



KRONİK BÖBREK YETMEZLİĞİ OLAN HASTALARDA İNFEKTİF ENDOKARDİT

Ankara Üniversitesi İbn-i Sina Hastanesi
Hasan Ali Yücel Salonu, Ankara



İEÇG KLİMİK DERNEĞİ İNFEKTİF ENDOKARDİT VE DİĞER
KARDİYOVASKÜLER İNFEKSİYONLAR ÇALIŞMA GRUBU



25 ARALIK 2021

Hemodiyaliz Hastalarında İnfektif Endokarditin Klinik ve Laboratuvar Özellikleri: Sorunlar, Çözüm Önerileri

DR. ELİF M. SARICAOĞLU

**ACQUIRED ARTERIOVENOUS FISTULA WITH COEXISTENT
SUBACUTE BACTERIAL ENDOCARDITIS AND
ENDARTERITIS ***

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ACQUIRED arteriovenous aneurysms may result in fatal cardiac insufficiency because of the unfavorable circulatory dynamics set up by the shunt. Another and less common outcome results from the establishment of a subacute bacterial infection of the fistula. This complication has been reported by Bretschneider,¹ Walz,² Gravier,³ Porter and Williams,⁴ Hamman and Rienhoff,⁵ Leaman,⁶ and Touroff et al.⁷ In the first four cases named, there was also a coexisting bacterial endocarditis of the aortic valve. Our case, which has certain unique features, closely resembles the four cases cited and becomes the fifth such to be reported.

CASE REPORT

V. M., a 57 year old Italian longshoreman, was admitted to The Long Island College Hospital June 20, 1944, complaining of generally increasing dependent edema of two weeks' duration. Thirty years before, the patient had been struck by a pistol

Clinical Presentation, Etiology and Outcome of Infective Endocarditis in the 21st Century: The International Collaboration

	Total Cohort	Patients admitted directly to study sites only ^a	Region				P value for the difference in regions
			North America	South America	Europe	Other	
ICE-PCS, 25 ülke, 2777 İE, HD 220 (%8)							
A. Baseline Characteristics							
Age, years (median (IQR))	57.9 (43.2–71.8)	59.8 (44.2–73.1)	52.9 (44.1–66.4)	56.8 (40.3–70.4)	61.4 (45.1–72.7)	58.0 (40.5–72.9)	<0.001
Male gender	1889/2777 (68)	1045/1556 (67)	388/596 (65)	179/254 (70)	873/1212 (72)	449/715 (63)	<0.001
First sign to admission < 1 month	2088/2711 (77)	1201/1529 (79)	496/582 (85)	166/244 (68)	896/1174 (76)	530/711 (75)	<0.001
Hemodialysis	220/2777 (8)	130/1556 (8)	124/596 (21)	20/254 (8)	49/1210 (4)	27/717 (4)	<0.001
Diabetes	447/2764 (16)	261/1550 (17)	158/592 (27)	25/253 (10)	169/1207 (14)	95/712 (13)	<0.001
HIV positive	58/2748 (2)	41/1540 (3)	16/594 (3)	4/236 (2)	33/1211 (3)	5/707 (1)	0.02
Cancer	230/2772 (8)	160/1553 (10)	52/596 (9)	15/251 (6)	101/1210 (8)	62/715 (9)	0.56
IE type							0.05
Native valve	1901/2636 (72)	1048/1471 (71)	411/573 (72)	167/246 (68)	860/1166 (74)	463/651 (71)	
Prosthetic valve	563/2636 (21)	321/1471 (22)	116/573 (20)	66/246 (27)	227/1166 (20)	154/651 (24)	
Pacemaker/ICD	172/2636 (7)	102/1471 (7)	46/573 (8)	13/246 (5)	79/1166 (7)	34/651 (5)	

- HD hastalarında;
 - Kardiyovasküler hastalıklardan sonra İE 2. en sık ölüm nedeni
 - Bakteriyemi insidansı; 0.7-1.2 epizod/100 hasta ayı
 - Bakteriyemi ile izlenen hastalarda İE gelişim insidansı; %1.1-12
 - Normal popülasyona göre İE gelişimi rölatif riski 16.7
 - Normal popülasyona göre İE morbiditesi ve mortalitesi daha yüksek

Infective endocarditis in Turkey: aetiology, clinical features, and analysis of risk factors for mortality in 325 cases

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International Journal of Infectious Diseases. 2015;30:106–114

Features	Total cohort (N = 325 ^b)	Patients who died (n = 234)	Patients who survived (n = 87)	Statistical analysis			
				Univariate analysis p-Value	Multivariate analysis		
					p-Value	HR	95% CI
	KBY----%5.85 HD-----%3.4						
Age, years	46.94 ± 17.11	44.54 ± 17.40	54.04 ± 14.37	<0.001			
Sex, male	187	134	53	0.582			
Left-sided IE	284	202	78	0.420			
Aortic valve endocarditis	156	108	48	0.160			
History of previous endocarditis	18	12	6	0.541			
Prosthetic valve endocarditis	141						
Early prosthetic valve endocarditis	52	25	27	<0.001			
Late prosthetic valve endocarditis	89	62	26	0.559			
Chronic renal failure	19	9	10	0.010			
Coronary heart disease	49	27	22	0.002	0.012	2.09	1.17–3.73
Hypertension	46	34	12	0.864			
Diabetes mellitus	31	16	15	0.005			
Congestive heart failure before endocarditis	20						
Chronic obstructive lung disease	4	4	0	0.220			
Chronic haemodialysis	11	3	8	0.001	0.001	4.13	1.83–9.30
Healthcare-associated endocarditis	75	45	30	0.005			
Central nervous system emboli	52	23	29	<0.001	0.002	2.33	1.35–4.03

HD---İE HASTALARINDA 4.13 KAT MORTALİTEYİ ARTTIRMAKTA

HD süresi

PTH, kalsiyum-fosfat metabolizması bozuklukları

Üremiye bağlı kronik mikroiinflatuar süreç

İleri yaş

İmmünsüpresyon

Demir yükü

S. aureus bakteriyemisi

Malnutrisyon

Kateter kullanımı

Valvular kalsifikasyon, dejeneratif kapak hst



İE prevelansı ↑



Infective endocarditis in chronic haemodialysis patients: an increasing clinical challenge

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Infective endocarditis (IE) in chronic haemodialysis (HD) is significantly more common and causes greater morbidity and mortality than in the general population, being second only to cardiovascular disease as the leading cause of death in this group of patients. Because of the peculiarity of this group of patients, it has been recently proposed to add a fifth category (health-care associated and HD-associated IE) in the actually four categories classification of IE (namely, native valve IE, prosthetic valve IE, IE in e.v. drug users, and nosocomial IE). Given that rates of acceptance into HD are increasing (including a higher proportion of older patients in whom valvular calcification is virtually ubiquitous), and along with improved survival in HD patients, the incidence of IE in this subset of patients will probably increase with significant diagnostic and therapeutic implications. In particular cardiac, diagnostic, echocardiographic, and surgical expertises are required to correctly identify patients at higher risk and who may benefit from surgical treatment. The aim of this review is to clarify the peculiar features of chronic HD patients with regard to pathogenesis, diagnosis, current therapeutic options, and determinants of prognosis of IE.

Major criteria

1. Blood cultures positive for IE

- Typical microorganisms consistent with IE from 2 separate blood cultures:
 - *Viridans streptococci*, *Streptococcus gallolyticus* (*Streptococcus bovis*), *HACEK* group, *Staphylococcus aureus*; or
 - Community-acquired enterococci, in the absence of a primary focus; or
- Microorganisms consistent with IE from persistently positive blood cultures:
 - ≥ 2 positive blood cultures of blood samples drawn > 12 h apart; or
 - All of 3 or a majority of ≥ 4 separate cultures of blood (with first and last samples drawn ≥ 1 h apart); or
- Single positive blood culture for *Coxiella burnetii* or phase I IgG antibody titre $> 1:800$

2. Imaging positive for IE

- Echocardiogram positive for IE:
 - Vegetation;
 - Abscess, pseudoaneurysm, intracardiac fistula;
 - Valvular perforation or aneurysm;
 - New partial dehiscence of prosthetic valve.
- Abnormal activity around the site of prosthetic valve implantation detected by ^{18}F -FDG PET/CT (only if the prosthesis was implanted for > 3 months) or radiolabelled leukocytes SPECT/CT.
- Definite paravalvular lesions by cardiac CT.

Minor criteria

- Predisposition such as predisposing heart condition, or injection drug use.
- Fever defined as temperature $> 38^\circ\text{C}$.
- Vascular phenomena (including those detected by imaging only): major arterial emboli, septic pulmonary infarcts, infectious (mycotic) aneurysm, intracranial haemorrhage, conjunctival haemorrhages, and Janeway's lesions.
- Immunological phenomena: glomerulonephritis, Osler's nodes, Roth's spots, and rheumatoid factor.
- Microbiological evidence: positive blood culture but does not meet a major criterion as noted above or serological evidence of active infection with organism consistent with IE.



- Kan kültürü üremeleri, öncelikle kateter/fistül/greft ilişkili enfeksiyon olarak değerlendirilmekte
- Başka bir odak varlığı IE tanısının konulmasını geciktirmekte



TTE ve TEE duyarlılığı genel popülasyon ile benzer



- Predispozan kardiyak durum varlığı daha az sıklıkta
- HD hastalarında ateş yanıtının daha düşük olması
- Ateşin nedeninin farklı odaklara atfedilmesi

Table 1. Main characteristics and location of IE in chronic hemodialysis patients based on the presence of valvular vegetations detected by transthoracic echocardiography and/or transesophageal echocardiogram.

Series	Period of study (years)	Number of cases (N)	Mean age, years	Gender, male (%)	Diabetes (%)	IDU (%)	Duration of dialysis, months	Cardiac valvular disease (%)	Mitral valve (%)	Aortic valve (%)	Mitral and aortic valves (%)	Tricuspid valve (%)	MSSA MRSA SE (%)	No native vascular access (%)	Overall IH mortality or at 30 d (%)
Leonard et al. (USA) ⁷	1966–1972	9	55	67	NR	NR	28.6	22.3	11.1	33.3	33.3	22.3	55.5	88.8	77.7
Doulton et al. (UK) ¹²	1980–2002	30	54.1	60.7	28.5	NR	46.3	NR	43.3	36.6	16.1	0	63.3	52.1	30
Mc Carthy et al. (USA) ⁶¹	1983–1997	20	63	76.4	35.2	NR	24	90	45	25	20	10	47	88.2	47
Takahashi et al. (Portugal) ⁷³	1985–1989	19	–	–	–	NR	19.5	NR	42.1	31.5	–	–	75	60	68.4
Chang et al. (Taiwan) ²⁰	1988–2002	20	64	65	45	NR	13	NR	55	15	10	20	60	75	60
Hanslik et al. (France) ¹³	1988–1994	30	62	NR	NR	NR	NR	NR	43	40	17	0	53	NR	43
Robinson et al. (USA) ¹⁹	1990–1997	20	55	30	45	5	3.4 ^a	NR	50	30	15	25	55	95	30
Maraj et al. (USA) ⁶	1990–2000	32	54	44	NR	16	7.6 ^a	NR	53	38	15.3	13	80	97	25
Baroudi et al. (USA) ⁶⁹	1990–2006	59	57.3	47	59	7	52.9	NR	63	17	13.6	5.1	45.7	91.6	37.9
Kamalakannan et al. (USA) ⁸	1990–2004	69	56	45	37.7	11.6	37 10 ^a	NR	49.3	21.7	13	10.1	72.3	88.4	49.3
Tao et al. (China) ⁷⁴	1990–2009	6	52	66.6	0	NR	27 ^a	20	50	33.4	16.6	0	33.3	83.4	33.3
Spies et al. (Hawaii) ¹⁸	1991–2001	40	59	35	50	0	39 22 ^a	38	52	23	20	5	65	48	52
Fernandez et al. (Uruguay) ²¹	1995–2000	21	61	47.6	9.5	0	56	NR	43	28.5	9.5	19	67.5	77	28.6
Rekik et al. (Tunis) ¹⁴	1997–2006	16	52	62.5	6.2	6.2	27.3	25	56.2	25	12.5	6.2	70.2	25	43.7
Jones et al. (UK) ²²	1998–2011	40	55	52.2	33.3	NR	57.4	33.3	30.9	42.8	NR	9.5	57.1	65	29.2
Nori et al. (USA) ¹⁵	1999–2004	54	60	52	42	12	6 ^a	NR	50	43	9.2	19	40	96	36.5
Oun et al. (UK) ¹⁶	2000–2013	29	57	59	24	NR	30	79.3	48.3	17.2	20.7	13.8	75.9	69	37.9
Mangoni et al. (Italy) ⁵⁵	2004–2011	42	66	69	42.9	11.9	NR	NR	35	35	NR	15	67.6	31	26.2
Kremery et al. (Slovakia) ¹⁷	23 years	28	NR	NR	3.6	0	NR	NR	50	50	NR	92.9	17.9	NR	32.1
Bentata et al. (Morocco) ⁶²	2010–2016	9	38	77.7	33.3	0	18	NR	22.2	22.2	0	55.6	22.2	77.7	55.5

Microbiological features, clinical characteristics and outcomes of infective endocarditis in adults with and without hemodialysis: A 10-year retrospective study in Northern Taiwan

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- 2008-2017 yılları arasında, retrospektif, 183 İE vakası (47 HD-İE, 136 non HD-İE)
- İleri yaş, yüksek Charlson komorbidite indeksi, DM, HT-----HD-İE hastalarında daha sık
- Predispozan kalp hastalığı non HD-İE hastalarında daha sık (%29.4---%12.8,p=0.023)
 - ❖HD hastalarında İE'e eğilim yaratan durumun; primer valvular dejenerasyon ve intrinsik faktörler ile ilişkili olduğunun bir göstergesi
- Kardiyak komplikasyonlar HD-İE hastalarında daha yüksek (%38.3---%14, p<0.001)

Table 1	Comp			p value
Age, years (median and IQR)				0.027
Female, n (%)				0.036
Type of IE, n (%)				0.781
Native valve infection				
Prosthetic valve infection				
CIED lead/other infection				
Dental procedure				0.064
Underlying disease				
Predisposing heart disease				0.023
Congenital heart disease				0.68
Prior IE upon admission				0.574
Diabetes mellitus				<0.001
Hypertension				<0.001
Heart valve disease				0.084
Cerebrovascular disease				0.728
HIV infection				1.0
Symptom duration, days (median and IQR) ^a	6.94 (2–7)	14.44 (3–14)		0.004
Time from onset to diagnosis, days ^b (median and IQR)	20.17 (7–22)	19.61 (6.25–27)		0.877
Use of intravenous drug, n (%)	0 (0)	7 (5.1)		0.193
Early suspicion of IE upon admission, n (%) ^d	2 (4.3)	39 (28.7)		0.001
Time from onset to diagnosis, days ^b (median and IQR)	20.17 (7–22)	19.61 (6.25–27)		0.877

- HD ilişkili İE ile izlenen hastalarda ateş prevelansı %45-90 arasında değişebilir
 - Üremi ilişkili bozulmuş hücrel konak defans mekanizması nedeni ile

Kamalakaran D. Ann Thorac Surg. 2007;83:2081– 6

Nucifora G. European Heart Journal. 2007;28:2307-12

- Genel popölasyonda ateşin olmaması İE tanısında negatif prediktif değeri yüksek iken, HD hastalarında İE tanısını ekarte ettirmez

Yavuz SŞ. Klimik Derg.2019;32(Suppl.1)2-116

Jones DA. *Nephron Clin Pract* 2013;123:151–156

Table 1. Baseline characteristics of patients with confirmed IE (n = 42)

Average age, years	55.3±15.6
Male	22 (52)
Average dialysis duration, mean (IQR)	57.4 (9.7–85.5)
Diabetes	14 (33.3)
New murmur	16 (38.1)
Fever >38°C	27 (64.3)
Pre-existing cardiac abnormality	14 (33.3)
Prosthetic valve replacement	4 (9.5)
Acquired valvular disease	9 (21.4)
Heart and lung transplant	1 (2.4)
Aetiology of end-stage renal failure	
Diabetes	14 (33.3)
Hypertension	4 (9.5)
Renovascular disease	4 (9.5)
Lupus	2 (4.5)
Reflux	1 (2.4)
Glomerulonephritis	2 (4.5)
Cyclosporine toxicity	1 (2.4)
Adult polycystic kidney disease	1 (2.4)
Obstructive uropathy	1 (2.4)
Amyloid	2 (4.5)
Unknown	10 (23.8)
Dialysis mode	
HD	40 (95.2)
Vascular catheter	4 (10.0)
Tunnelled line	22 (55.0)
AVF	14 (35.0)
PD	2 (4.8)

Bentata Y. *The Journal of Vascular Access*. 2020

Table 2. Clinical, biological, and echocardiographic characteristics of chronic hemodialysis patients having developed infective endocarditis.

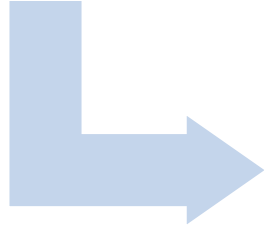
Parameters (n=31)	N (%)
Last functional vascular access prior to the IE episode	
Non-tunneled catheter	10 (32.2)
Tunneled catheter	14 (45.2)
Arteriovenous fistula	7 (22.5)
Bacteremia preceding infective endocarditis (21 days before the IE episode)	27 (87)
Fever >38.5°C	29 (93.5)
Systolic blood pressure <80 mm Hg	18 (58)

Wang CY. *J Microbiol Immunol Infect*. 2020;53:336-43

Symptoms, n (%) ^c	HD	Non- HD	
Constitutional	42 (89.4)	125 (91.9)	0.594
Cardiopulmonary	32 (68.1)	79 (58.1)	0.226
Neurological	17 (36.2)	32 (23.5)	0.092
Gastrointestinal	7 (14.9)	20 (14.7)	0.975
Musculoskeletal	7 (14.9)	23 (16.9)	0.747
Shock	6 (12.8)	19 (14)	0.836
Respiratory failure	5 (10.6)	12 (8.8)	0.712

Staphylococcus
spp

- Kan kültürü pozitifliği HD-İE hastalarında daha fazla (%89.4---%72.8, $p=0.02$)
- *S. aureus*, KNS
- *Streptococcus* spp
- *Enterococcus* spp.



S. aureus

- HD hastalarında *S.aureus* taşıyıcılığının yüksek prevelansı
- HD varlığı *S.aureus* İE için; OR 3.1 (1.6-5.9)



MRSA

- MRSA oranı HD-İE hastalarında daha yüksek (%31.9---%5.9, $p<0.001$)

	Nonhemodialysis (n = 6,138)	Hemodialysis (n = 553)	p Value
Causative microorganisms	5,743	527	
<i>Staphylococcus aureus</i>	1,600 (27.9)	252 (47.8)	<0.001
MRSA	346/1,600 (21.6)	95/252 (37.7)	<0.001
Coagulase-negative staphylococci	619 (10.8)	78 (14.8)	0.012
Viridans group streptococci	1,087 (18.9)	16 (3.0)	<0.001
Enterococci	630 (11.0)	81 (15.4)	0.007
Bovis group streptococci	380 (6.6)	7 (1.3)	<0.001
Other streptococci	357 (6.2)	8 (1.5)	<0.001
HACEK	82 (1.4)	0	<0.001
Non-HACEK Gram negative	183 (3.2)	20 (3.8)	0.481
Fungi/yeast	106 (1.8)	17 (3.2)	0.081
Polymicrobial	71 (1.2)	14 (2.7)	0.047
Blood culture negative	482 (8.4)	28 (5.3)	0.003

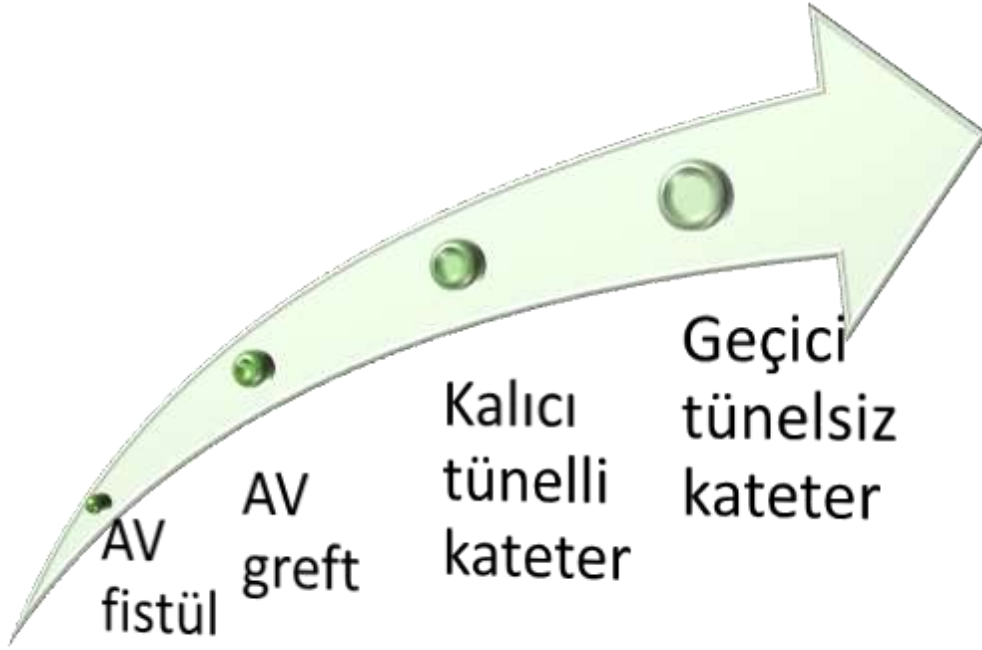
- ***Enterococcus* spp sıklığında artış**

** Enfeksiyonun SHİ olarak edinilmesinin sıklığında artış ile ilişkili

- HD-İE hastalarında persistant bakteriyemi oranı daha yüksek (%22.4-%8.4, $p < 0.001$)

** Bu grup hastalarda kaynak kontrolünün (kateter çıkarılması) sağlanamaması ile ilişkili olabilir

Vasküler giriş enfeksiyon oranları



- Uzun dönem kateter kullanımı için geçerli sadece iki indikasyon olmalıdır;
 - ❖ Son kalan vasküler giriş yolu ise
 - ❖ AVF ya da greftin olgunlaşması için beklenirken geçici olarak
- Hemodiyaliz merkezlerinde kateter kullanım oranlarının %10'nun altında olması sağlanmalıdır

Table 2. Risk factors for infective endocarditis in patients with incident ESRD receiving RRT in Denmark

Parameter	Number of Events	Unadjusted Incidence Rate/100,000 person-years	Hazard Ratio (95% Confidence Interval)
Renal replacement modality			
Uncuffed CVC	39	3053	14.10 (7.76 to 25.50)
Cuffed CVC	39	2099	10.03 (5.52 to 18.24)
Arteriovenous fistula	138	874	4.59 (2.73 to 7.73)
Arteriovenous graft	1	570	3.19 (0.42 to 24.26)
Unknown hemodialysis access	24	809	3.67 (1.94 to 6.94)
Hemodialysis	241	1092	5.46 (3.28 to 9.10)
Kidney transplant	10	85	0.41 (0.18 to 0.91)
Peritoneal dialysis	16	212	1.00 (reference)
RRT periods			
RRT period 1 ^a	67	1353	1.89 (1.37 to 2.60)
RRT period 2 ^a	67	501	0.80 (0.59 to 1.10)
RRT period 3 ^a	133	549	1.00 (reference)

Infective Endocarditis in Patients on Chronic Hemodialysis



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non HD-İE HD-İE

Predisposing risk factors			
Intravenous drug abuse	535 (8.8)	10 (1.8)	<0.001
Previous episode of IE	603 (9.8)	65 (11.8)	0.175
Congenital heart disease	599 (9.8)	25 (4.5)	<0.001
Hemodialysis vascular access	—	488/553 (88.2)	
Arteriovenous fistula	—	189 (34.2)	NA
Arteriovenous graft	—	12 (2.5)	NA
Central catheter	—	235 (48.1)	NA
Unknown	—	52 (22.1)	NA
Place of acquisition and presentation	5,754	528	
Community	4,450 (77.3)	105 (19.9)	<0.001
Nosocomial	1,028 (17.9)	105 (19.9)	0.264
Non-nosocomial health care associated	276 (4.8)	318 (60.2)	<0.001
Length of symptoms to presentation <1 month	4,402/5,608 (78.5)	456/498 (91.6)	<0.001
Type of endocarditis	5,885	543	
Native valve	3,900 (66.3)	419 (77.2)	<0.001
Prosthetic valve	1,516 (25.8)	76 (14)	<0.001
CIED	469 (8.0)	48 (8.8)	0.493

- ICE-PCS prospektif çok merkezli verileri;
2000-2006 arası, 28 ülke, 5591 İE hastası
2008-2012 arası, 18 ülke, 2124 İE hastası
6138 non HD-İE, 553 HD-İE hastası
- **AVF varlığı 2. sıklıkta**
** AVF enfekte görünümde olmasa bile olası bakteriyemi kaynağı olarak mutlaka akılda bulundurulmalıdır

İnfektif Endokarditin Tanısı, Tedavisi ve Önlenmesi: Ulusal UzlaŖı Raporu

Serap ŖimŖek-Yavuz, Ahmet Rũćhan Akar, Sinan Aydoćdu, DeneŖ Berzeg-Deniz, Hakan Demir, Tuncay Hazirolan, Mehmet Ali Ŗzatik, Necle Ŗzer, Murat Sargın, Emine Nursen Topcuoćlu, Nesrin Turhan, Mehmet Birhan Yılmaz, Ŗzlem Azap, Seniha Baćaran, Yasemin ćać, Atahan ćaćatay, Gũle ćınar, Sibel Doćan-Kaya, Lokman Hızmalı, Mehmet Emirhan IŖık, Nurgũl Kılıćaslan, Ŗirin MenekŖe, Meliha Merić-Koć, Serpil Ŗztũrk, Ayfer Ŗensoy, Yasemin Tezer-Tekće, Elif Tũkenmez-Tigen, YeŖim Uygun-Kızmaz, Mutlu Ŗeyda Velloćlu-Ŗcalmaz, AyŖegũl YeŖilkaya, Emel Yılmaz, Neziha Yılmaz, Fatma Yılmaz-Karadać

- Arteriyovenũz fistũller veya greftlerin tercih edilmesi, SVK'lardan kaćınılması
- Kateterle diyalize girmesi zorunlu olan hastalarda tũnelli kateterlerin tercih edilmesi
 - Kateter takılırken deri temizlići ićin alkollũ klorheksidin solũsyonları kullanılmalı
 - Femoral bũlge yerine internal jũgũler ven sećilmeli
 - Maksimal bariyer önlemlerine ve kateter manipũlasyonlarında hijyenik kurallara uyulmalı
 - Kateter giriŖ yerine her diyaliz seansından sonra povidon iyodlu veya basitrasin/gramisidin/polimiksin B'li veya mupirosinli pomadlar sũrũlmesi
- Kullanılmayan infekte veya kolonize iŖlev gũrmeyen greftlerin erkenden saptanması ve etkili olarak tedavi edilmesi



Dialysis Event Surveillance Protocol

Dialysis Event Surveillance Protocol

Event Definitions and Key Terms

Dialysis Event: Three types of dialysis events are reported by users: IV antimicrobial start; positive blood culture; and pus, redness, or increased swelling at the vascular access site. The following measures are also generated from the reported data: bloodstream infection (BSI), local access site infection (LASI), access-related bloodstream infection (ARBSI), and vascular access infection (VAI).

Çözüm önerisi;

- HD ilişkili enfeksiyon oranlarının izleminde; diyaliz ilişkili olay sürveyansının uygulanması
- Her diyaliz merkezinin vasküler giriş yollarının düzenli değerlendirme ve denetleme prosedürlerinin olması

Sol kalp > Sağ kalp



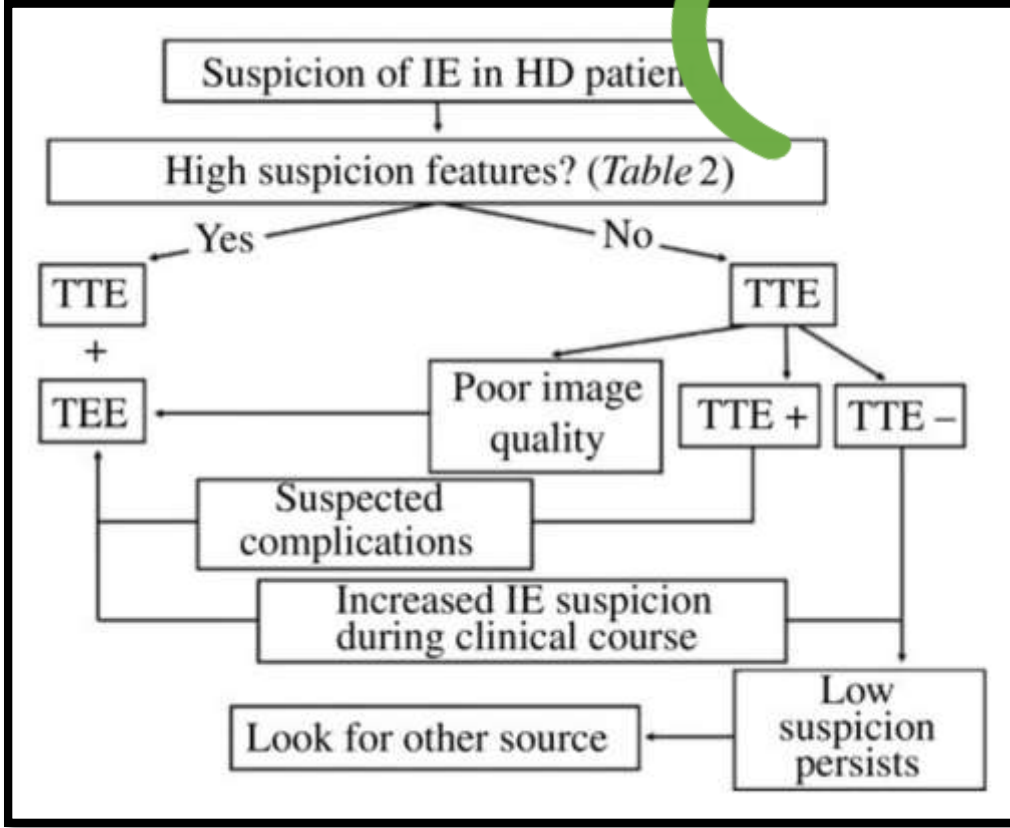
Mitral kapak > Aort kapak

- Çoğu vakada bakteriyemi kaynağı vasküler giriş yolu olmasına rağmen sağ kalp tutulumu sık görülmez
 - ❖ %90 nın üzerinde sol kalp tutulumu
- SDBY olan hastalarda aort ve mitral kapaklarda kalınlaşma ve dejeneratif kapak hastalığı (hemodinamik ve lezyonel) daha siktir
 - ❖ Bu nedenle laminar akımdaki değişikliklere bağlı İE açısından daha duyarlıdırlar

- HD-İE hastalarında sol kalp tutulumunun patogeneğinde asıl rolü olan valvular ve perivalvular anomaliler;
 - Fosfor-kalsiyum metabolizmasındaki deęişiklikler, ateroskleroz ve inflamasyon ile yakın ilişkilidir
- Renal kalsitriol üretimindeki defektler, renal kalsiyum-fosfor atılımındaki bozukluk ve reabsorbsiyon bozuklukları sonucunda SDBY hastalarındaki aşağıdaki anomaliler görülür
 - Hipokalsemi
 - Hiperfosfatemi
 - Kalsiyum-fosfor ürünlerinde artış
 - PTH artışı
 - Fibroblast growth faktör 23 artışı

Table 3 Echocardiographic data of the two study subgroups.

	HD patients (n = 47)	Non-HD patients (n = 136)	p value
Echocardiogram positive, n (%) ^a	45 (95.7)	124 (91.2)	0.310
TTE performed, n (%)	47 (100)	136 (100)	1.000
TTE evidence of IE, n (%)	37 (78.7)	109 (80.1)	0.834
TEE performed, n (%)	13 (27.7)	26 (19.1)	0.218
TEE evidence of IE, n (%)	13 (100)	25 (96.1)	0.211
Heart side involved, n (%)			
Left side of the heart	37 (78.7)	111 (81.6)	0.664
Right side of the heart	8 (17)	16 (11.8)	0.357
Both sides of the heart	0 (0)	2 (1.5)	1.000
Vegetation size, mm (median and IQR)	13.39 (8–17.9)	12.44 (8–15)	0.375
Vegetation site, n (%)			
Aortic	14 (29.8)	39 (28.7)	0.885
Mitral	26 (55.3)	78 (57.4)	0.808
Tricuspid	7 (14.9)	16 (11.8)	0.577
Pulmonary	1 (2.1)	0 (0)	0.257
2 or more affected valves	3 (6.4)	9 (6.6)	1.000



HD hastalarında İE açısından **yüksek riskli** durumlarda TTE sonrası TEE yapılması önerilen durumlar

- Yeni başlangıçlı KKY
- Endokarditin diğer bulgularının varlığı
- HD ilişkili hipotansiyon (özellikle öncesinde HT hastalarda)
- Geçirilmiş ya da tekrarlayan İE hikayesi
- Geçirilmiş valvular cerrahi
- Tipik m.o etken olması (*S.aureus*, KNS, *Enterococcus* spp ve *Streptococcus* spp.)
- Etkenden bağımsız antibiyotiğin kesilmesinin takiben tekrarlayan bakteriyemi
- HD kateteri ile izlenen hastalar

	HD-İE	non HD-İE	P değeri
BK >12.000	29 (61.7)	69 (50.7)	0.194
CRP >1mg/dl	46 (97.9)	133 (97.8)	0.975

Wang CY. J. Microbiol Immun Infect 2020;52:336-43

	HD-İE	non HD-İE	P değeri
Elevated CRP levels	36 (86)	116 (93)	0.421
Elevated ESR	27 (64)	86 (68)	0.236

Mangoni ED. Infection. 2016;44:467-74

	HD-İE	non HD-İE	P değeri
Hematocrit	26.69±5.72	30.33±6.25	0.016
CRP (mg/dL)	138.27±81.01	155.68±124.46	NS
ESR	87.2±33.32	52.96±28.19	0.001

Hsiao CC. Therapeutics Clin Risk Management. 2017;13:663-68

Epidemiology of Anemia Associated with Chronic Renal Insufficiency among Adults in the United States: Results from the Third National Health and Nutrition Examination Survey

CHI-YUAN HSU,* CHARLES E. MCCULLOCH.† and GARY C. CURHAN‡

Table 2. Predicted change in mean hemoglobin level by renal function^a

CrCl	Women		Men	
	Change in Hemoglobin (g/dl)	P Value	Change in Hemoglobin (g/dl)	P Value
CrCl > 80 ml/min	Reference		Reference	
80 ≥ CrCl > 70 ml/min	−0.0 (−0.1, 0.1)	0.68	−0.1 (−0.2, 0.0)	0.16
70 ≥ CrCl > 60 ml/min	−0.1 (−0.2, 0.0)	0.08	−0.2 (−0.3, −0.0)	0.02
60 ≥ CrCl > 50 ml/min	−0.1 (−0.2, 0.1)	0.36	−0.3 (−0.5, −0.1)	0.007
50 ≥ CrCl > 40 ml/min	−0.2 (−0.3, −0.0)	0.01	−0.4 (−0.6, −0.2)	0.0005
40 ≥ CrCl > 30 ml/min	−0.4 (−0.6, −0.2)	<0.0001	−0.8 (−1.1, −0.6)	<0.0001
30 ≥ CrCl > 20 ml/min	−1.0 (−1.2, −0.7)	<0.0001	−1.4 (−2.1, −0.6)	0.0005
CrCl ≤ 20 ml/min	−2.3 (−2.8, −1.9)	<0.0001	−2.7 (−3.8, −1.6)	<0.0001

Kronik enfeksiyon göstergelerinden birisi olan anemi HD hastalarında normalde de sık saptanan bir bulgu

> Am J Kidney Dis. 1987 Jul;10(1):34-40. doi: 10.1016/s0272-6386(87)80008-2.

The erythrocyte sedimentation rate in end-stage renal failure

J Bathon, J Graves, P Jens, R Hamrick, M Mayes

PMID: 3605082 DOI: 10.1016/s0272-6386(87)80008-2

Abstract

The effect of end-stage renal failure and the dialytic process on erythrocyte sedimentation rate (ESR) is largely unknown. We prospectively studied 60 stable patients with end-stage renal disease to determine the prevalence of elevated ESR in this population. ESRs were also measured immediately pre- and postdialysis in 48 hemodialysis patients. ESR was found to be elevated (greater than or equal to 25 mm/h, Westergren method) in 93% of patients with end-stage renal failure. Fifty-seven percent of patients had marked elevation of ESR (greater than 60 mm/h), while 20% had extreme increases in ESR (greater than or equal to 100 mm/h). In a linear models analysis, aging (P less than .02), anemia (P less than .01), and hypocalcemia (P less than .0001) correlated significantly with ESR elevation. Midweek BUN and creatinine, type and duration of dialysis, cause of renal failure, and serum albumin and total protein measurements did not correlate with ESR. In 48 stable in-center hemodialysis patients, mean predialysis ESR of 70 +/- 4 mm/h was not significantly different from mean postdialysis ESR of 72 +/- 5 mm/h. Retrospective chart review of available ESRs prior to initiation of any dialysis treatment also revealed significant elevation of ESR, mean 82 +/- 9 mm/h, in patients with renal disease not yet on dialysis. An upward trend in ESR during acute illness (74 +/- 9 to 95 +/- 8, N = 10) was observed. In a subpopulation of patients,

- ESH yüksekliği; SDBY olan hastalarda zaten sıklıkla izlenmektedir

- Komplikasyonlar;
 - HD hastaları bozulmuş immun sistem ve metabolik anomaliler (SDBY, malnutrisyon vb durumlar ile ilişkili) nedeni ile daha hassas bir gruptur
 - *S.aureus* KDE'lerinde septik komplikasyon oranı daha yüksek
 - Komplikasyonlar HD-İE hastalarında daha sık görülür (%38.3--%14, $p<0.001$)
 - Sıklıkla sol kalp tutulumuna bağlı komplikasyonlar
 - En sık komplikasyonlar; kardiyak (%38.3), nörolojik (%19.1) ve embolik (%12.8)

Nucifora G. European Heart Journal. 2007;28:2307-12

Nori US. Nephrol Dial Transplant 2006;21:2184–90

Rekik S. Clin Exp Nephrol . 2009;13:350-4

Wang CY. J. Microbiol Immun Infect 2020;52:336-43

QUALITY AND OUTCOMES

Trends and outcomes of infective endocarditis in patients on dialysis

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Abhishek Sharma⁵ | Manyoo Agarwal⁶ | Lohit Garg⁷
Sudip Nanda² | Jamshid Shirani²

Mortalite; HD İE> Genel İE

Cerrahi oranları; HD İE< Genel İE

Akut iskemik olay; HD İE> Genel İE

TABLE 5 Trends in in-hospital outcomes of patients with IE

Outcome	Year, n (%)						OR per Year (95% CI)	
	2006	2007	2008	2009	2010	2011	Unadjusted	Adjusted
In-hospital mortality	5072 (12.9)	4285 (11.5)	5286 (13.2)	4968 (11.7)	5051 (11.9)	5152 (11.2)	0.98 (0.97-0.98)	0.95 (0.94-0.95)
Dialysis group	1210 (19.4)	985 (16.4)	1273 (18.1)	1219 (14.9)	1306 (16.7)	1502 (15.8)	0.96 (0.95-0.98)	0.95 (0.93-0.96)
Control group	3861 (11.6)	3300 (10.6)	4013 (12.2)	3749 (10.9)	3745 (10.9)	3650 (10.1)	0.98 (0.97-0.98)	0.95 (0.94-0.95)
VRS	3656 (9.3)	3332 (9.0)	4041 (10.1)	4301 (10.1)	3890 (9.2)	4408 (9.6)	1.01 (1.00-1.02)	1.00 (0.99-1.01)
Dialysis group	481 (7.7)	446 (7.4)	462 (6.6)	648 (7.9)	503 (6.4)	721 (7.6)	0.99 (0.97-1.02)	0.99 (0.97-1.02)
Control group	3175 (9.6)	2886 (9.3)	3579 (10.8)	3653 (10.6)	3386 (9.8)	3687 (10.2)	1.01 (1.01-1.02)	1.01 (0.99-1.02)
Acute stroke	3118 (7.9)	3236 (8.7)	3690 (9.2)	4165 (9.8)	4427 (10.5)	4850 (10.6)	1.07 (1.06-1.08)	1.04 (1.03-1.04)
Dialysis group	551 (8.8)	587 (9.8)	640 (9.1)	862 (10.5)	763 (9.8)	1076 (11.3)	1.05 (1.03-1.07)	1.03 (1.01-1.05)
Control group	2568 (7.7)	2649 (8.5)	3049 (9.2)	3303 (9.6)	3664 (10.6)	3774 (10.4)	1.07 (1.06-1.08)	1.04 (1.03-1.05)

Abbreviations: CI, confidence interval; IE, infective endocarditis; OR, odds ratio; VRS, valve replacement surgery.

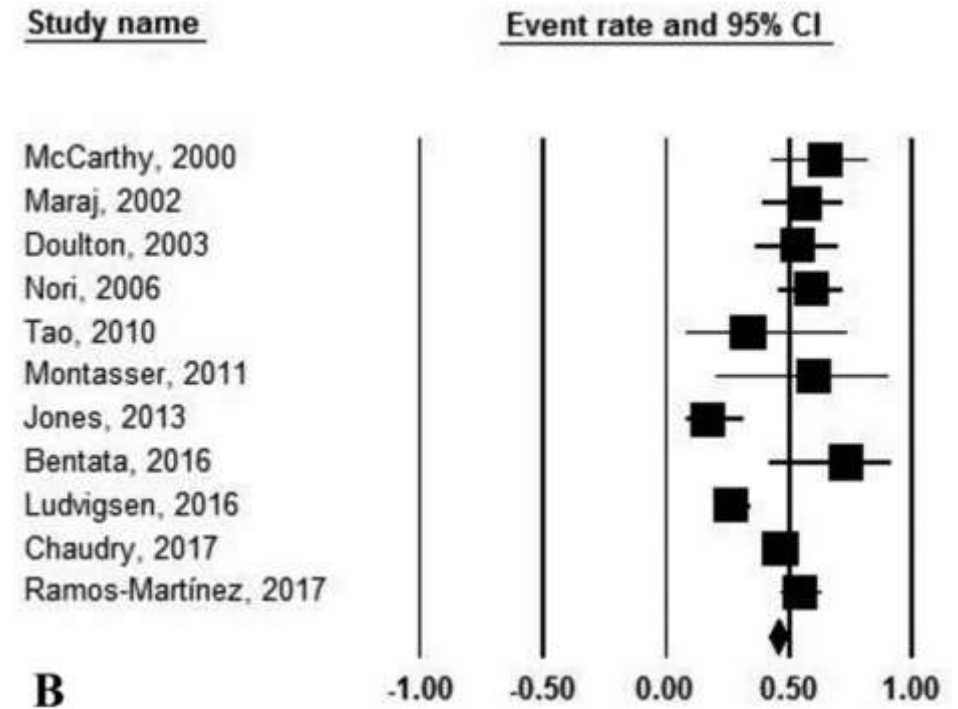
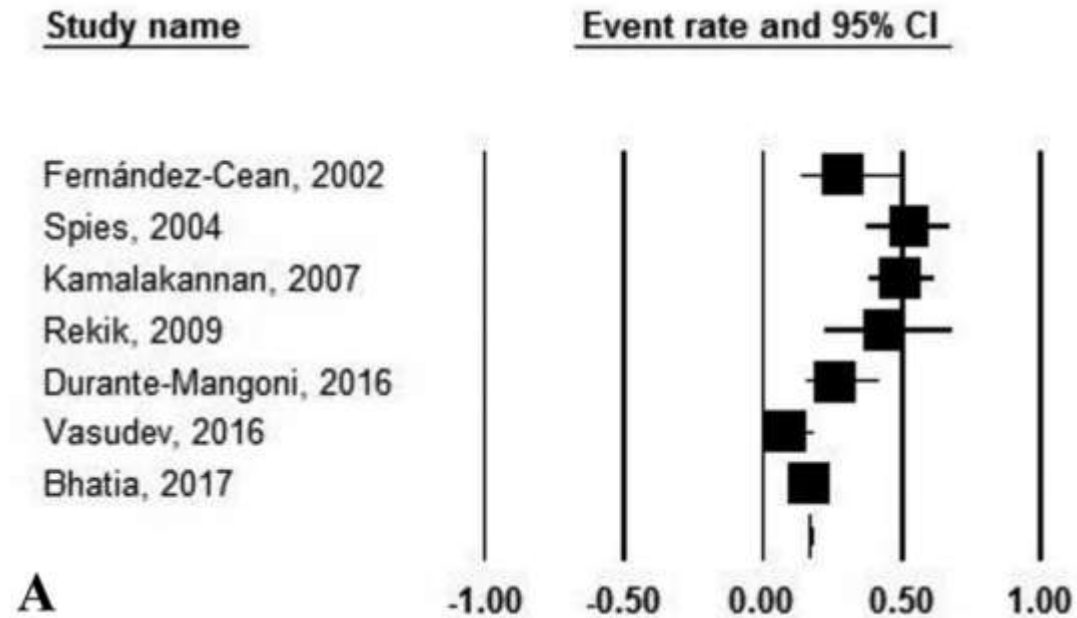
Mortalite oranları;

- HD-İE hastalarında tanıdan itibaren ilk 30-60 gün mortalite en yüksektir
 - Bu dönemde hastaların yakın monitorizasyonu
 - Tekrarlayan ekokardiyografik incelemeler
 - Medikal tedavilerinin düzenlenmesi
 - Takipte cerrahi gerekliliğin değerlendirilmesi
 - Enfekte greft/kateterin çıkarılması mortalite oranlarının düşürülmesinde en önemli konulardır

HD-İE

Hastane mortalite oranları: %29.5

Geç mortalite oranları: %45.6



BRIEF COMMUNICATION

Infective Endocarditis Hospitalizations and Outcomes in Patients With End-Stage Kidney Disease: A Nationwide Data-Linkage Study

Peter J. Gallacher, MD, MPH ; David A. McAllister, MD, PhD; Nicholas L. Mills, MD, PhD ; Nicholas L. Cruden, MD, PhD; Anoop S. V. Shah, MD, PhD ; Neeraj Dhaun, MD, PhD 

SDBY+

SDBY-

BACKGROUND: We investigated the clinical features, microbiology, and short- and long-term outcomes of incident infective endocarditis (IE) hospitalizations in patients with end-stage kidney disease (ESKD) requiring dialysis or with a kidney transplant over 25 years in Scotland.

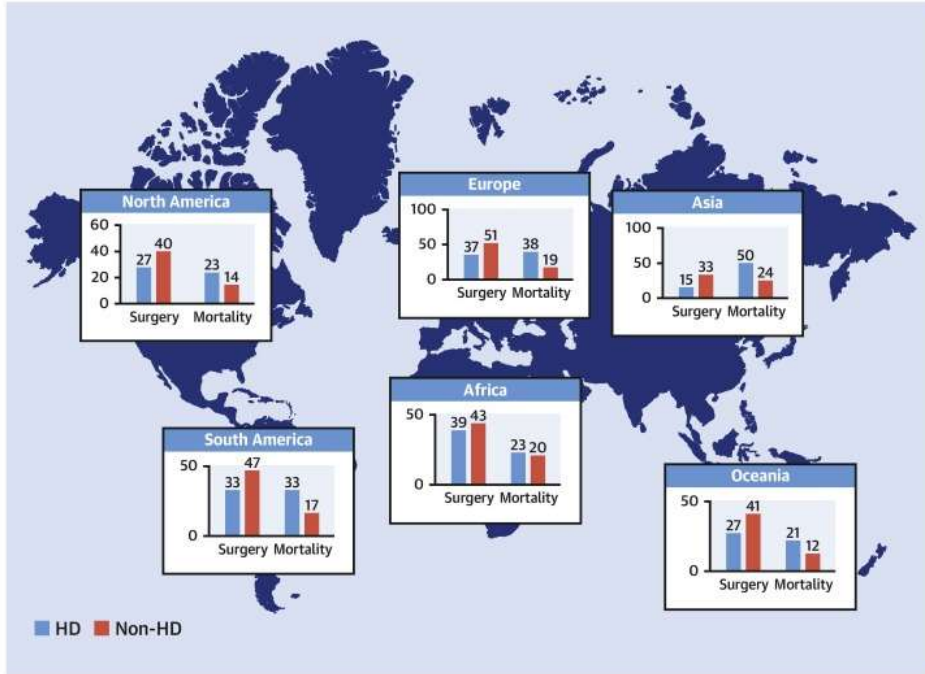
METHODS AND RESULTS: In this retrospective, population-based cohort study linking national hospitalization and mortality data, we identified patients with a history of ESKD and hospitalized with IE in Scotland between January 1, 1990 and December 31, 2014. From January 1, 2008, individual IE hospitalizations were additionally linked to national microbiology data. Multivariable logistic regression, adjusting for patient demographics and comorbidities, evaluated the association between ESKD and all-cause death at 1 and 3 years. Of 7638 incident IE hospitalizations between 1990 and 2014, 2.8% (216/7638) occurred in 210 patients with ESKD and 97.2% (7422/7638) occurred in 7303 patients without ESKD. Positive findings from blood cultures were identified in 42% (950/2267) of incident IE hospitalizations from 2008. *Staphylococcus aureus* was isolated in 25.9% (21/81) and 12.8% (280/2186) of patients with and without ESKD, respectively ($P=0.002$). ESKD was associated with an increased odds of death at 1 (44.9% versus 31.4%; adjusted odds ratio [aOR], 2.47, 95% CI, 1.85–3.30; $P<0.001$) and 3 years (63.9% versus 42.8%; aOR, 3.77; 95% CI, 2.79–5.12; $P<0.001$).

CONCLUSIONS: IE is associated with a poor prognosis in patients with ESKD, especially in the longer term. Compared with patients without ESKD, patients with ESKD were twice as likely to die within 1 year, and 3 times as likely to die within 3 years of IE hospitalization.

All-cause death, n (%)		
30 d	40 (18.5)	1041 (14.0)
1 y	97 (44.9)	2329 (31.4)
3 y	138 (63.9)	3179 (42.8)

- Kısa dönem sonuçları benzer olmakla birlikte uzun dönem sonuçları SDBY olan hastalarda daha kötü
- SDBY olan İE hastalarında her bir 10 yaş artış 1. ve 3. yıl mortalitede 1.33 ve 1.44 artışa neden olmaktadır

CENTRAL ILLUSTRATION: Global Distribution of Infective Endocarditis Cases in the International Collaboration on Endocarditis Cohort and Rates of Cardiac Surgery and In-Hospital Mortality for Chronic Hemodialysis-Infective Endocarditis and Non-Chronic Hemodialysis-Infective Endocarditis Groups



Pericàs, J.M. et al. J Am Coll Cardiol. 2021;77(13):1629–40.

TABLE 2 Continued

	Nonhemodialysis (n = 6,138)	Hemodialysis (n = 553)	p Value
Duration of follow-up in survivors, months	12.0 (10.6–12.0)	12.0 (6.6–12.0)	<0.001
Lost to 6-month follow-up*	1,928 (31.4)	138 (24.9)	0.087
Outcomes			
In-hospital mortality	1,044 (16.9)	168 (30.4)	<0.001
By geographical region			<0.001
North America	120 (14.3)	47 (23.2)	
South America	101 (17.4)	21 (33.3)	
Oceania	117 (12.3)	11 (21.2)	
Africa	27 (19.6)	3 (23.1)	
Europe	575 (18.5)	74 (38.3)	
Asia	75 (24.2)	10 (50.0)	
6-month mortality	1,268 (20.7)	220 (39.8)	<0.001
Relapses	81/3,014 (2.7)	22/234 (9.4)	<0.001

**Relaps oranı HD-İE hastalarında yüksek

**Cerrahi oranları düşük

HD-İE hastalarında mortalite için prognostik faktörler

Erken mortalite	Geç mortalite
✓ Septik embolizm ✓ Mitral kapak tutulumu ✓ TEE'de vejetasyon boyutunun $>2\text{ cm}^3$	✓ 65 yaş üzeri ✓ DM'e bağlı SDBY ✓ Serebrovasküler olay/geçici iskemik atak ✓ Mitral kapak tutulumu (özellikle mitral anular kalsifikasyon ya da ciddi mitral yetmezlik olması) ✓ Etkenin MRSA ya da VRE olduğu İE'ler

Impact of Chronic Renal Failure on Surgical Outcomes in Patients With Infective Endocarditis

Check for updates

Marissa Guo, BS, Emma St. Pierre, BS, Jeffrey Clemence, Jr, BS, Xiaoting Wu, PhD, Paul Tang, MD, PhD, Matthew Romano, MD, Karen M. Kim, MD, and Bo Yang, MD, PhD

University of Michigan Medical School, Ann Arbor, Michigan; and Department of C Michigan

Ann Thorac Surg 2021;111:828-35

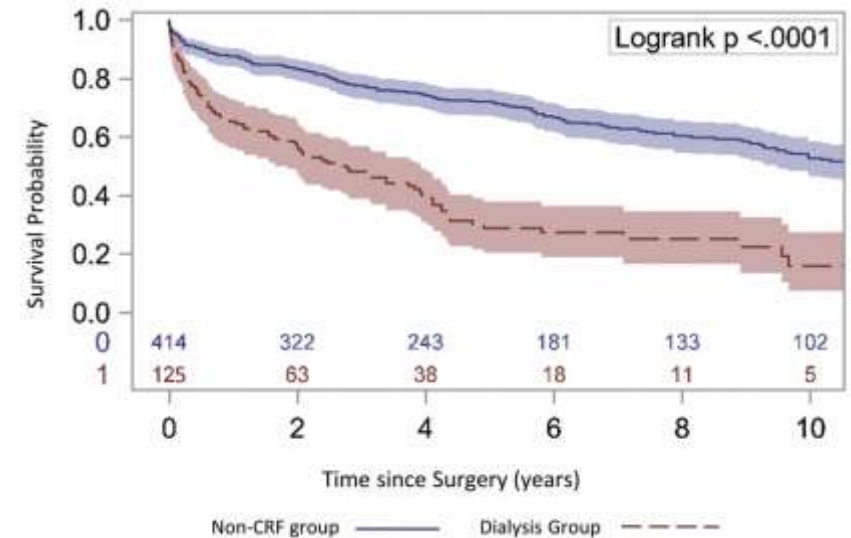
Background. Patients with chronic renal failure (CRF) who are undergoing hemodialysis are at increased risk for infective endocarditis (IE). However, outcomes of surgical treatment for IE in these patients have not been well studied.

Methods. Between 1997 and 2017, 539 patients underwent surgical treatment for IE. Of these patients, 125 were undergoing hemodialysis for end-stage renal disease (ESRD), and 414 had no history of CRF. Primary end points compared in this study were short-term survival and long-term survival.

Results. Preoperatively, dialysis-treated patients had higher incidences of diabetes (43% vs 18%), hypertension (79% vs 49%), congestive heart failure (63% vs 48%), cardiogenic shock (13% vs 5.3), and sepsis (29% vs 18%) (all $P < .05$). Postoperatively, they experienced higher rates of prolonged mechanical ventilation (54% vs 22%), pneumonia (17% vs 5.6%), sepsis (6.4% vs 1.0%), cardiac arrest (7.2% vs 1.7%), gastrointestinal events (14% vs

5.1%), and operative mortality (14% vs 5.8%) (all $P < .05$). The 5- and 10-year survival rates were significantly worse in the dialysis-treated group at 29% and 16%, respectively, compared with 72% and 53% in the patients who did not have CRF ($P < .001$). ESRD was a risk factor for both short-term mortality (odds ratio, 2.0) and long-term mortality (hazard ratio, 2.7). Rates of reoperation in dialysis-treated patients were very low: 5- and 10-year incidences were 0% and 2.0%, respectively.

Conclusions. In patients with ESRD and IE, poor postoperative outcomes emphasized the importance of prevention and raised the question whether indications for surgical treatment in the general population are appropriate for patients who are dialysis dependent. Additionally, low rates of reoperation supported the use of bioprosthetic valves in these patients.



(Ann Thorac Surg 2021

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Sonuç

HD ilişkili İE;

- Önemli bir morbidite ve mortalite nedenidir
- Klinik ve laboratuvar olarak tanınması zor
 - Ayırıcı tanılar arasında olmalı!!!
- En sık olarak vasküler giriş yolu ilişkili bakteriyemiye sekonder olarak görülür. Bu nedenle bakteriyeminin;



ÖNLENMESİ

- **ERKEN TANINMASI**
- **ETKİLİ TEDAVİSİ**



Mutlu Yıllar!

TEŞEKKÜRLER...