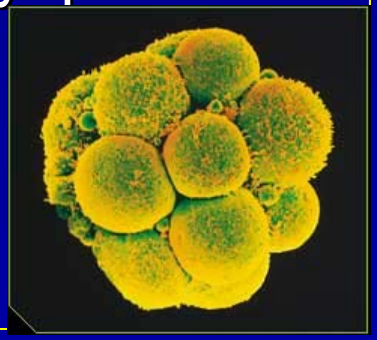
- 45 hastalık çalışma
- 4 cm'den büyük olan diyabetik ülserli hastalar
- Tinospora Cordofolia suspansiyonu oluşumu
- Yara üzerine topikal uygulama
- 4. ayda yara iyileşmesinde belirgin düzelme (%73 karşı 19)

Purandare H, Supe A. Immunmodulatory role of tinospora cordifolia as an surgical treatment of diabetic foot ulcers: A prospective randomized controlled study. Indian J Med Sci 2007;61:347-55.

Diyabetik ayak ve hemopoietik kök hücre

Kök hücre özellikleri

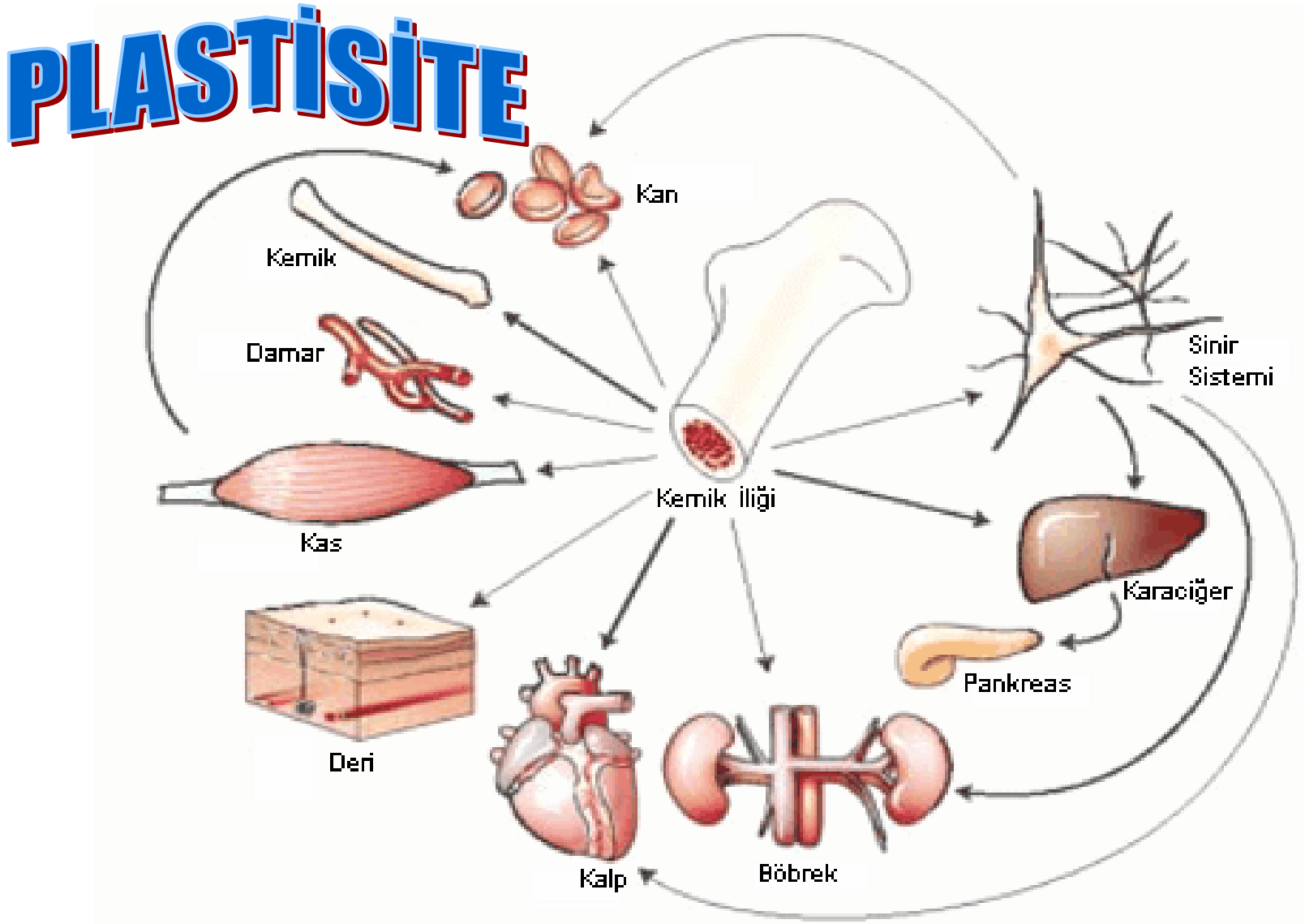
- Kendini yenileme yeteneği
- Farklılaşarak yeni hücre oluşturma
- Yamalanma
- Tek seride yapılanma (klon)



Bulunduğu yerler

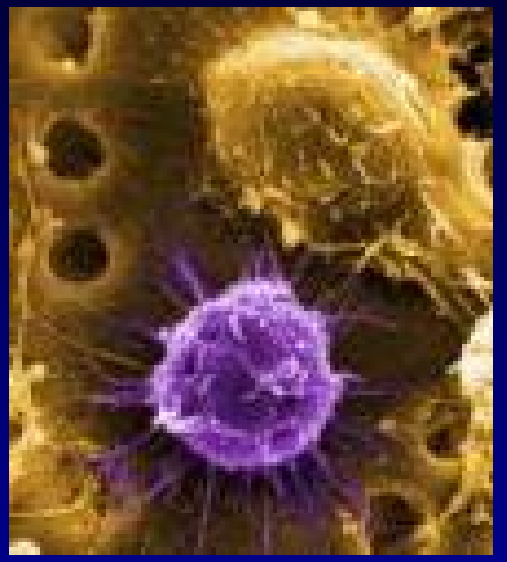
- Kemik iliği
- Dolaşımdaki kan
- Göz tabakaları (kornea, retina)
- Beyin
- Çizgili kas
- Diş pulpa tabakası
- Deri
- Mide-barsak sistem, karaciğer, pankreas ….

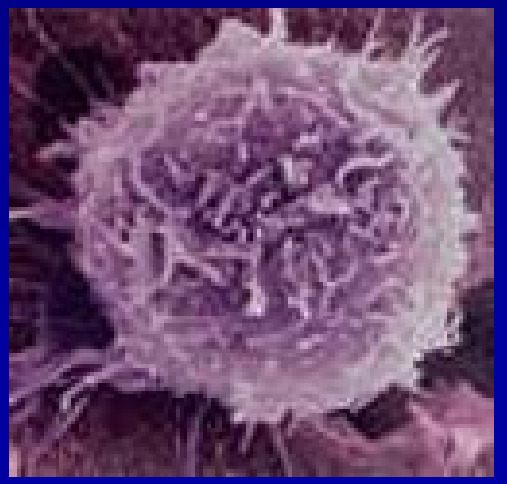
Diyabetik ayak ve hemopoietik kök hücre



Diyabetik ayak ve hemopoietik kök hücre

- Angiogenezin yüksek olduğu alanlarda
  - FGF, VEGF, IL-1, TNF yüksek oranda bulunur
- Kök hücre anjiojenik sitokinleri salgılama yeteneğine sahiptir
- Kök hücreler iskemi alanında kapiller yoğunluğu artırma özelliğindedir

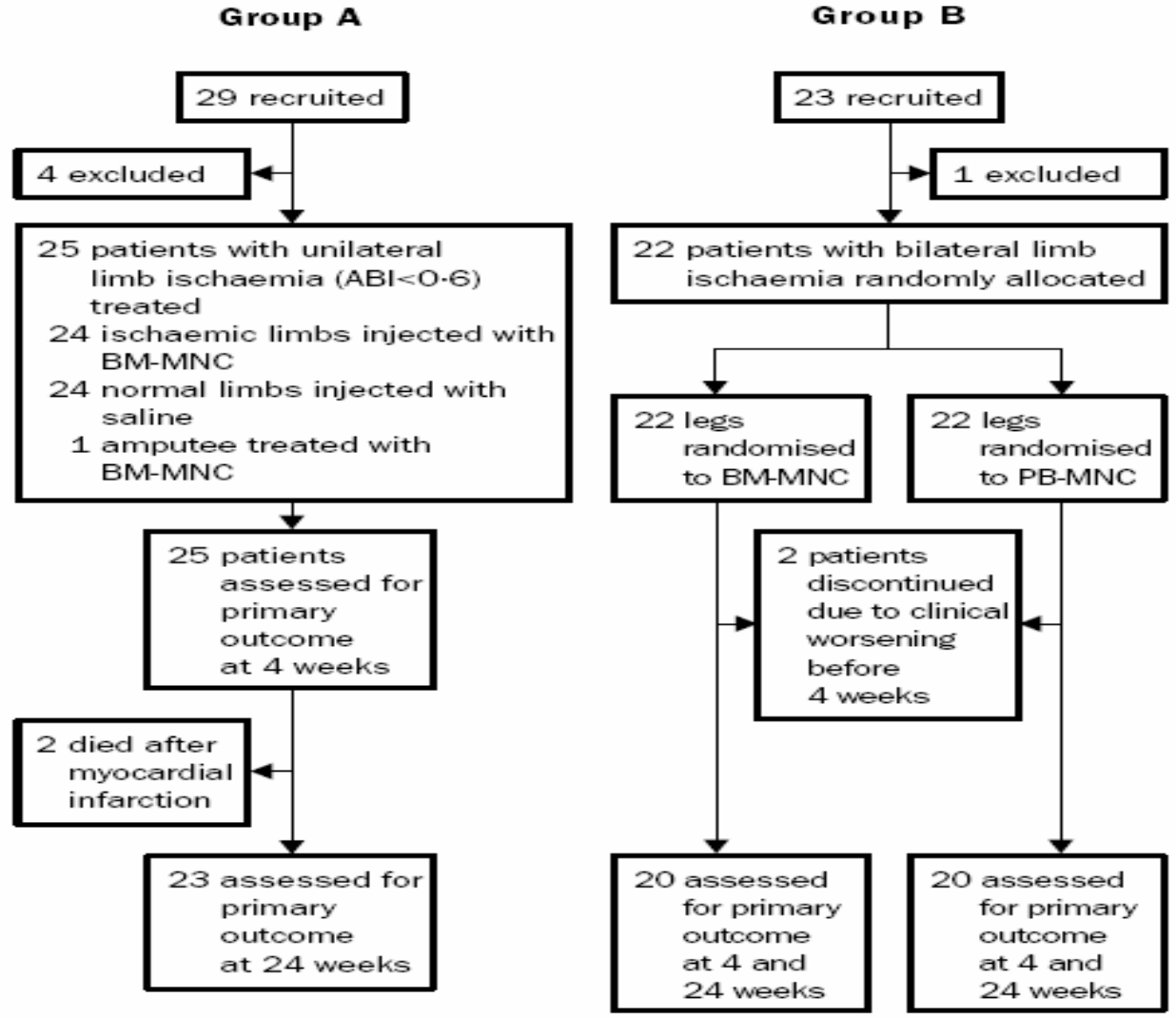




Kalka C, et al. Transplantation of ex vivo expanded endothelial progenitor cells for therapeutic neovascularization. Proc Natl Acad Sci USA 2000; 97: 3422-27.

Diyabetik ayak ve hemopoietik kök hücre transplantasyonu

İlk çalışma Yuyama ve arkadaşları Lancet 2002; 360: 427



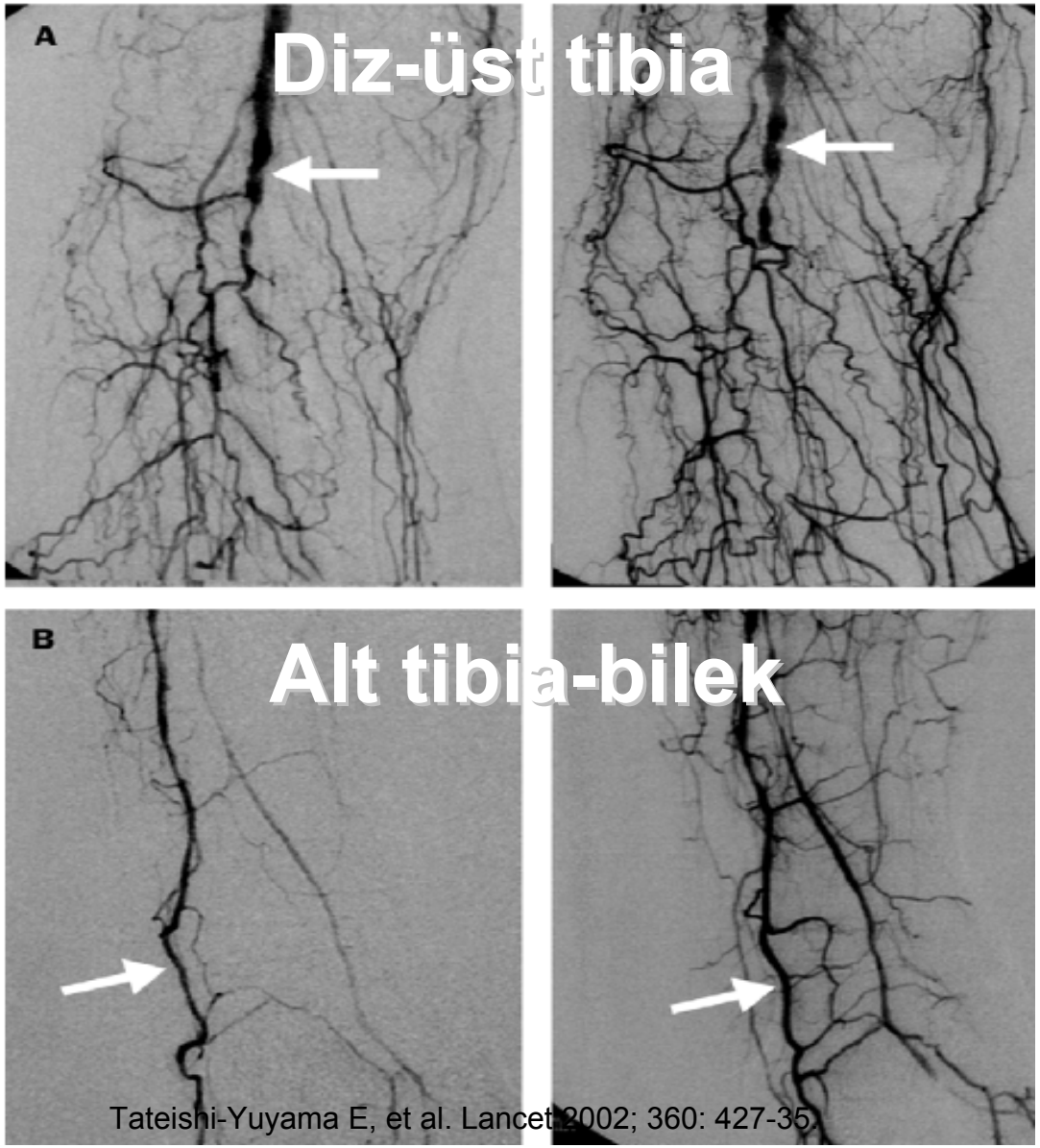
Diyabetik ayak ve hemopoietik kök hücre transplantasyonu

	All patients (n=45)	Group A (n=25)	Group B (n=20)
Age (years, mean [SD])	66 (12)	67 (13)	69 (11)
Sex			
Male	38 (84%)	20 (80%)	18 (90%)
Female	7 (16%)	5 (20%)	2 (10%)
Previous treatment			
PTA	5 (11%)	3 (12%)	2 (10%)
Bypass graft	24 (53%)	13 (52%)	11 (55%)
PTA and bypass graft	8 (18%)	4 (16%)	4 (20%)
Ischaemic status			
Non-healing ulcer	10 (22%)	6 (24%)	4 (20%)
Gangrene	18 (40%)	8 (32%)	10 (50%)
Disorders			
Hypertension	32 (71%)	18 (72%)	14 (70%)
Hyperlipidaemia	19 (42%)	8 (32%)	11 (55%)
Diabetes	31 (69%)	18 (72%)	13 (65%)
Chronic renal failure	5 (11%)	5 (20%)	0
ABI (mean [SD])			
BM-MNC implanted limb	0·35 (0·14)	0·34 (0·16)	0·37 (0·12)
PB-MNC or saline implanted limb	0·61 (0·19)	0·71 (0·08)	0·40 (0·11)
TcO_2 (mm Hg, mean [SD])			
BM-MNC implanted limb	28 (10)	28 (11)	29 (9)
PB-MNC or saline implanted limb	44 (12)	56 (9)	31 (9)
Pain-free walking time (min, mean [SD])	1·3 (0·5)	1·6 (0·8)	0·8 (0·3)
Implanted cell number (mean [SD])			
BM-MNC (10^9 cells)	1·6 (0·6)	1·6 (0·6)	1·5 (0·6)
CD34 in BM-MNC (10^7 cells)	3·7 (1·8)	3·9 (2·2)	3·5 (1·3)
PB-MNC (10^9 cells)	0·003 (0·001)	0·003 (0·001)	1·5 (0·6)

Tateishi-Yuyama E, et al. Lancet 2002; 360: 427-35.

Diyabetik ayak ve hemopoietik kök hücre transplantasyonu

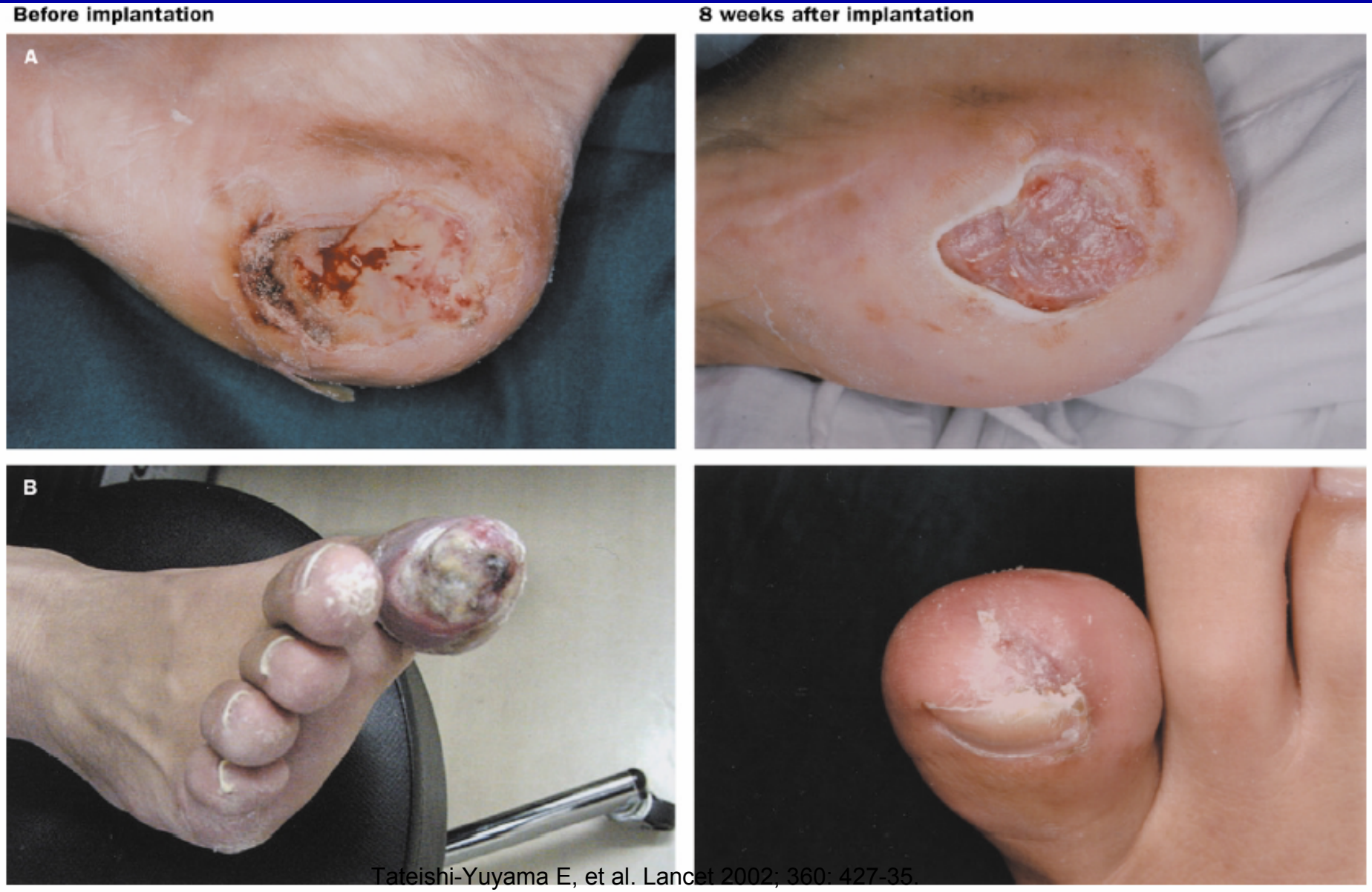
Tedavi Öncesi



Tedavi 24 hafta sonrası

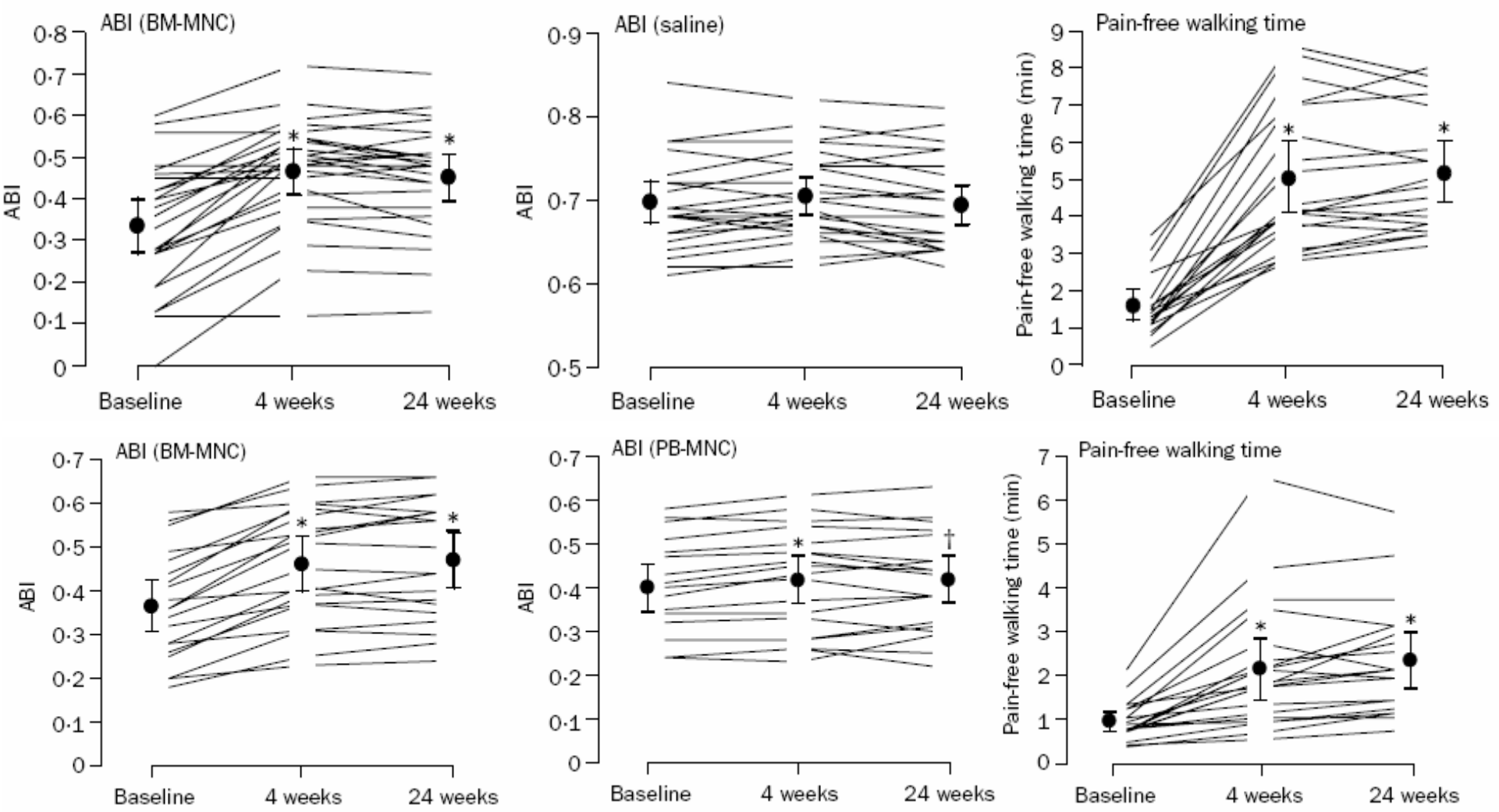
Tateishi-Yuyama E, et al. Lancet 2002; 360: 427-35

Diyabetik ayak ve hemopoietik kök hücre transplantasyonu



Tateishi-Yuyama E, et al. Lancet 2002; 360: 427-35.

Diyabetik ayak ve hemopoietik kök hücre transplantasyonu



Tateishi-Yuyama E, et al. Lancet 2002; 360: 427-35.

Autologous Transplantation of Granulocyte Colony–Stimulating Factor–Mobilized Peripheral Blood Mononuclear Cells Improves Critical Limb Ischemia in Diabetes

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SHANGZHU LI, MSPH[1]
MINGZHE HAN, PHD[1]
ZHIJIAN XIAO, MD[1]
RENCHI YANG, MD[1]
ZHONG CHAO HAN, PHD, MD[1,2]

Diabetes Care 28:2155–2160, 2005

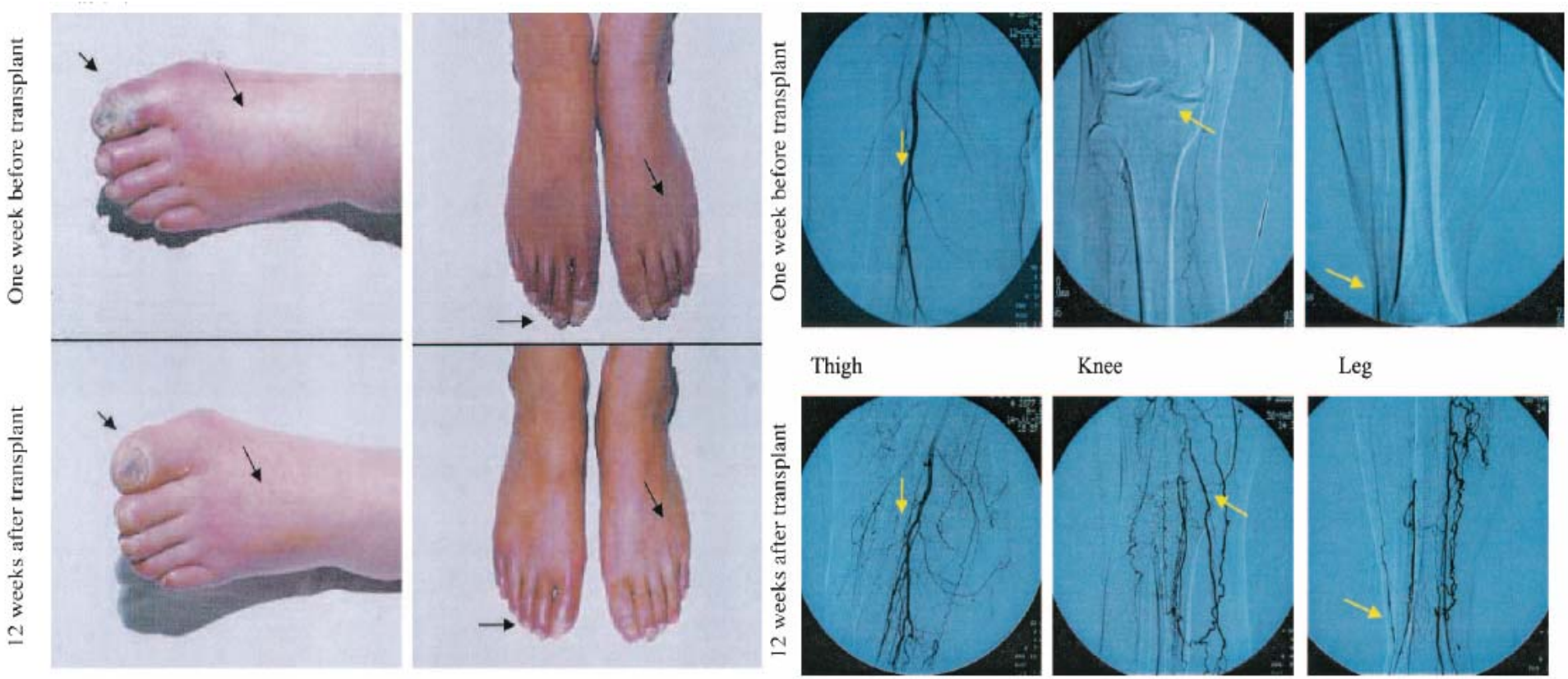
OBJECTIVE — To assess the application of autologous transplantation of granulocyte colony–stimulating factor (G-CSF)–mobilized peripheral blood mononuclear cells (PBMNCs) in the treatment of critical limb ischemia (CLI) of diabetic patients and to evaluate the safety, efficacy, and feasibility of this novel therapeutic approach.

RESEARCH DESIGN AND METHODS — Twenty-eight diabetic patients with CLI were enrolled and randomized to either the transplant group or the control group. In the transplant group, the patients received subcutaneous injections of recombinant human G-CSF (600 μg/day) for 5 days to mobilize stem/progenitor cells, and their PBMNCs were collected and transplanted by multiple intramuscular injections into ischemic limbs. All of the patients were followed up after at least 3 months.

RESULTS — At the end of the 3-month follow-up, the main manifestations, including lower limb pain and ulcers, were significantly improved in the patients of the transplant group. Their laser Doppler blood perfusion of lower limbs increased from 0.44 ± 0.11 to 0.57 ± 0.14 perfusion units ($P < 0.001$). Mean ankle-brachial pressure index increased from 0.50 ± 0.21 to 0.63 ± 0.25 ($P < 0.001$). A total of 14 of 18 limb ulcers (77.8%) of transplanted patients were completely healed after cell transplantation, whereas only 38.9% of limb ulcers (7 of 18) were healed in the control patients ($P = 0.016$ vs. the transplant group). No adverse effects specifically due to cell transplantation were observed, and no lower limb amputation occurred in the transplanted patients. In contrast, five control patients had to receive a lower limb amputation ($P = 0.007$, transplant vs. control group). Angiographic scores were significantly improved in the transplant group when compared with the control group ($P = 0.003$).

CONCLUSIONS — These results provide pilot evidence indicating that the autologous transplantation of G-CSF–mobilized PBMNCs represents a simple, safe, effective, and novel therapeutic approach for diabetic CLI.

Diyabetik ayak ve hemopoietik kök hücre transplantasyonu

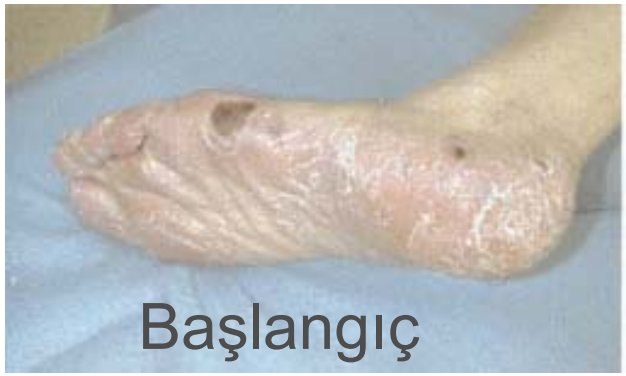


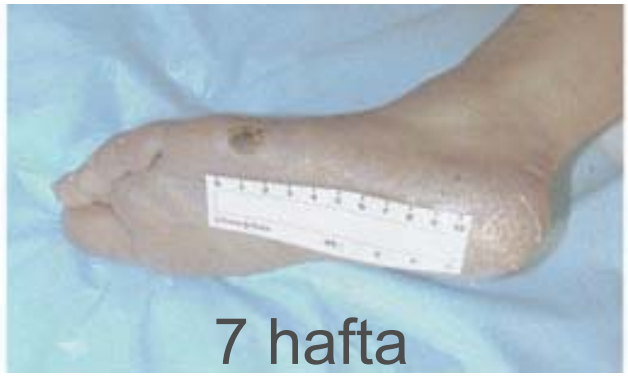
Huang P, Li S, Han M, Xiao Z, Yang R, Han ZC. Autologous Transplantation of Granulocyte Colony–Stimulating Factor-Mobilized Peripheral Blood Mononuclear Cells Improves Critical Limb Ischemia in Diyabetes. Diabetes Care 2005;28:2155–60.

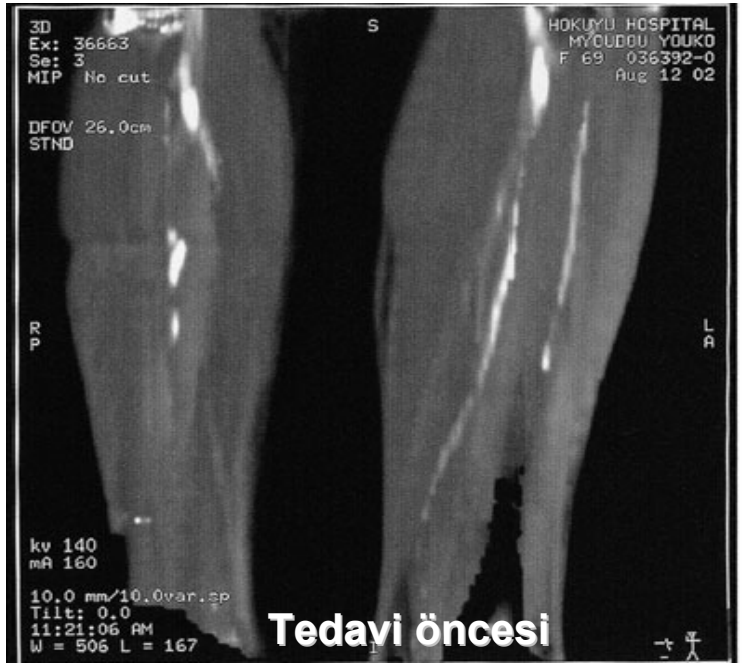
Prevention of Limb Amputation in Patients with Limbs Ulcers by Autologous Peripheral Blood Mononuclear Cell Implantation

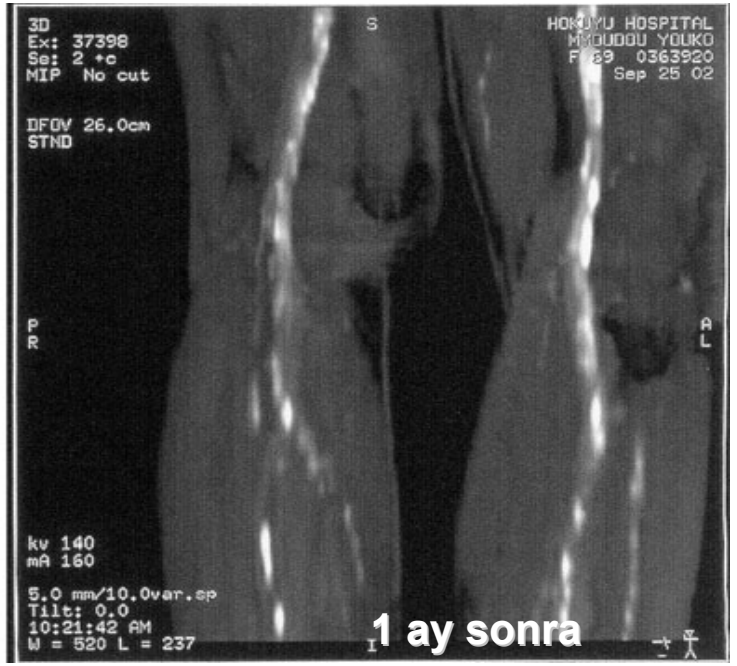
Akio Kawamura, Takashi Horie, Ichirou Tsuda, Atushi Ikeda, Hirotoshi Egawa, Emi Imamura, Jun-ichi Iida, Hiromi Sakata, Tohru Tamaki, Kazutaka Kukita, Jun-ichi Meguro, Motoki Yonekawa, and Masaharu Kasai

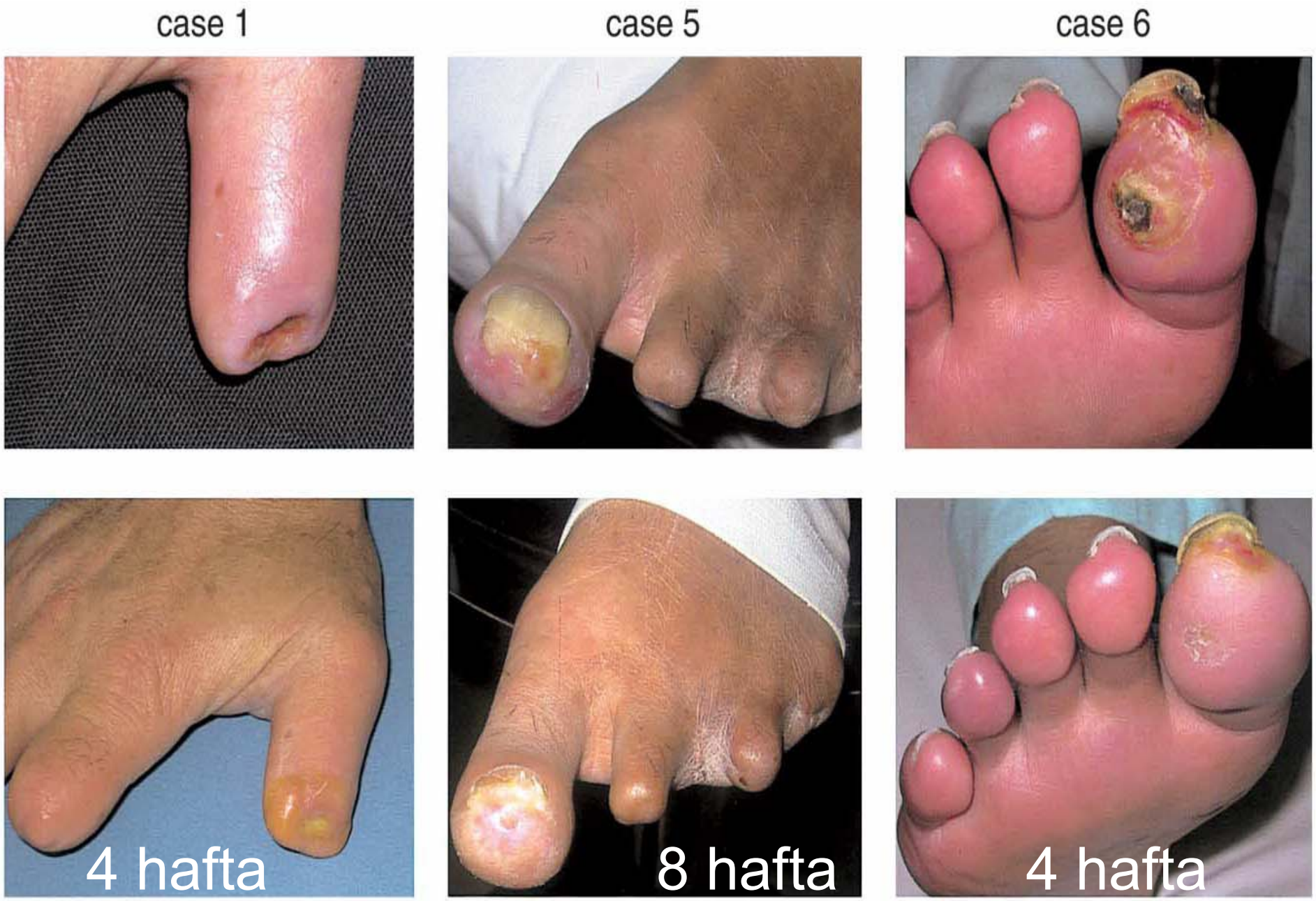
Therop Apher &Dialysis 2005;9:51











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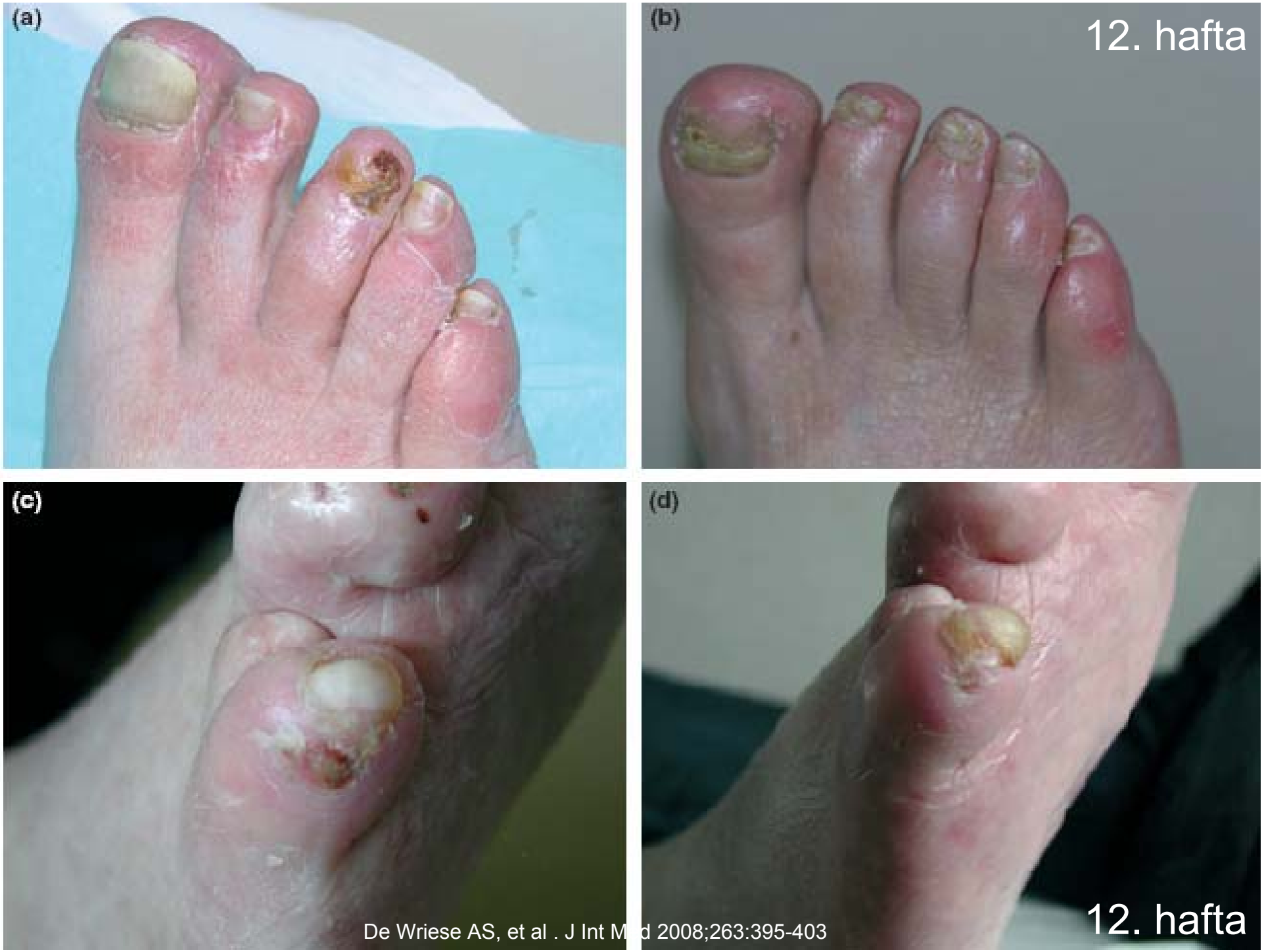

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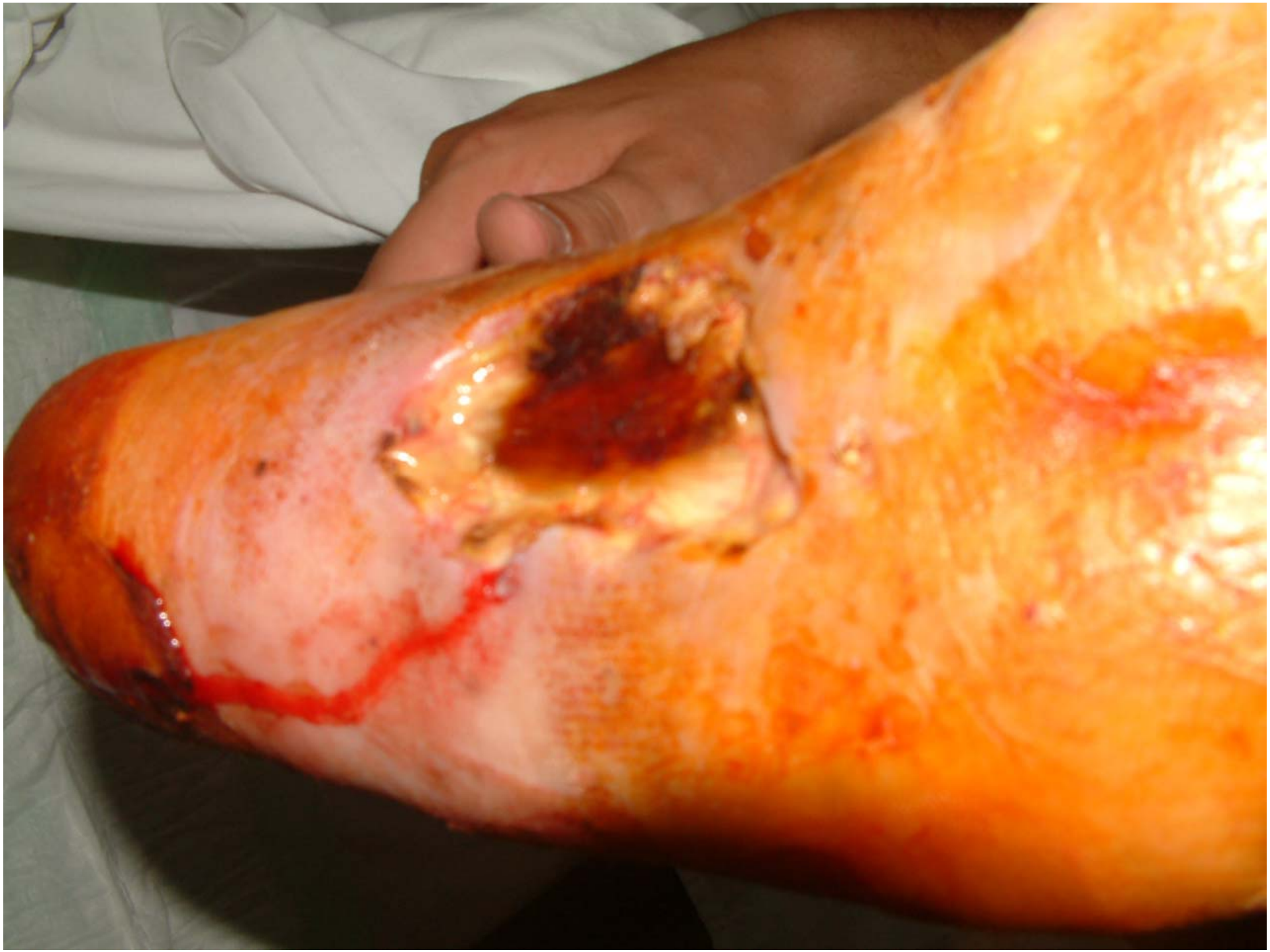
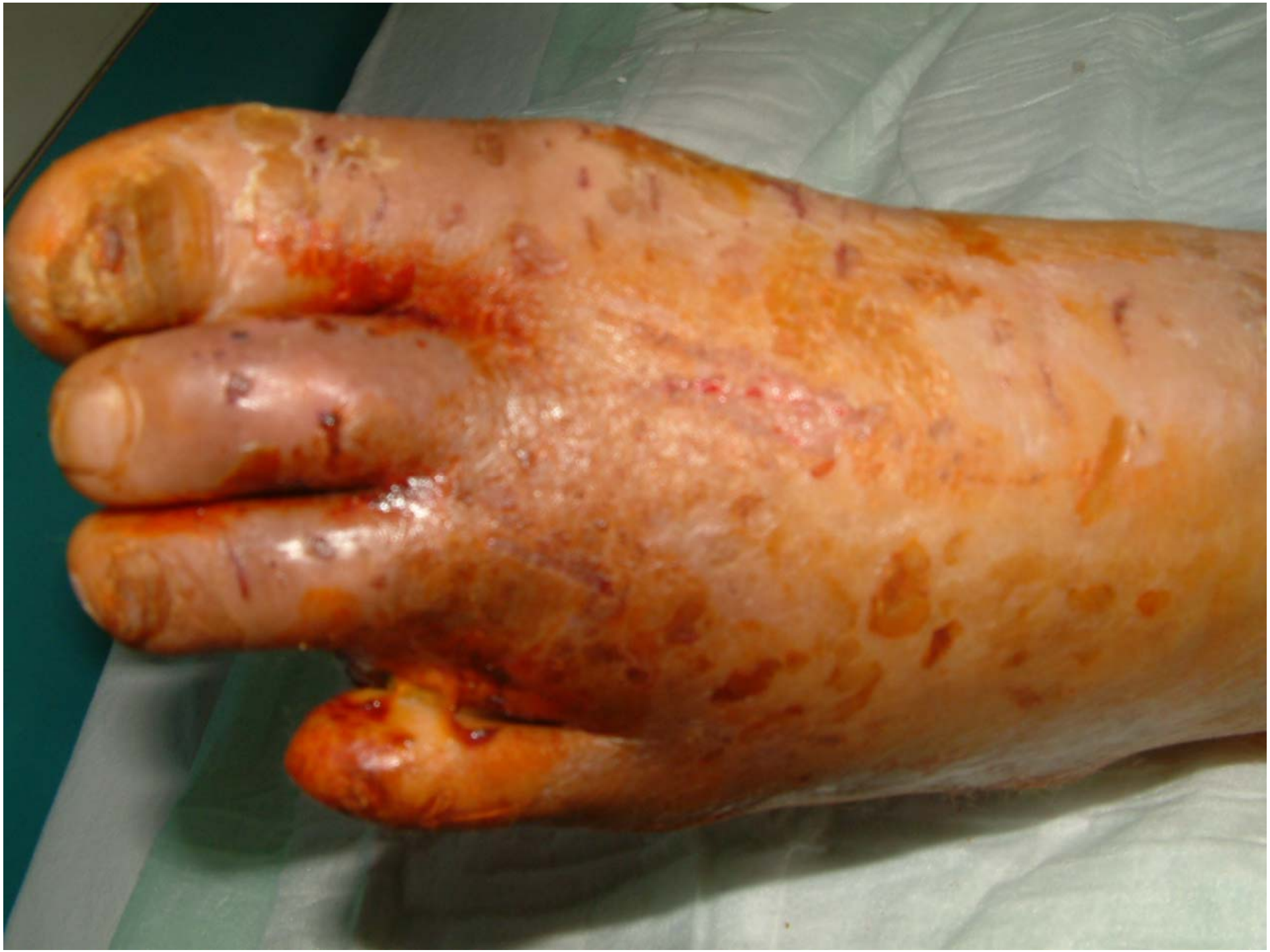
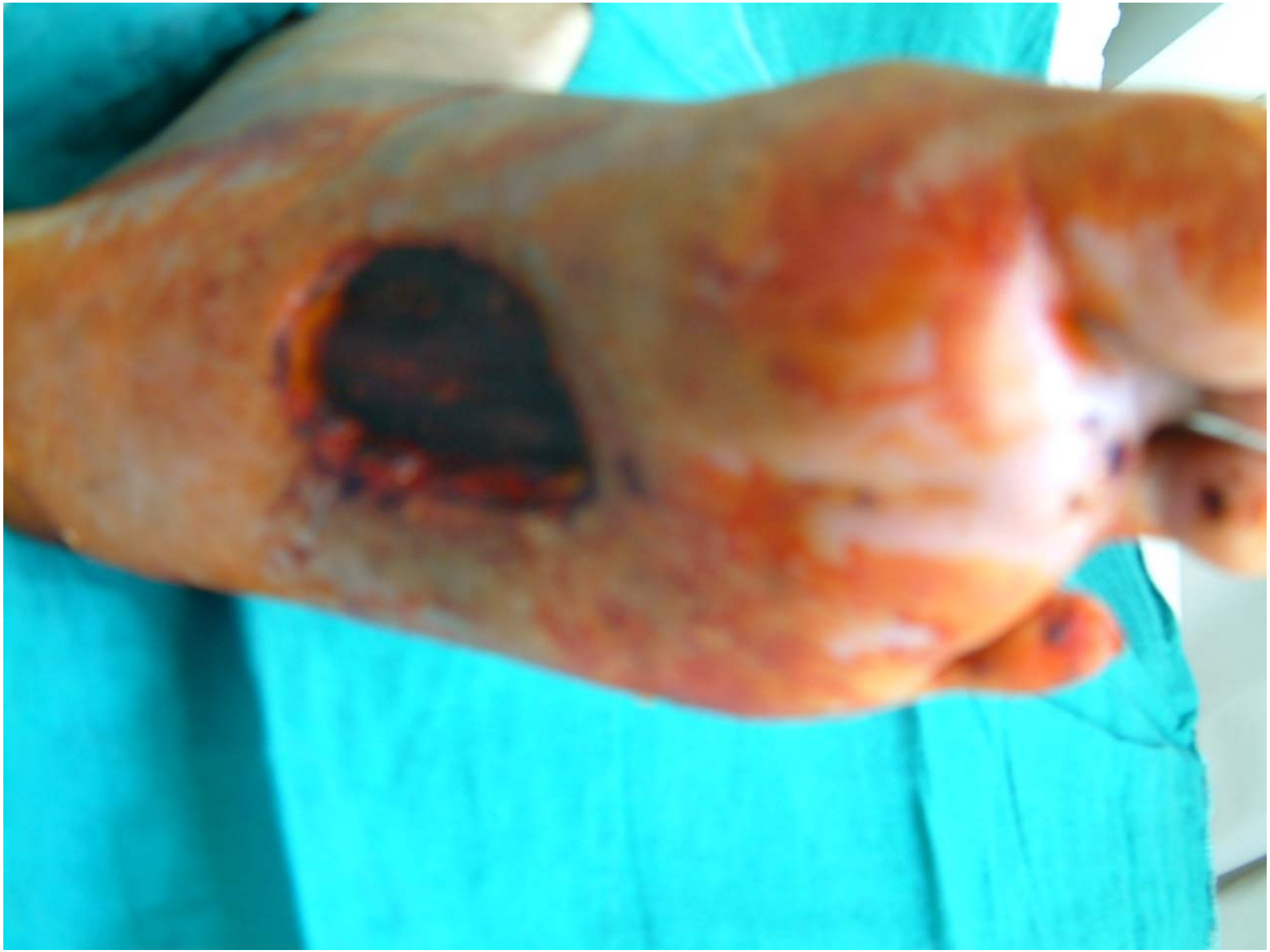
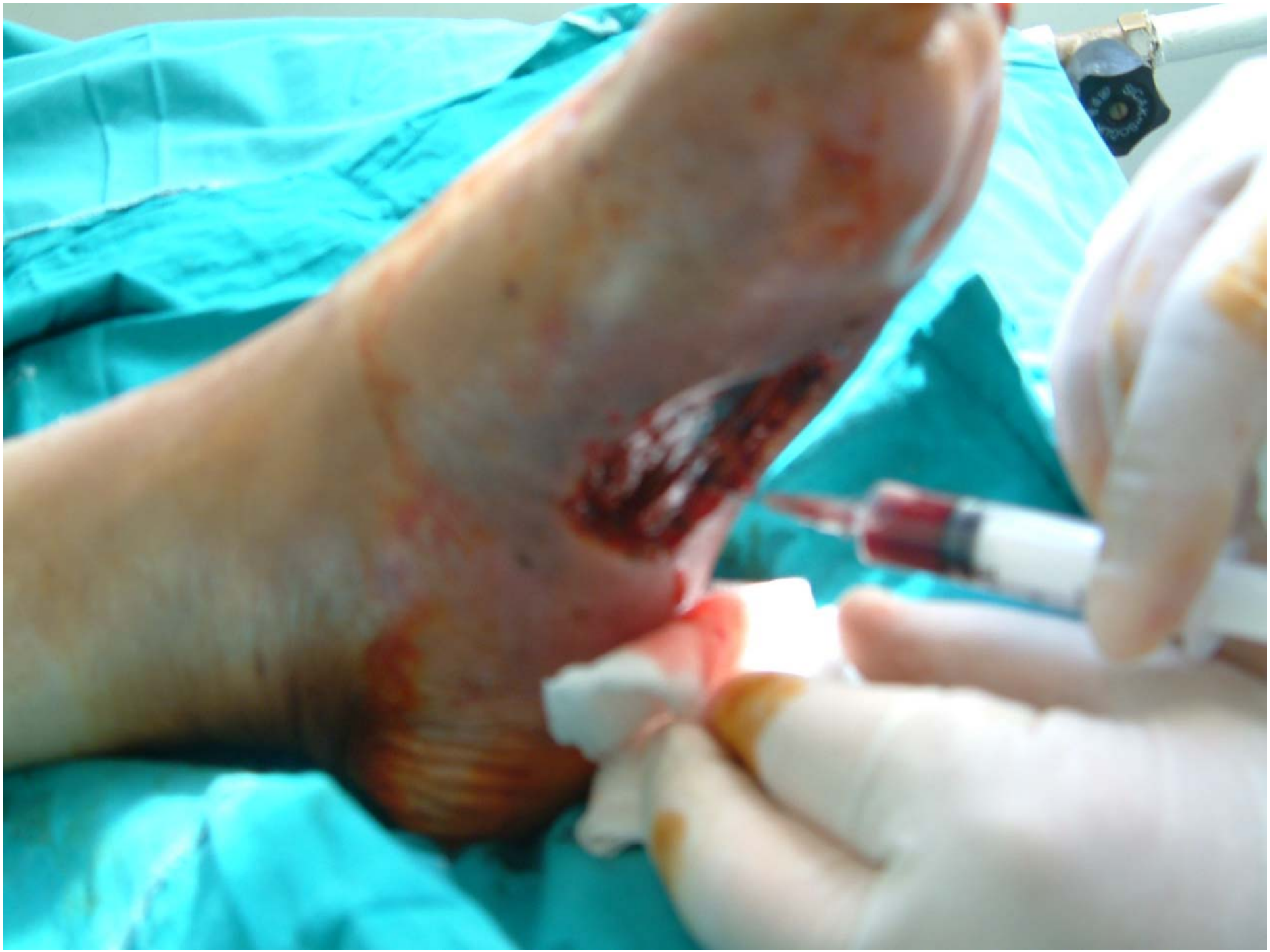
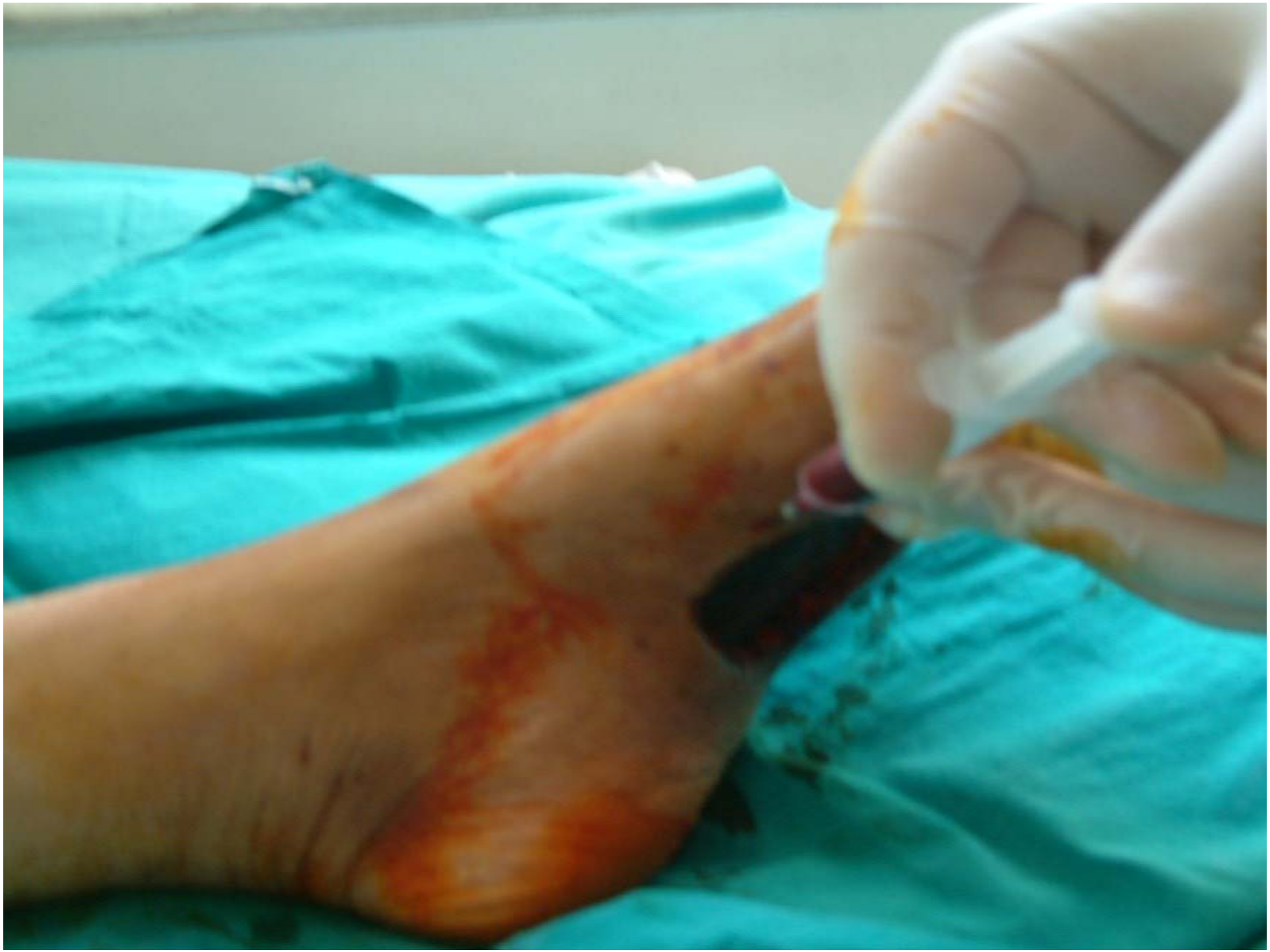
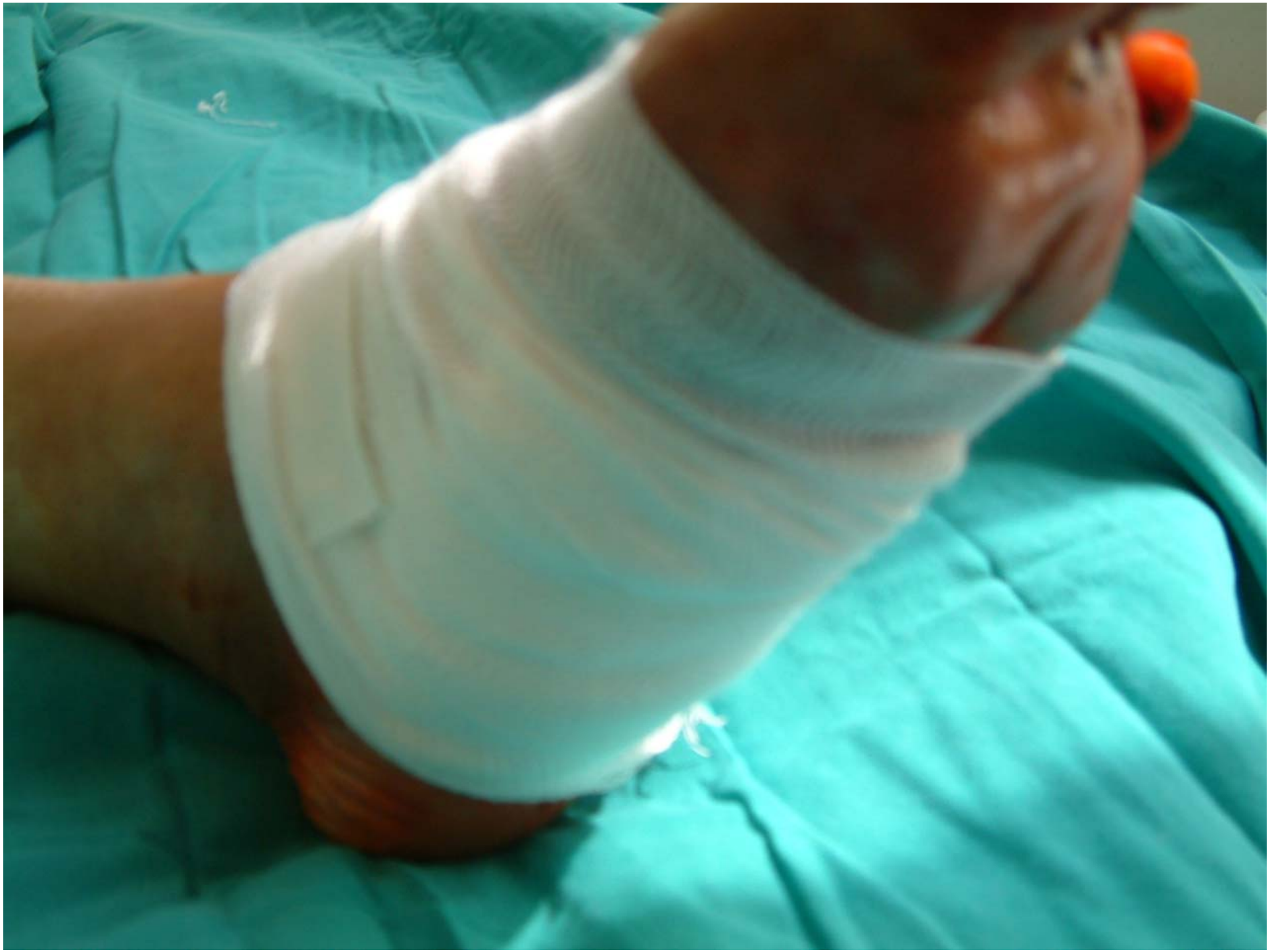


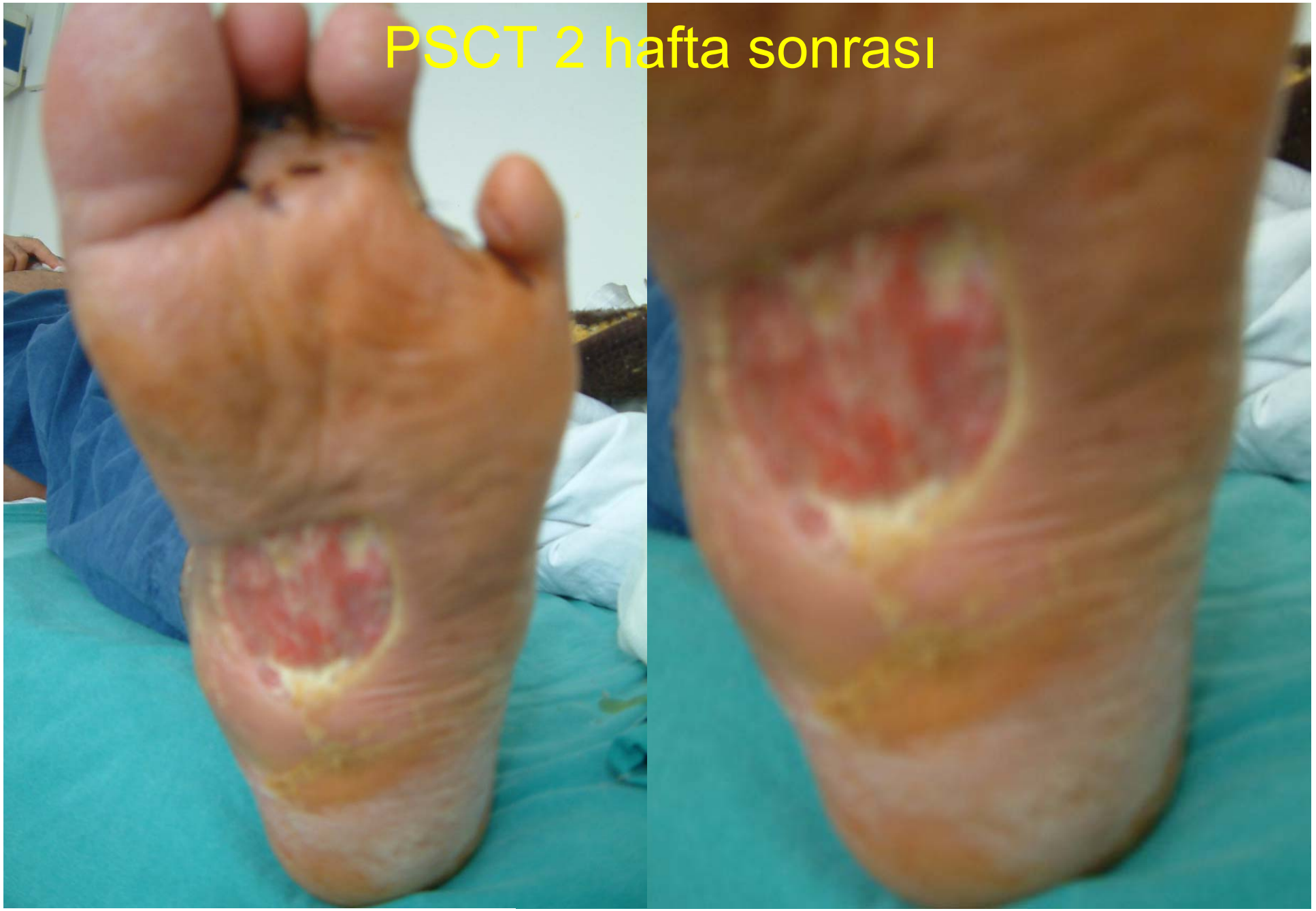


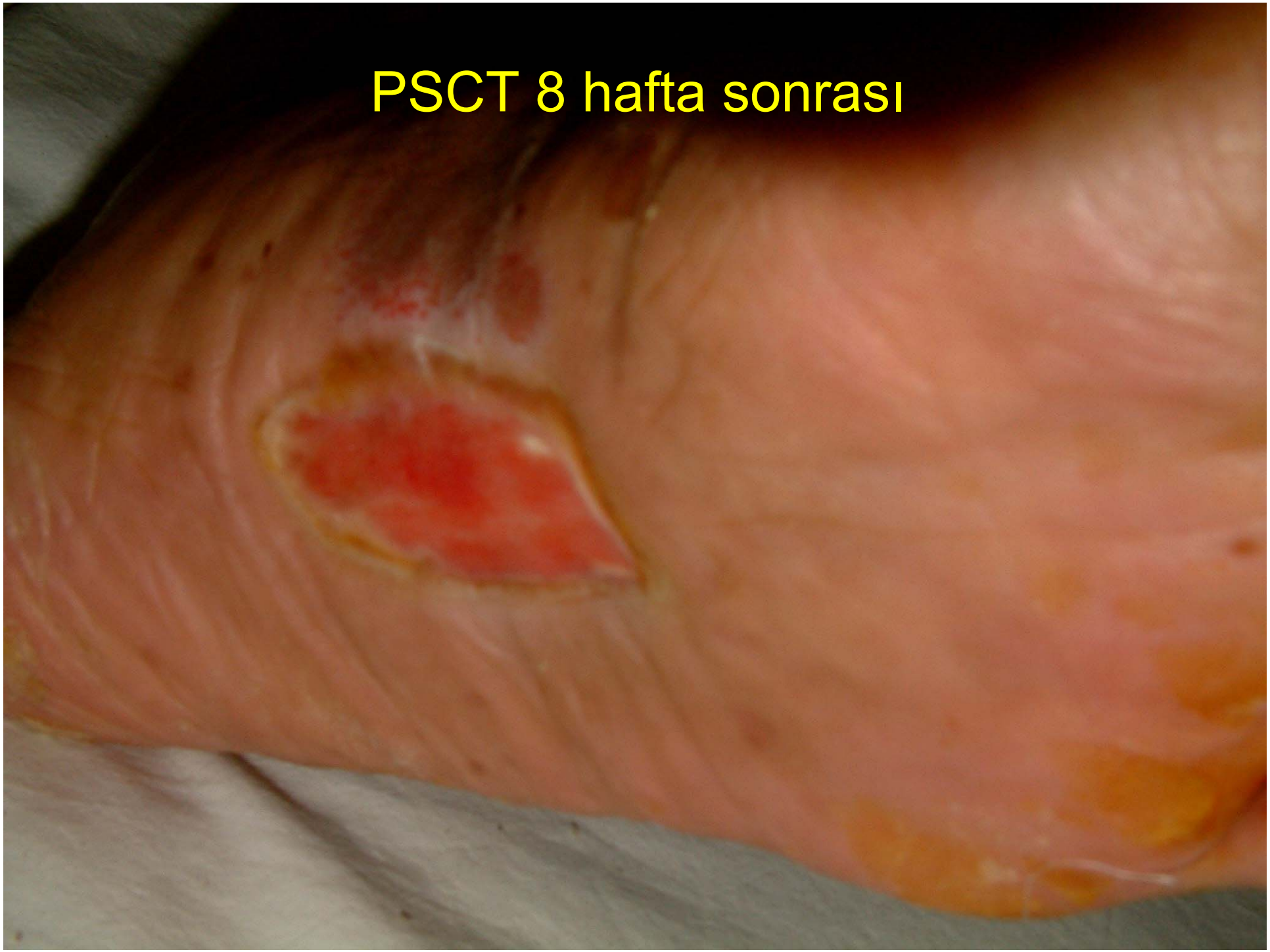


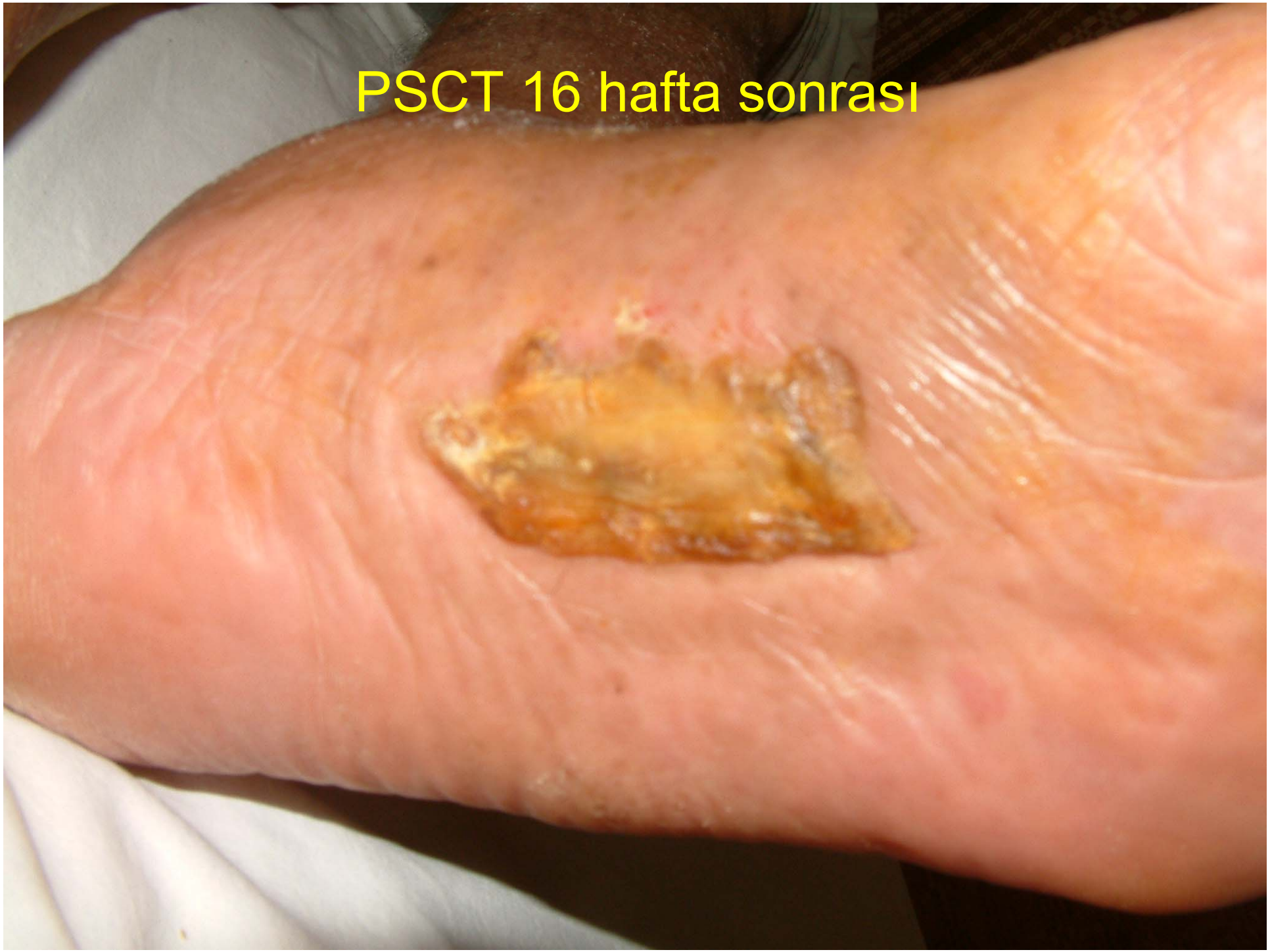







PSCT 2 hafta sonrası


PSCT 8 hafta sonrası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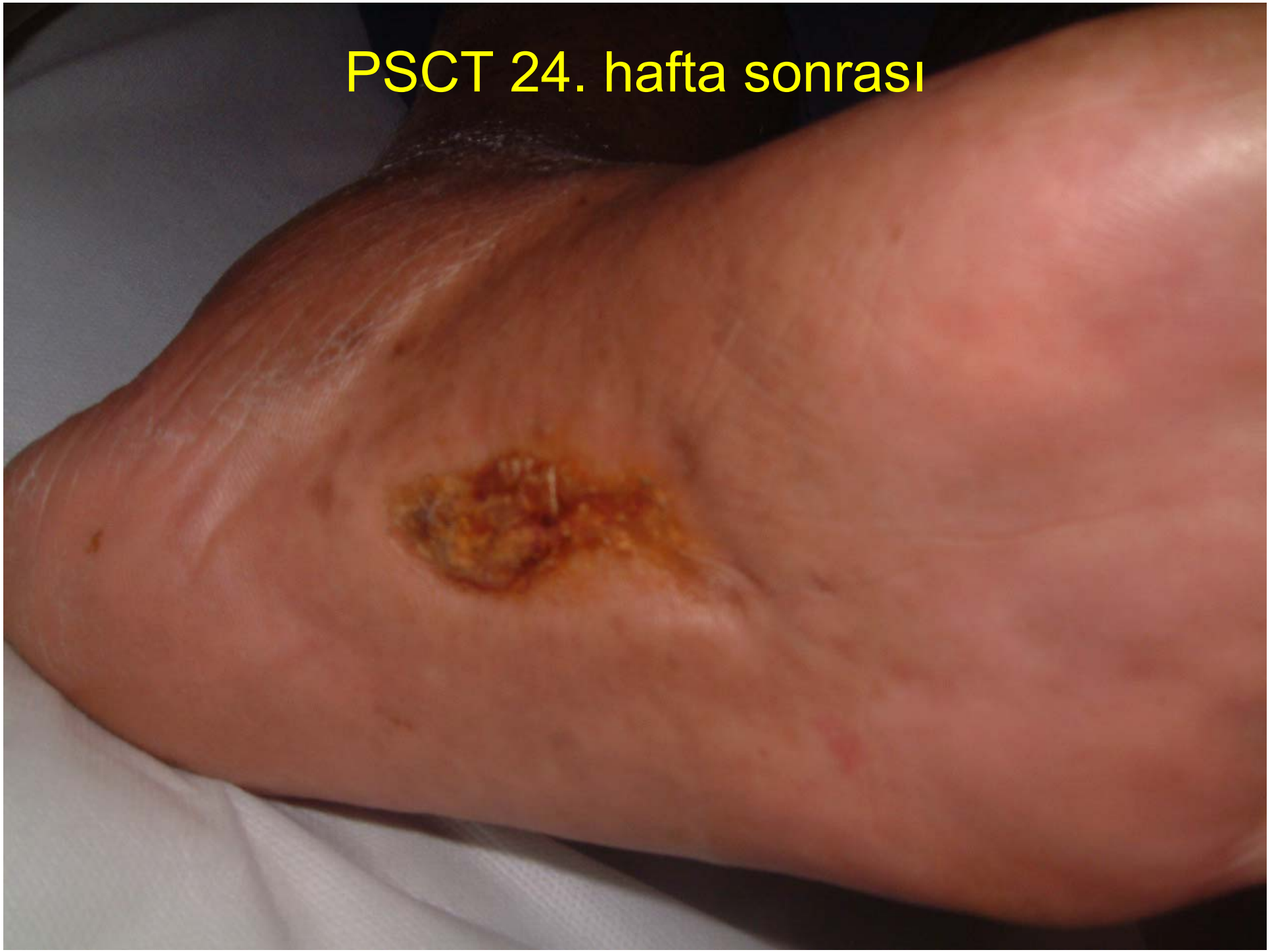
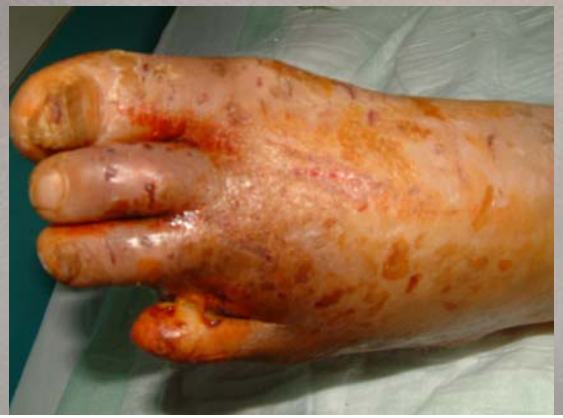
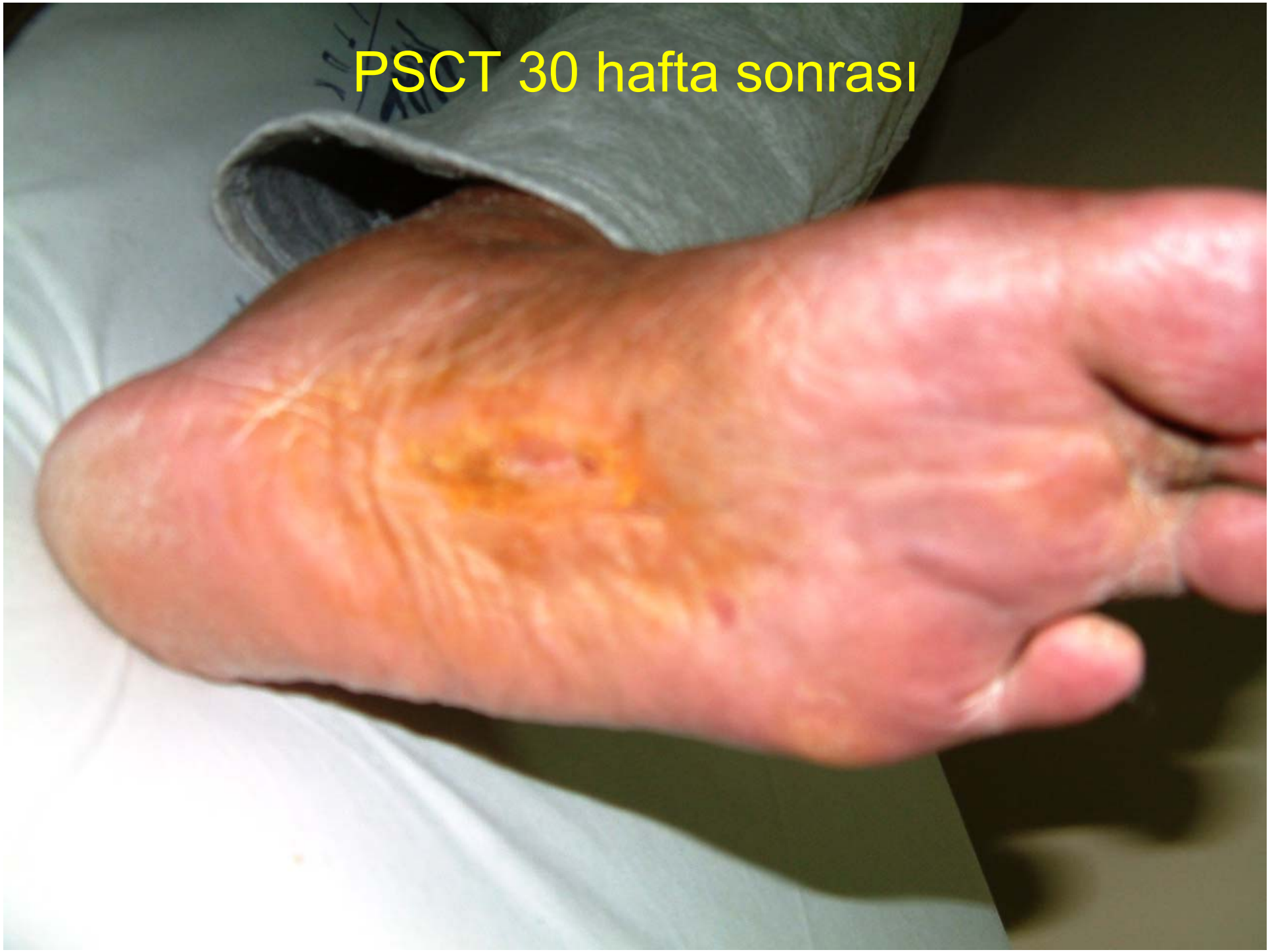
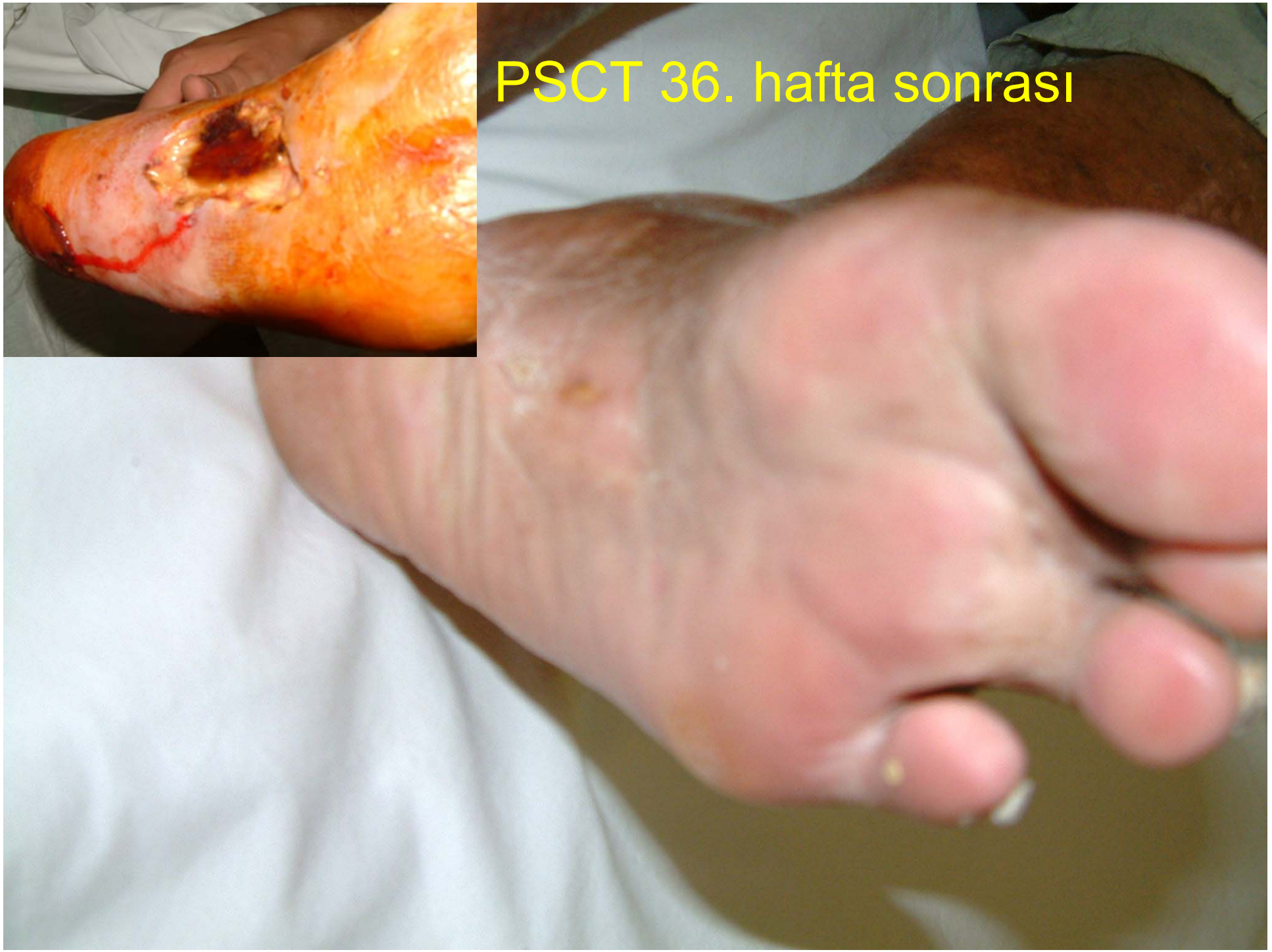

PSCT 24. hafta sonrası

PSCT 24. hafta sonrası



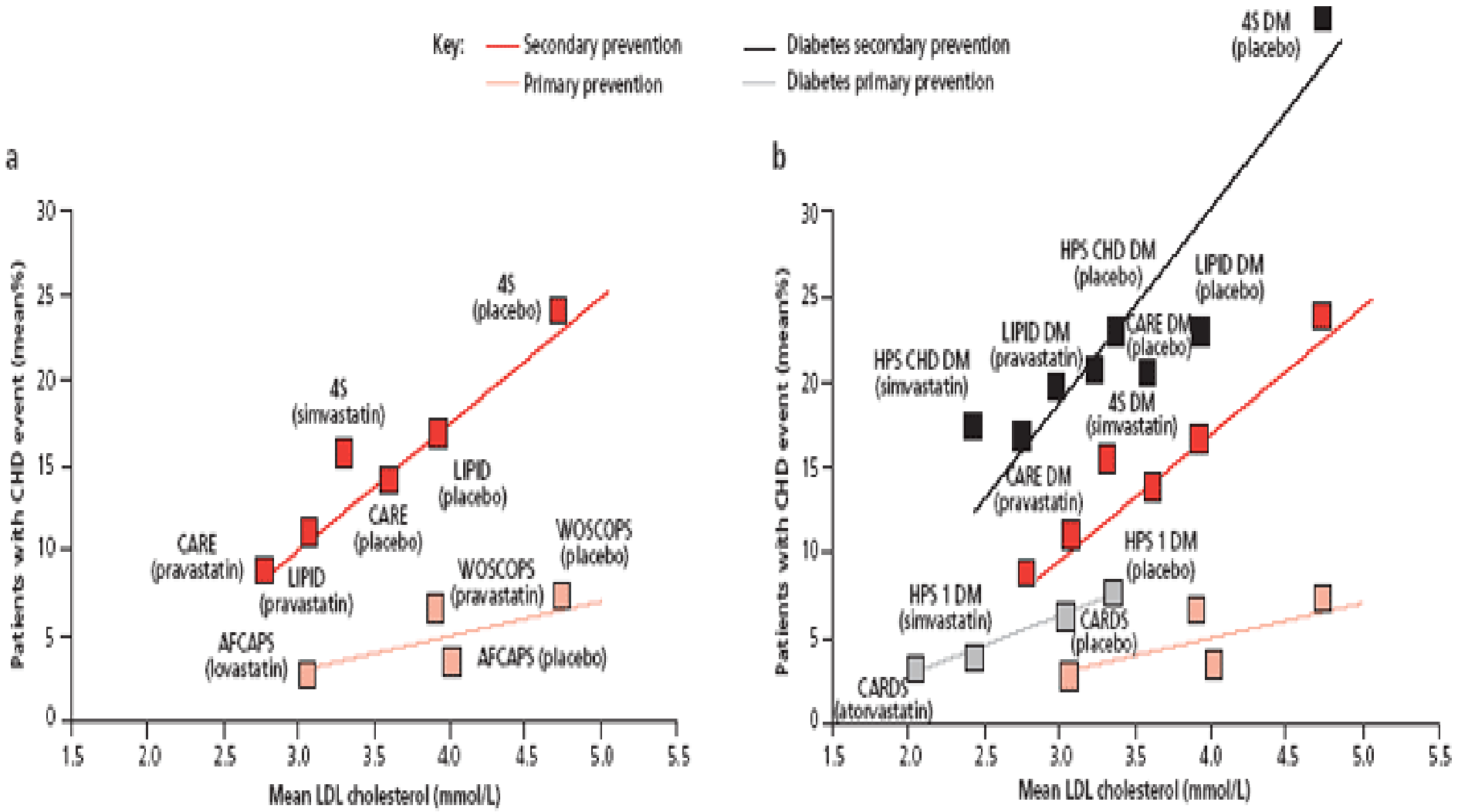

PSCT 30 hafta sonrası


PSCT 36. hafta sonrası

Diyabetik vasküler patoloji-ülserlerin tedavisinde statin kullanılımı

- Antihiperlipidemik ilaç
- Endotelial disfonksiyonları düzeltir
- Oksidatif stresi azaltır
- inflamatuar yanıtı inhibe etme
- Aterosklerotik plakların regresyonu ve stabilizasyonunu sağlama

Grobbee DE, Bots ML. Atherosclerotic disease regression with statins: studies using vascular markers. Int J Cardiol 2004;96:447-59.



Key: CHD = coronary heart disease; LDL = low-density lipoprotein; AFCAPS = Airforce Coronary Atherosclerosis Prevention Study; CARDS = Collaborative AtoRvastatin Diabetes Study; CARE = Cholesterol and Recurrent Events; HPS 1 DM = Heart Protection Study primary prevention diabetes subjects; HPS CHD DM = Heart Protection Study diabetes subjects with CHD; LIPID = Long-term Intervention with Pravastatin in Ischaemic Disease; WOSCOPS = West of Scotland Coronary Prevention Study; 4S = Scandinavian Simvastatin Survival Study

Incidence of and Factors Associated with Achieving Target Lipid Levels in Patients with Peripheral Arterial Disease

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BACKGROUND: Patients with peripheral arterial disease (PAD) have increased mortality compared with patients without PAD. Coronary artery disease (CAD) accounts for almost 75% of deaths in PAD patients. Studies suggest that PAD is underdiagnosed and atherosclerotic risk factors undertreated when compared with CAD.

OBJECTIVE: To determine whether cholesterol guidelines are being met in patients with PAD and to determine whether any independent factors increase the likelihood of reaching goal low-density lipoprotein (LDL).

DESIGN: A retrospective chart review of subjects diagnosed with PAD in 2001 at 2 Veterans Affairs Medical Centers.

MEASUREMENTS: Univariate analysis compares baseline characteristics between those reaching goal and those who do not. Multivariate logistic regression analysis identified predictors of meeting LDL goal among PAD patients.

RESULTS: Of 315 patients, 62% reached goal LDL. Those more likely to reach goal were older, had hypertension, and a history of CAD and stroke. Positive predictors of LDL goal were age and CAD, while smoking was a negative predictor.

CONCLUSION: The majority of veterans with PAD received lipid-lowering medication and achieve goal LDL, but they are more likely to do so if they are older than 70 and have a history of CAD.

Should All Diabetic Patients Receive a Statin? Results From Recent Trials

Gillian Marshall; Claire McDougall; Adrian JB Brady; Miles Fisher

Br J Cardiol. 2004; 11 : 455-460.

Abstract

Diabetes is associated with the development of premature cardiovascular disease. In the three early trials of statin therapy for patients with established coronary heart disease there were many patients with diabetes; subgroup analysis has confirmed the benefits of cholesterol lowering with statin therapy in these patients. In the two early primary prevention trials, however, there were few patients with diabetes and so, initially, there was little evidence supporting the use of statins in diabetic patients without cardiovascular disease. The Heart Protection Study (HPS) and Collaborative AtoRvastatin Diabetes Study (CARDS) have now provided this evidence and firmly established that cholesterol lowering is of benefit in reducing cardiovascular events in patients with type 2 diabetes, regardless of the level of baseline cholesterol, or the presence or absence of cardiovascular disease. A few recent studies have failed to find benefit in diabetic patients but there are explanations for these negative findings. Ideally all patients with diabetes, especially the middle-aged and elderly, should be treated with statins but it remains uncertain at what age therapy should start and how low to reduce the cholesterol for maximum benefit.

Effects of Atorvastatin on Coagulation Parameters and Homocysteine in Patients with Primary Hypercholesterolemia

Zahit Bolaman, MD; Gurhan Kadikoylu, MD; Nihat Özgel, MD; and Cigdem Yenisey, PhD

JOURNAL OF THE NATIONAL MEDICAL ASSOCIATION
VOL. 98, NO. 8, AUGUST 2006

Background: The mechanism of the antithrombotic action of statins is unclear. We evaluated the effects of atorvastatin on the coagulation parameters and homocysteine levels of patients with primary hypercholesterolemia.

Materials and Methods: Forty-four patients with primary hypercholesterolemia were treated with atorvastatin 10 mg/d for 24 weeks at Adnan Menderes University Medical Faculty, Division of Hematology, Aydin, Turkey. We evaluated the effects of atorvastatin on homocysteine; lipid parameters such as total cholesterol, low-density-lipoprotein (LDL) cholesterol, very-low-density-lipoprotein (VLDL) cholesterol, triglycerides, high-density-lipoprotein (HDL) cholesterol, lipoprotein (a), apolipoprotein AI and apolipoprotein B; and coagulation parameters such as fibrinogen, antithrombin-III, protein C, protein S, von Willebrand factor, D-dimer, partial thromboplastin time and prothrombin time; and hematological parameters such as hemoglobin, white blood cell and platelet counts, vitamin B_{12} and folic acid.

Results: Atorvastatin significantly decreased the levels of total cholesterol, LDL cholesterol ($p<0.001$), VLDL cholesterol, triglycerides and apo B ($p<0.001$). The level of HDL cholesterol significantly increased with atorvastatin treatment ($p<0.001$). Atorvastatin significantly increased the levels of fibrinogen ($p<0.001$), but it had no effect on other coagulation factors and homocysteine ($p>0.05$). After treatment, while vitamin B_{12} levels significantly increased ($p<0.05$), other hematological parameters were not changed with atorvastatin ($p>0.05$).

Conclusion: Although there were beneficial effects of atorvastatin on lipid parameters, atorvastatin did not significantly change the level of homocysteine and hematological, and coagulation parameters, with the exception of fibrinogen and vitamin B_{12} levels.

Diyabetik vasküler patoloji-ülserlerin tedavisinde diğer ilaçlar

- Aspirin
  - İlave tromboembolik olayların oluşmaması için yararlı
  - Oluşmuş lezyona tedavi edici özelliği ????
- Diğer İlaçların yararı ??
  - Pentoksifilin, Cilostrazol, Buflomedil, Naftidurofil, Karnitin, Polikanazol, Arginin, Selodeksil, Angiotensin dönüştürücü enzim inhibitörleri, Trombaksan reseptör antogonistleri, Ginko alkoloidleri, antioksidanlar

SONUÇ

Diyabetik ayak olan hastalarda kolay uygulanabilen bir yöntem olan kök hücre nakli iyi bir tedavi seçeneği olarak değerlendirilebilir