İnfeksiyon Kontrolünde Yılın Makaleleri

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Protective efficacy of the chimeric *Staphylococcus aureus* vaccine candidate IC in sepsis and pneumonia models

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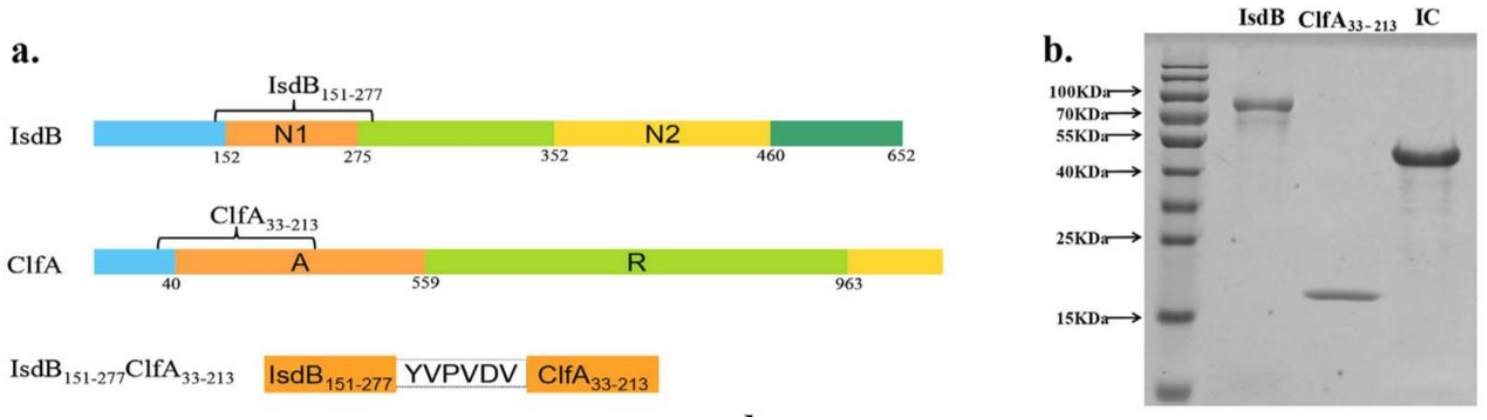
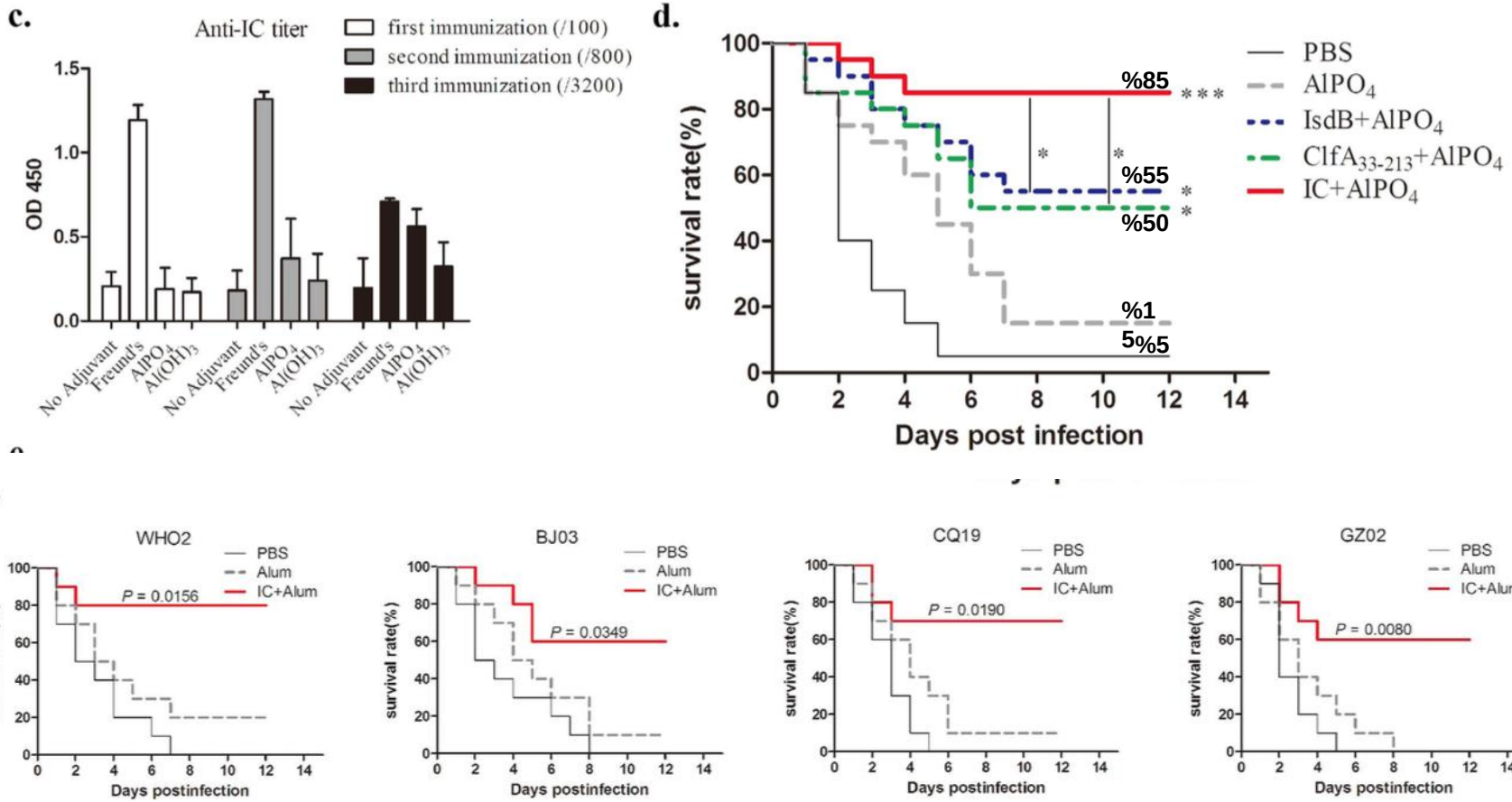
Staphylococcus aureus causes serious sepsis and necrotic pneumonia worldwide. Due to the spread of multidrug-resistant strains, developing an effective vaccine is the most promising method for combating *S. aureus* infection. In this study, based on the immune-dominant areas of the iron surface determinant B (IsdB) and clumping factor A (ClfA), we designed the novel chimeric vaccine $IsdB_{151\text{-}277}ClfA_{33\text{-}213}$ (IC). IC formulated with the $AlPO_4$ adjuvant induced higher protection in an *S. aureus* sepsis model compared with the single components alone and showed broad immune protection against several clinical *S. aureus* isolates. Immunisation with IC induced strong antibody responses. The protective effect of antibodies was demonstrated through the opsonophagocytic assay (OPA) and passive immunisation experiment. Moreover, this new chimeric vaccine induced Th1/Th17-skewed cellular immune responses based on cytokine profiles and $CD4^+$ T cell stimulation tests. Neutralisation of IL-17A alone (but not IFN-γ) resulted in a significant decrease in vaccine immune protection. Finally, we found that IC showed protective efficacy in a pneumonia model. Taken together, these data provide evidence that IC is a potentially promising vaccine candidate for combating *S. aureus* sepsis and pneumonia.

Aşı içeriği

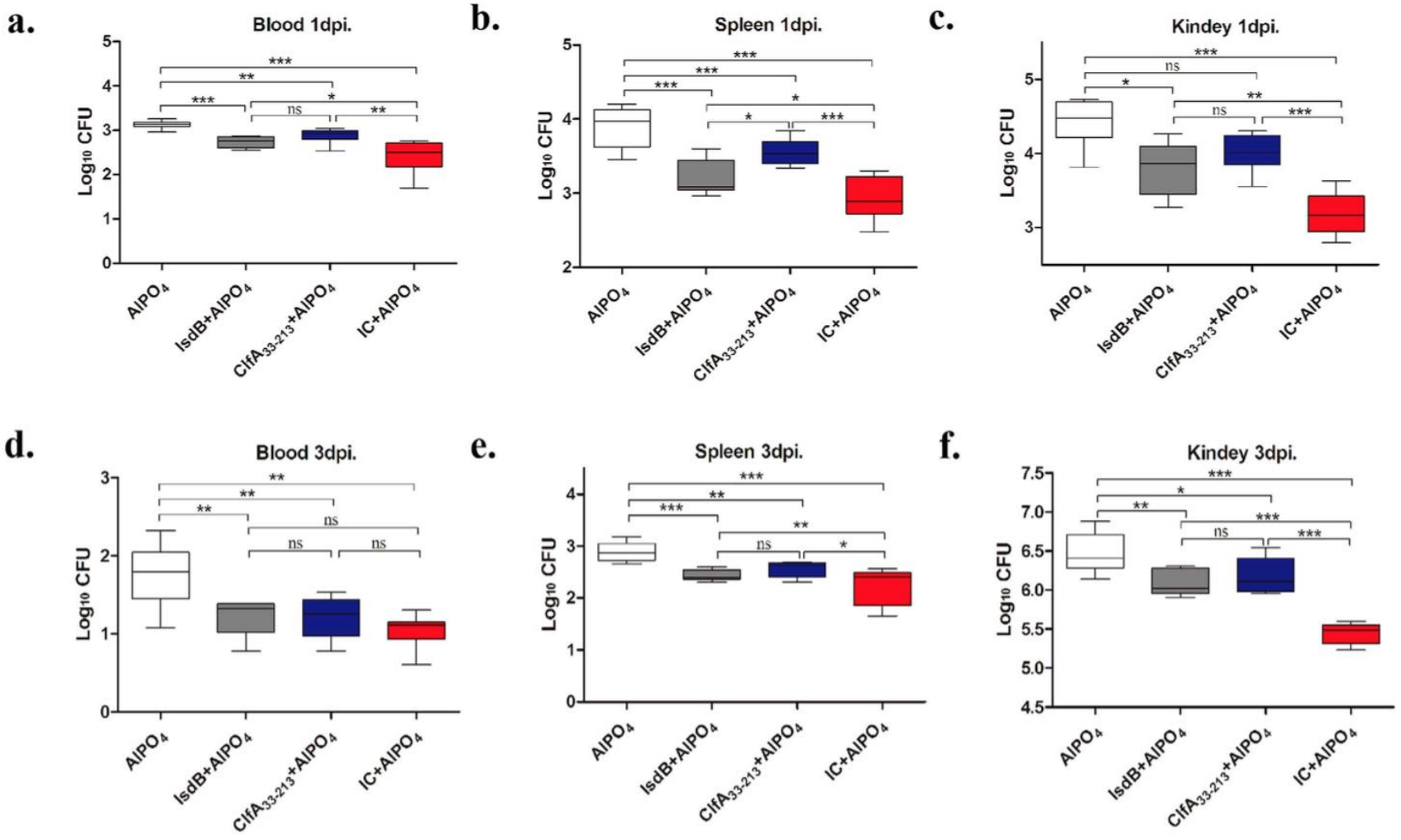


a. IsdB151-277, ClfA33-213 ve IC primer yapısının şematik gösterimi
b. Afinite kromitografi ile pürifiye edilen rekombinat IsdB, ClfA ve IC SDS-PAGE analizi

En uygun adjuvan seçimi ve 3. *aureus* sepsis modelinde koruyucu etkinlik



Kantitatif bakteri yükünde azalma



Histopatolojik inceleme

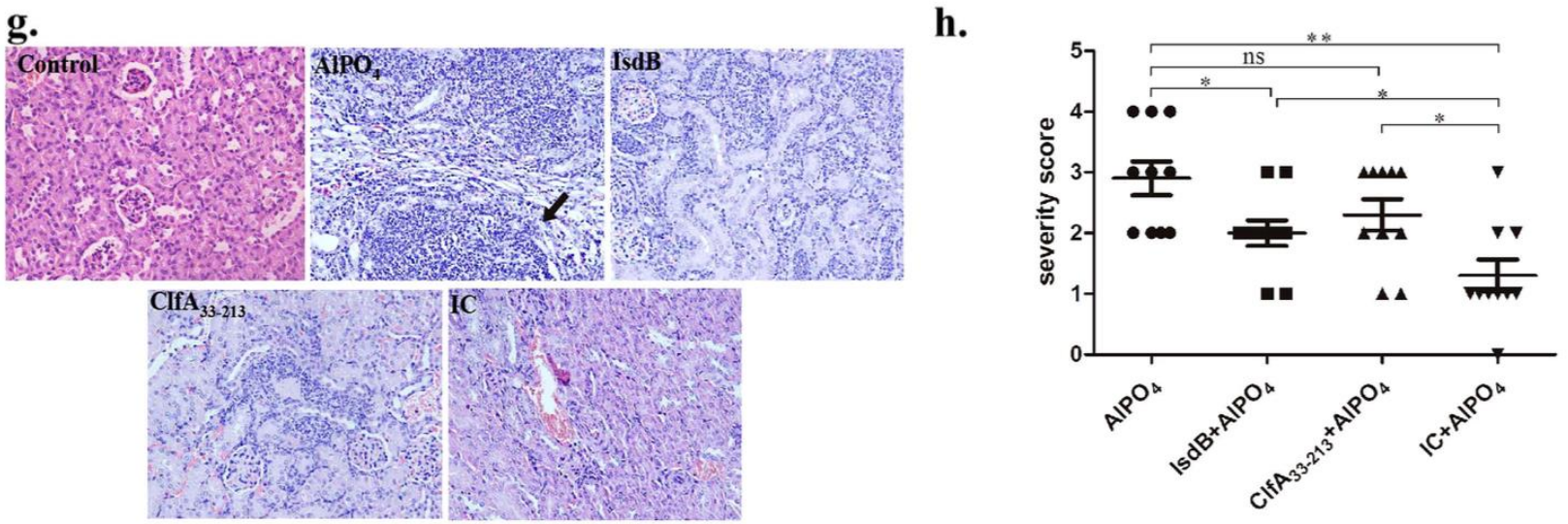


Figure 2. Immunisation with IC significantly reduced both organ bacterial burdens and pathology. (**g**) HE-stained kidneys from the AlPO4 group and recombinant vaccine immunised groups at 3 days post-infection were shown. BALB/c mice were immunised with recombinant proteins. Three days post-infection (5 × 108 CFUs), the kidneys were collected, and representative histopathological sections were shown (magnification = 400×). The kidney tissue of mouse without infection were used as control. Arrowheads indicate Staphylococcal abscesses. (**h**) Severity scores of kidneys (n = 10) from the AlPO4 group and recombinant vaccine immunised groups at 3 days post-infection were shown. Data were presented as scatter plots, and the means ± SEM were shown. Asterisks indicate significant differences between two groups (*$P < 0.05$, **$P < 0.01$).

Antikor yanıtı

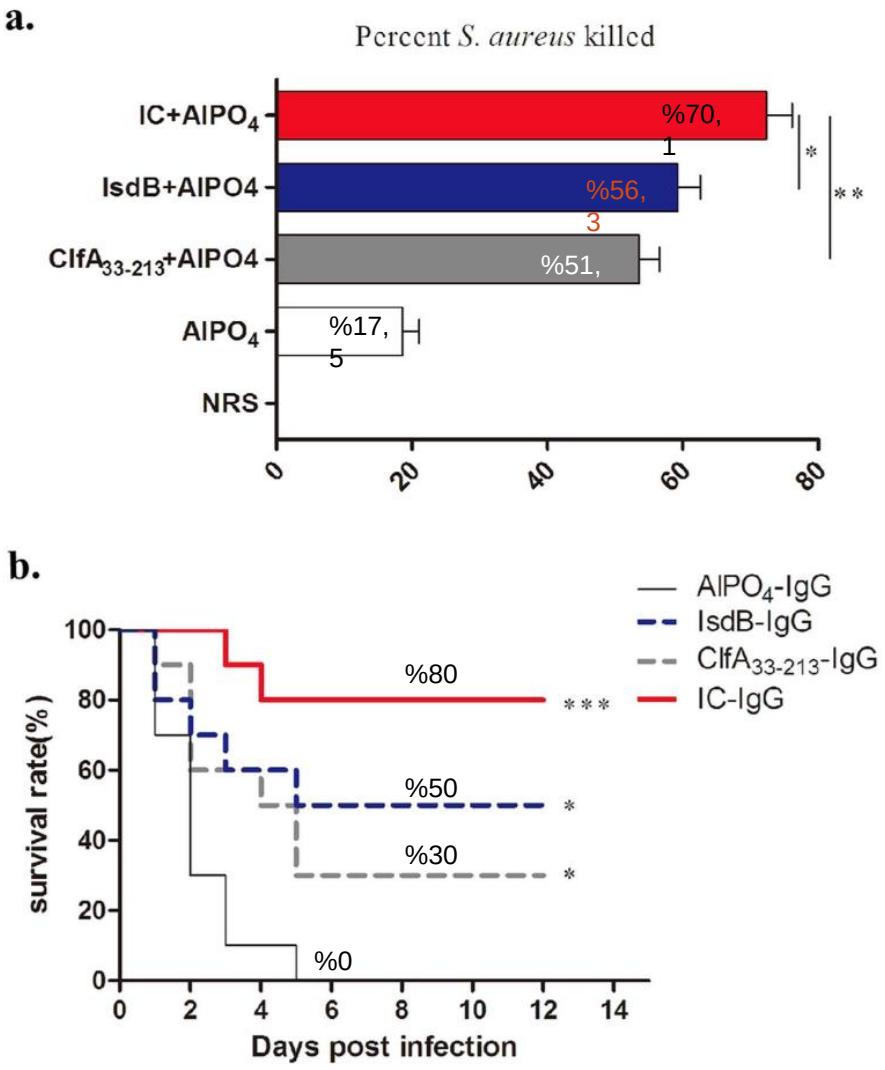
Recombinant proteins	Antibody response[#]		
	IgG	IgG1	IgG2a
IsdB	1.0733 ± 0.1206	0.7052 ± 0.0430	0.1546 ± 0.0708
$ClfA_{33-213}$	0.6747 ± 0.3884	0.6475 ± 0.0958	0.1348 ± 0.0643
IC	1.3467 ± 0.0443	1.0529 ± 0.0508	0.179 ± 0.10258

Table 1. Antibody responses induced by active immunisation with recombinant proteins. [#]Antibody response is expressed as mean absorbance at 450 nm ± SD. All serum samples were diluted 1:6000.

Recombinant proteins	Anti-IsdB antibody[*]	Anti-$ClfA_{33-213}$ antibody[*]	Significance[#]
IsdB	85,333 ± 13,492	ND	
$ClfA_{33-213}$	ND	120,000 ± 32,984	
IC	80,000 ± 16,000	128,000 ± 28,621	$^{a}P > 0.05$, $^{b}P > 0.05$

Table 2. IgG titers of specific antibodies for recombinant proteins (IsdB and $ClfA_{33-213}$). [*]IgG titers (mean serum titers ± SD) in response to immunization of mice as determined by ELISA (n = 6 animals). [#]Specific antibody titers raised against proteins were not significantly different when immunizing antigens were administered individually or in combination. ^{a}P, anti-IsdB antibodies from the mice immunized with IsdB were compared to those from the mice immunized with IC; ^{b}P, anti-$ClfA_{33-213}$ antibodies from the mice immunized with $ClfA_{33-213}$ were compared with those from the mice immunized with IC. ND means not detected.

Opsonofagositik deney ve pasif immunizasyon



Sitokin yanıtı ve T hücre polarizasyonu

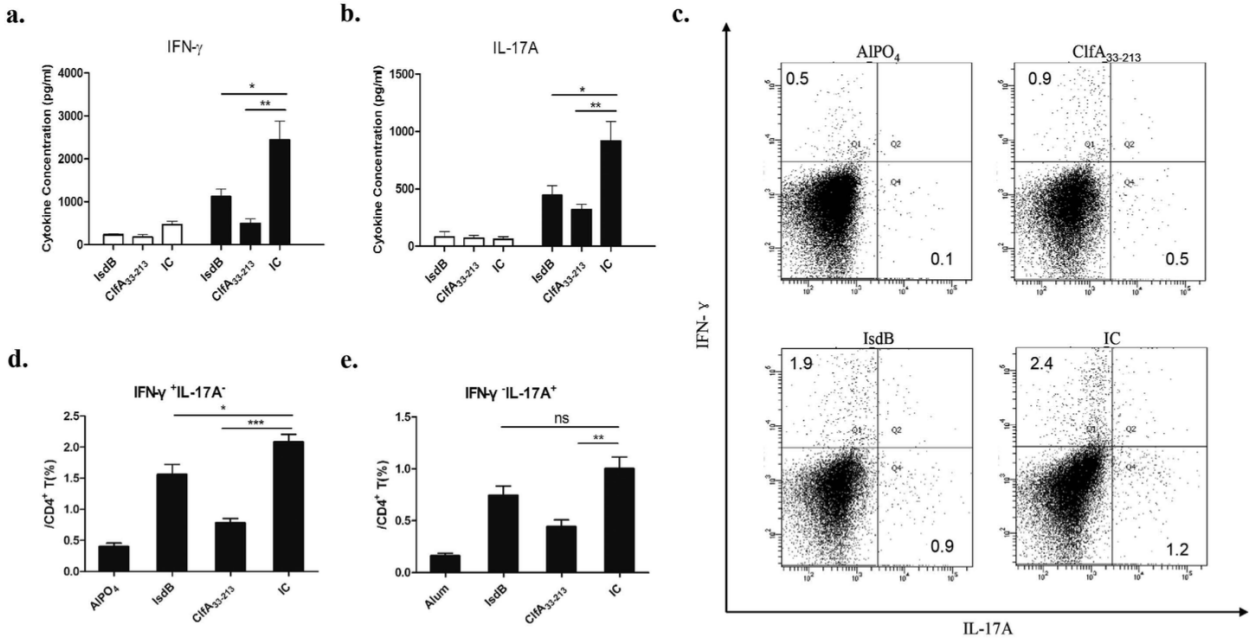


Figure 4. Cytokine responses and CD4$^+$ T cell polarization of splenocytes. One week following the last booster, the splenocytes from vaccinated mice (n = 6) were incubated with corresponding antigen proteins (10 μg/mL) for 5 days. The supernatants were harvested, and the cytokine levels of (**a**) IFN-γ, (**b**) IL-17A were determined. The means ± SEM were shown. Empty boxes representative without stimulation, black boxes representative splenocytes stimulate with corresponding proteins. Asterisks indicate significant differences. ($^*P < 0.05$, $^{**}P < 0.01$). (**c**) After 5 days incubation, the splenocytes were stimulated with PMA/ionomycin and Golgistop for 6 h. Cells were stained for CD3, CD4, IFN-γ, or IL-17, and was analysed by flow cytometry. The responses of Th1 (**d**) and Th17 (**e**) of the $AlPO_4$ group and recombinant vaccine immunised groups were presented as column bar graph and shown as means ± SEM. Results represent three independent experiments ($^*P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$).

Aşının etkinliğinde IL17A Rolü

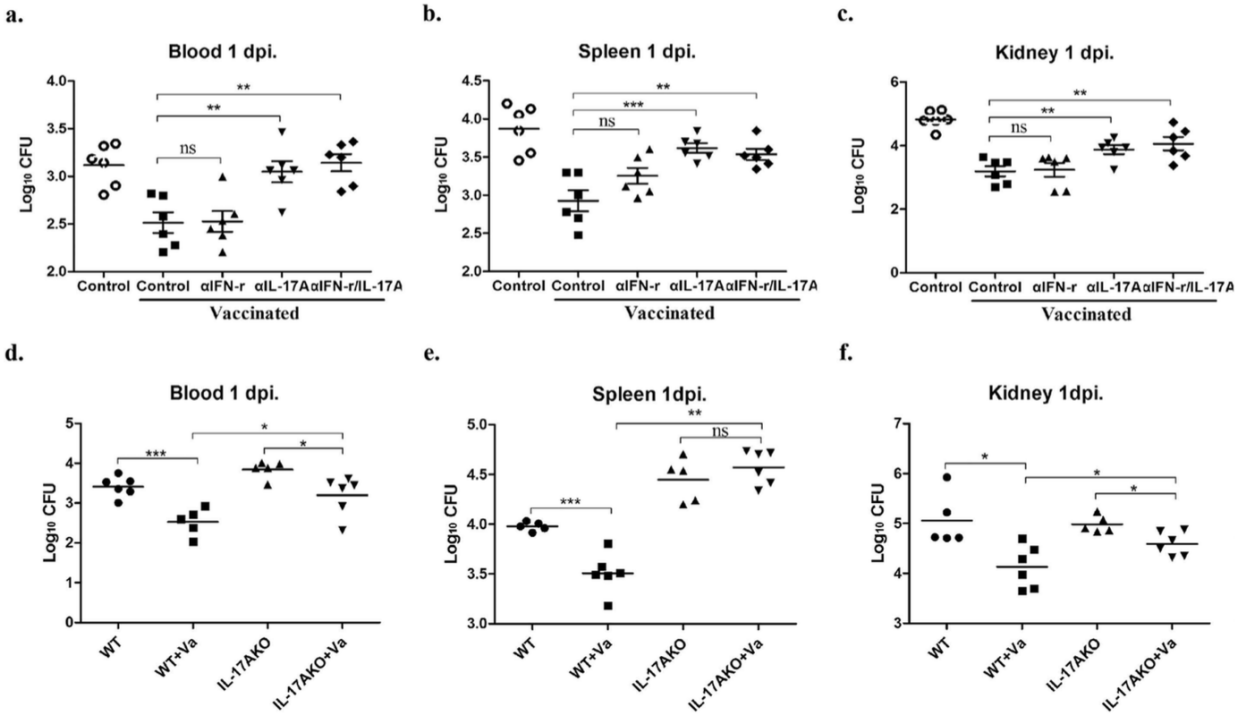


Figure 5. Impact of IFN-γ and/or IL-17A neutralisation on bacterial burdens in the protective effects of IC vaccination. Vaccinated BALB/c mice were injected with αIFN-γ, αIL-17A, or both at 2 days before infection. The unvaccinated mice or untreated vaccinated mice regarded as control or vaccinated control. Bacterial burdens were calculated in the blood (**a**), spleens (**b**) and kidneys (**c**) 3 days post-infection. (**d–f**) IL-17KO and WT mice were immunised as described before, the bacterial burdens were monitored 3 days post-infection. Data are presented as scatter plots, and the medians were shown. Asterisks indicate significant differences between vaccinated and control mice. Results represent three independent experiments ($^{*}P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$).

S. aureus pnömonisinde koruyuculuk

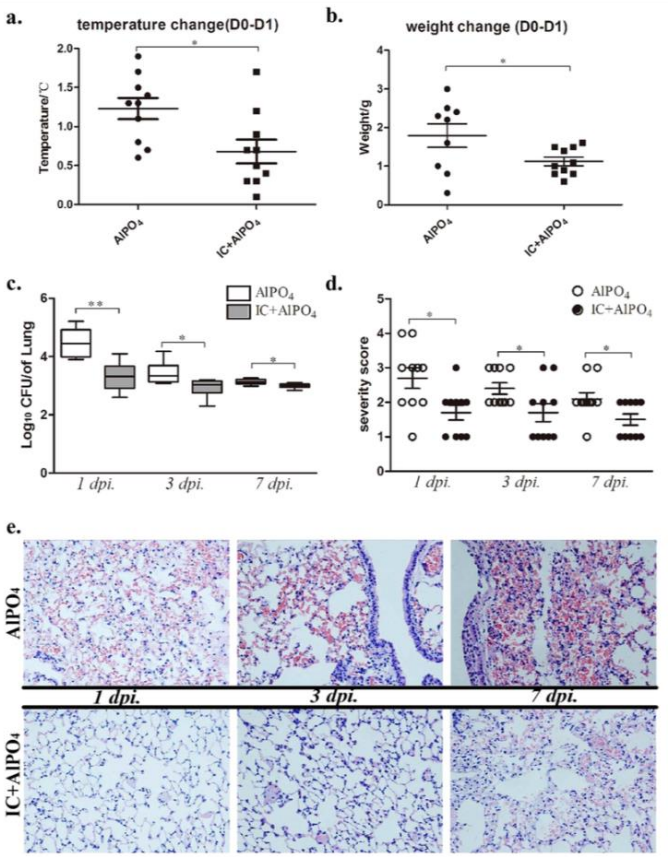


Figure 6. Immunisation with IC can effectively reduce lung damage in an *S. aureus* pneumonia model. C57 mice (n = 10) were immunised with IC on day 0, 14 and 21, and control group immunised with $AlPO_4$. Mice were inoculated with 4×10^8 CFUs of MRSA252 suspension in the naris on day 28. Temperature and weight changes were measured and shown as temperature(D0-D1) and weight(D0-D1) (**a,b**). The bacterial burdens (**c**) were calculated 1, 3 and 7 days post-infection. (**d**) The histological scores of pneumonia in four groups were monitored and presented as scatter plots. The data was presented as means derived from 3 independent experiments. (**e**) The representative HE-stained lung tissues (e, magnification = 400×) on 1, 3 and 7 days post-infection were shown.

SONUÇ

- ***S. aureus*** **yüzey antijenlerinden oluşan Kimerik IC aşısı *S. aureus* infeksiyonlarına karşı güçlü humoral ve hücresel yanıt oluşturuyor.**
- ***S. aureus*** **sepsis ve pnömonisinde etkili.**
- **Yeni bir aşı olarak umut verici.**

Original Investigation

Association of a Bundled Intervention With Surgical Site Infections Among Patients Undergoing Cardiac, Hip, or Knee Surgery

IMPORTANCE Previous studies suggested that a bundled intervention was associated with lower rates of *Staphylococcus aureus* surgical site infections (SSIs) among patients having cardiac or orthopedic operations.

OBJECTIVE To evaluate whether the implementation of an evidence-based bundle is associated with a lower risk of *S aureus* SSIs in patients undergoing cardiac operations or hip or knee arthroplasties.

DESIGN, SETTING, AND PARTICIPANTS Twenty hospitals in 9 US states participated in this pragmatic study; rates of SSIs were collected for a median of 39 months (range, 39-43) during the preintervention period (March 1, 2009, to intervention) and a median of 21 months (range, 14-22) during the intervention period (from intervention start through March 31, 2014).

INTERVENTIONS Patients whose preoperative nares screens were positive for methicillin-resistant *S aureus* (MRSA) or methicillin-susceptible *S aureus* (MSSA) were asked to apply mupirocin intranasally twice daily for up to 5 days and to bathe daily with chlorhexidine-gluconate (CHG) for up to 5 days before their operations. MRSA carriers received vancomycin and cefazolin or cefuroxime for perioperative prophylaxis; all others received cefazolin or cefuroxime. Patients who were MRSA-negative and MSSA-negative bathed with CHG the night before and morning of their operations. Patients were treated as MRSA-positive if screening results were unknown.

MAIN OUTCOMES AND MEASURES The primary outcome was complex (deep incisional or organ space) *S aureus* SSIs. Monthly SSI counts were analyzed using Poisson regression analysis.

RESULTS After a 3-month phase-in period, bundle adherence was 83% (39% full adherence; 44% partial adherence). Overall, 101 complex *S aureus* SSIs occurred after 28 218 operations during the preintervention period and 29 occurred after 14 316 operations during the intervention period (mean rate per 10 000 operations, 36 for preintervention period vs 21 for intervention period, difference, −15 [95% CI, −35 to −2]; rate ratio [RR], 0.58 [95% CI, 0.37 to 0.92]). The rates of complex *S aureus* SSIs decreased for hip or knee arthroplasties (difference per 10 000 operations, −17 [95% CI, −39 to 0]; RR, 0.48 [95% CI, 0.29 to 0.80]) and for cardiac operations (difference per 10 000 operations, −6 [95% CI, −48 to 8]; RR, 0.86 [95% CI, 0.47 to 1.57]).

CONCLUSIONS AND RELEVANCE In this multicenter study, a bundle comprising *S aureus* screening, decolonization, and targeted prophylaxis was associated with a modest, statistically significant decrease in complex *S aureus* SSIs.

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Supplemental content at jama.com

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Demet uygulamaları

- Standart değil,
- Çoğunlukla *S. aureus* taraması yapılmıyor, yada sadece MRSA taranıyor,
- Dekolonizasyon çoğunlukla MRSA için uygulanıyor,
- Çok merkezli çalışmaları içermiyor,
- Bu nedenle; çok merkezli (20 hastane), yarı deneysel pragmatik çalışma [(STOP SSSI) Study to Optimally Prevent SSIs in Select Cardiac and Orthopedic Procedures]planlandı.

Study to Optimally Prevent SSIs in Select Cardiac and Orthopedic Procedures (STOP SSI)

- Demet uygulamaları kardiyak, kalça-diz operasyonlarında kompleks (derin insizyonel veya organ-boşluk) *S. aureus* CAI'larını önlemede etkili.
- Çok merkezli (20 hastane), yarı deneysel, pragmatik çalışma.
- Demet uygulamaları (*S. aureus* taraması, taşıyıcıların dekolonizasyonu, optimal profilaksi).
- Uygulama öncesi dönem (Mart 2009-Haziran 2012) gözlemsel ölçüm.
- Uygulama sonrası (haziran 2012-mart 2014) prospektif müdahale.

İntranazal *S. aureus* taraması

MRSA/MSSA +	• Mupirocin 2x1 intra-nazal 5 gün • Klorhegzidin banyo 1x1 5 gün
MRSA/MSSA -	• Klorhegzidin banyo, op. öncesi ve op. günü
Preoperatif profilaksi	• MRSA+: Vankomisin+sefozlolin veya sefuroksim • MRSA-/MSSA+/--: sefazolin veya sefuroksim • Tarama -, MRSA öyküsü +: MRSA+gibi • Acil vakalar ve sonuç beklenen: MRSA+ gibi

Charecteristics of Ptients Undergoing Selected Operations During the Preintervention and Intervention Periods

	All	Preintervention	Intervention	*P* Value
Cardiac Operations				
No. of operations	10 833	7576	3257	
Women	3409 (31.5)	2408 (31.8)	1000 (30.7)	.27
Age, median (range), y	67 (18-95)	67 (18-94)	67 (18-95)	.78
Diabetes	4402 (40.6)	3023 (39.9)	1379 (42.3)	.02
Renal disease	31 (0.3)	25 (0.3)	6 (0.2)	.19
Cancer	184 (1.7)	127 (1.7)	57 (1.8)	.79
Charlson comorbidity score ≥2	5100 (47.1)	3600 (47.5)	1500 (46.1)	.16
MRSA history	449 (4.2)	329 (4.3)	120 (3.7)	.11
Smoking history[b]	2998 (60.0) (n = 5001)	1517 (60.9) (n = 2490)	1481 (60.0) (n = 2511)	.16
Albumin, mean (SD), g/dL[b]				
Preoperative[c]	3.53 (0.53) (n = 5475)	3.53 (0.53) (n = 2993)	3.53 (0.52) (n = 2482)	.88
Postoperative[c]	3.08 (0.59) (n = 3085)	3.17 (0.61) (n = 1881)	2.94 (0.52) (n = 1204)	<.001
Creatinine, mean (SD), mg/dL[b]				
Preoperative[d]	1.17 (0.97) (n = 6689)	1.20 (0.96) (n = 3746)	1.14 (1.00) (n = 2943)	<.001
Postoperative[d]	1.16 (0.88) (n = 8142)	1.20 (0.91) (n = 4930)	1.11 (0.86) (n = 3212)	<.001
Glucose, mean (SD), mg/dL[b]				
Preoperative[e]	126.9 (48.1) (n = 6805)	126.9 (49.0) (n = 3812)	126.9 (47.0) (n = 2993)	.96
Postoperative[e]	143.4 (46.9) (n = 8165)	142.5 (48.9) (n = 4955)	144.7 (43.6) (n = 3210)	<.001

	All	Preintervention	Intervention	*P* Value
Hip or Knee Arthroplasties				
No. of operations	31 701	20 642	11 059	
Women	19 395 (61.2) (n = 31 692)	12 661 (61.4) (n = 20 633)	6734 (60.9)	.41
Age, median (range), y	68 (18-107)	68 (21-107)	68 (18-101)	<.001
Diabetes	6304 (19.4)	4158 (20.1)	2146 (19.4)	.12
Renal disease	26 (0.08)	17 (0.08)	9 (0.08)	.98
Cancer	393 (1.2)	250 (1.2)	143 (1.3)	.53
Charlson comorbidity score ≥2	3590 (11.3)	2446 (11.9)	1144 (10.3)	<.001
MRSA history	1122 (3.5)	788 (3.8)	334 (3.0)	<.001
Smoking history[b]	7749 (46.6) (n = 16 631)	3656 (47.4) (n = 7717)	4093 (45.9) (n = 8914)	.06
Albumin, mean (SD), g/dL[b]				
Preoperative[c]	3.72 (0.46) (n = 6918)	3.73 (0.46) (n = 3682)	3.71 (0.46) (n = 3236)	.03
Postoperative[c]	2.89 (0.46) (n = 3157)	2.91 (0.49) (n = 1832)	2.84 (0.41) (n = 1325)	<.001
Creatinine, mean (SD), mg/dL[b]				
Preoperative[d]	1.00 (0.58) (n = 14 474)	1.03 (0.57) (n = 7435)	0.97 (0.58) (n = 7039)	<.001
Postoperative[d]	1.00 (0.66) (n = 21 303)	1.03 (0.75) (n = 11 644)	0.98 (0.54) (n = 9659)	<.001
Glucose, mean (SD), mg/dL[b]				
Preoperative[e]	110.5 (34.0) (n = 15 567)	112.0 (34.1) (n = 8022)	108.9 (33.9) (n = 7545)	<.001
Postoperative[e]	137.6 (38.6) (n = 21 391)	138.3 (37.8) (n = 11 798)	136.8 (39.6) (n = 9593)	.04

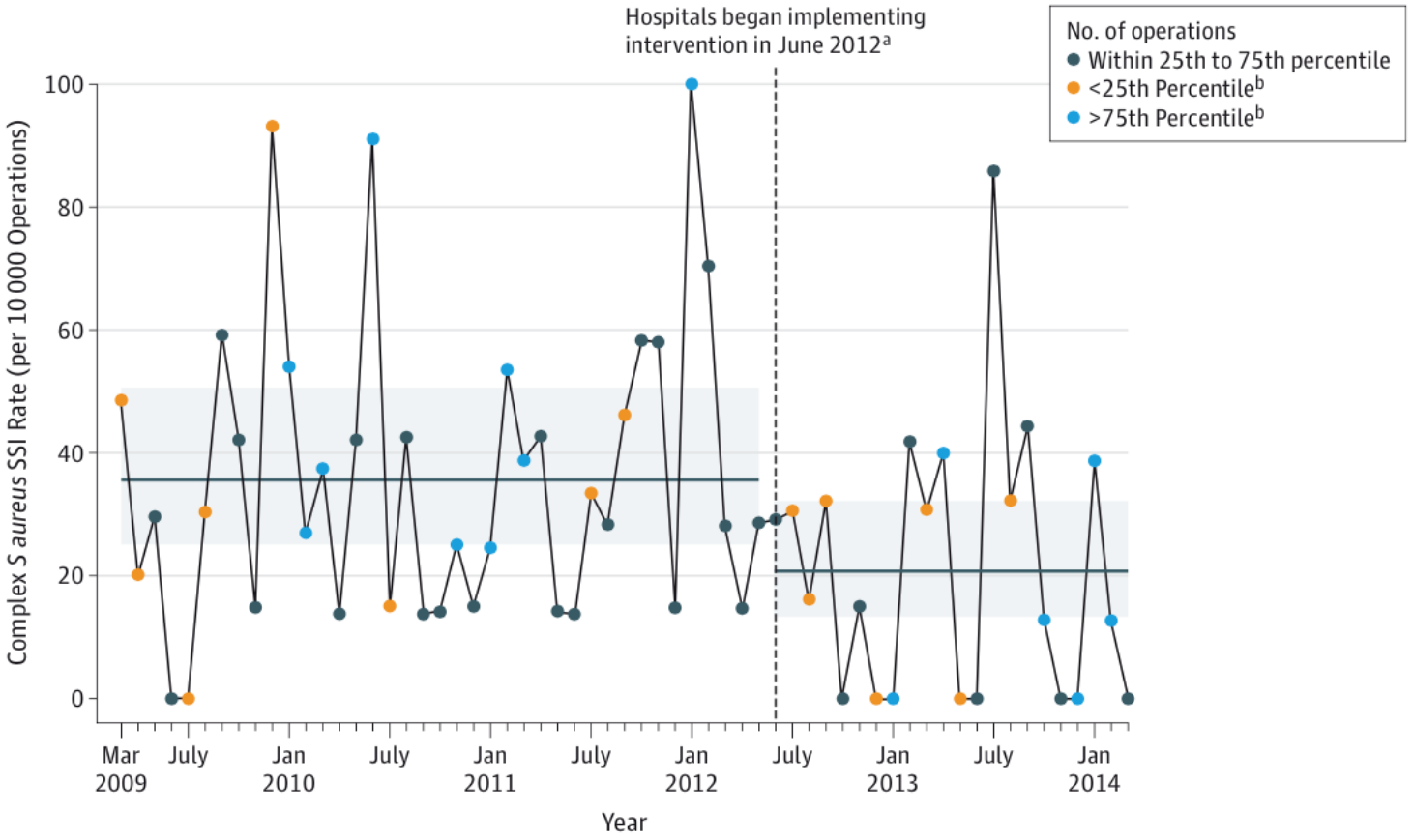
CAI hızı

	Kompleks CAI
• Müdahale öncesi	101 (MRSA 45, MSSA 44)
• Müdahale sonrası	29 (MRSA 14, MSSA 13)

- Lojistik regresyon (yaş, diyabet, Charlson komorbidite indeksi, MRSA öyküsü kontrol edilerek)

  OR 0,60 (%95 CI 0,37-0,98)

Figure 1. Pooled Rate of Complex *Staphylococcus aureus* Surgical Site Infections (SSIs) by Admission Month



infeksiyon gelişmeyen ay: 2|39 (%5,1); 8|22 (%36,4) p=0,006 Fisher exact

Table 2. Poisson Regression Analysis of Monthly Rates of Complex *Staphylococcus aureus* Surgical Site Infections per 10 000 Operations

	Preintervention Period		Intervention Period		Rate Ratio for Bundled Intervention (95% CI)	*P* Value
	No. of Operations	Mean Rate (95% CI)	No. of Operations	Mean Rate (95% CI)		
All operations	28 218	36 (25-51)	14 316	21 (13-32)	0.58 (0.37-0.92)[a]	.02
Urgent/emergent			1189	37 (15-88)	1.03 (0.41-2.57)[a]	.95
Scheduled			13 127	20 (13-30)	0.55 (0.35-0.86)[a]	.009
Cardiac operations	7576	46 (26-82)	3257	40 (23-70)	0.86 (0.47-1.57)[b]	.63
Urgent/emergent			571	67 (32-137)	1.44 (0.53-3.91)[b]	.48
Scheduled			2686	33 (18-62)	0.72 (0.45-1.15)[b]	.17
Hip or knee arthroplasties	20 642	32 (21-48)	11 059	15 (10-24)	0.48 (0.29-0.80)[c]	.005
Urgent/emergent			618	14 (3-75)	0.44 (0.07-2.72)[c]	.38
Scheduled			10 441	16 (10-26)	0.51 (0.30-0.85)[c]	.009

Abbreviations: SSI, surgical site infection.

[a] Compared with the monthly rates of complex *S aureus* SSIs after all operations performed during the preintervention period.

[b] Compared with the monthly rates of complex *S aureus* SSIs after all cardiac operations performed during the preintervention period.

[c] Compared with the monthly rates of complex *S aureus* SSIs after all hip or knee arthroplasties performed during preintervention period.

Figure 2. Bundled Intervention Adherence by Month During the Intervention Period (N = 14 316 Operations)

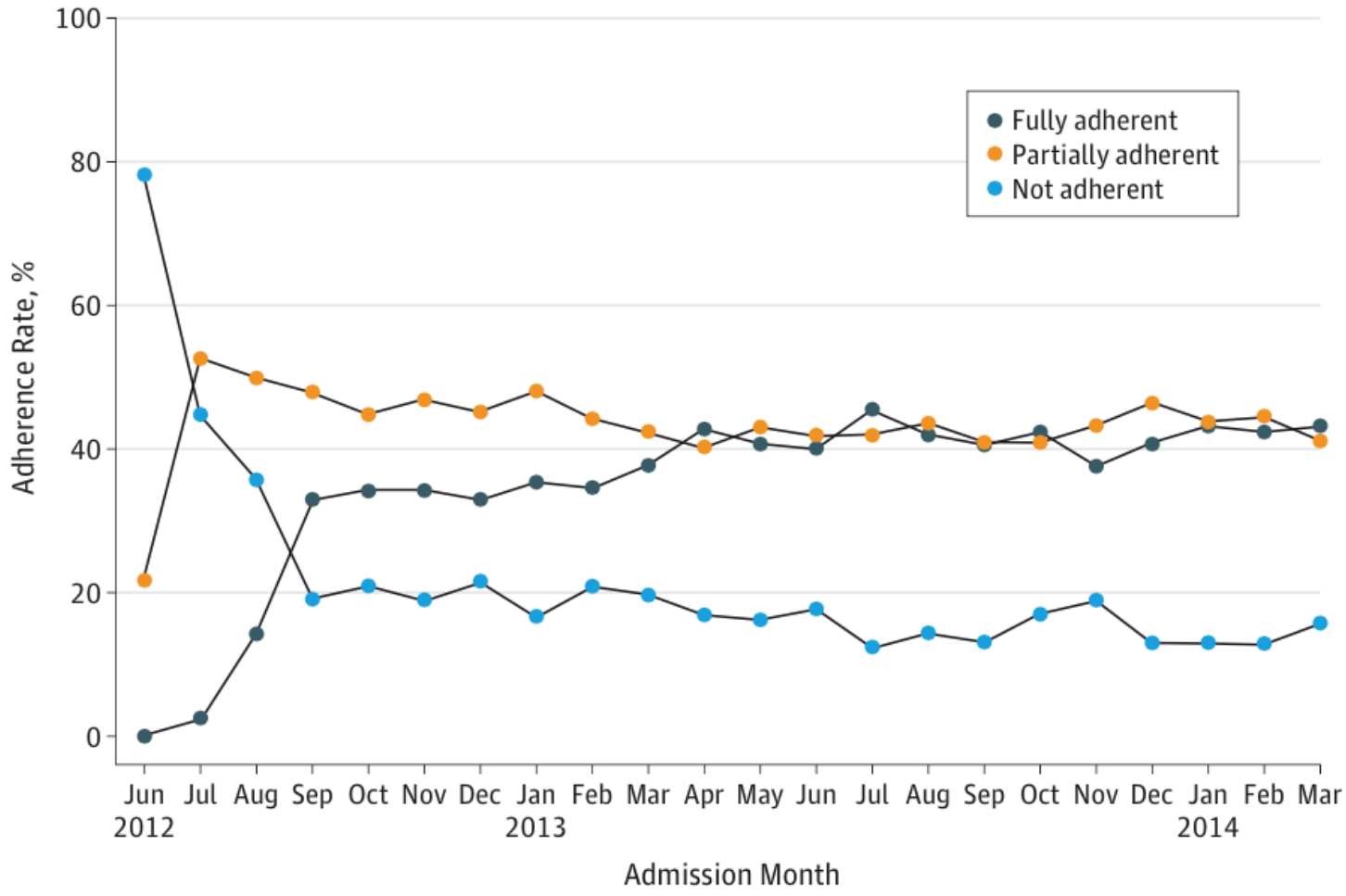
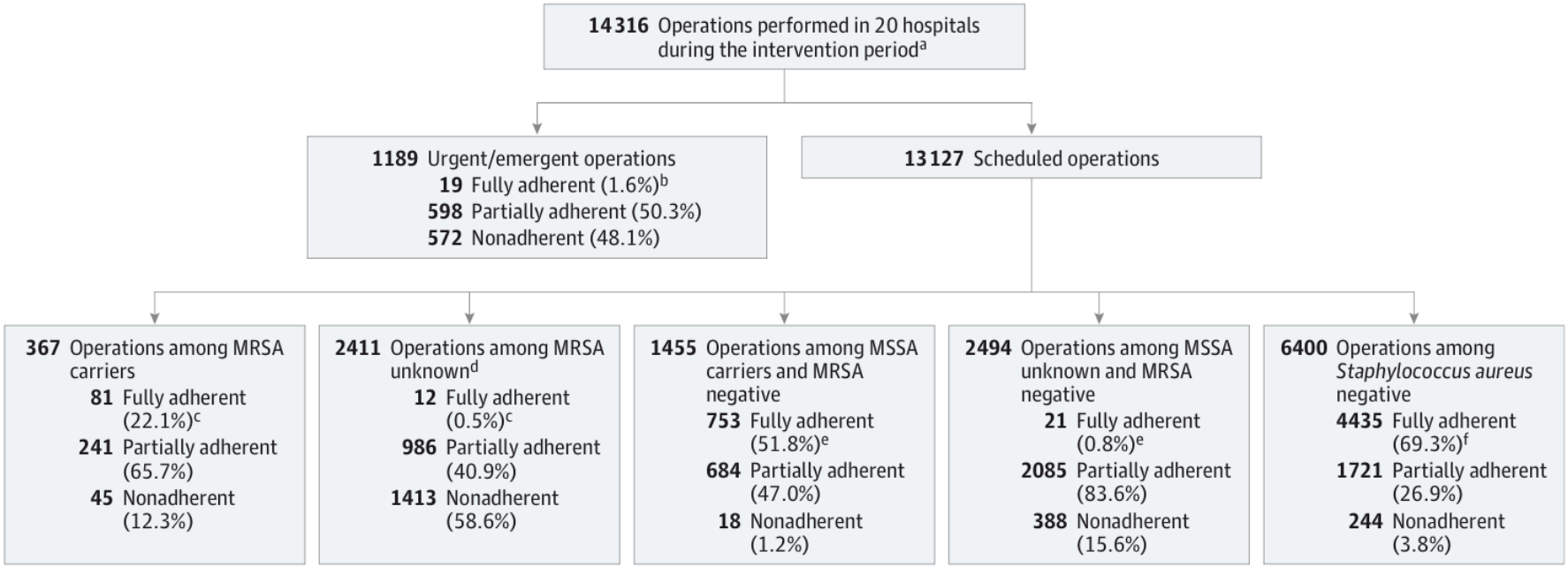


Figure 3. Bundled Intervention Adherence by Operation Scheduling and *Staphylococcus aureus* Carriage Status



CHG indicates chlorhexidine gluconate; MSSA, methicillin-susceptible *S aureus*; MRSA, methicillin-resistant *S aureus*.

[a] Includes patients whose surgeons did not implement the bundle.

[b] Fully adherent defined as patient received both mupirocin (≥ 1 day) and prophylaxis with vancomycin and cefazolin or cefuroxime.

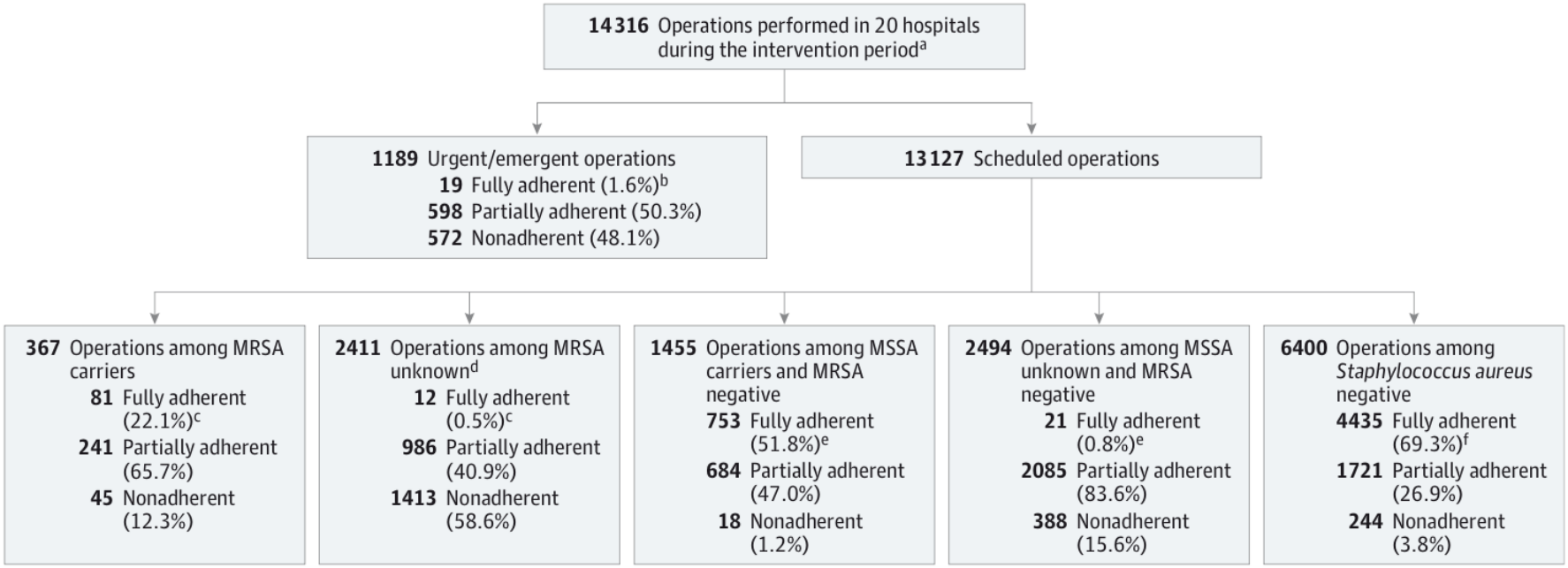
[c] Fully adherent defined as patient received CHG bathing, mupirocin for 3 days or more, and prophylaxis with vancomycin and cefazolin or cefuroxime.

[d] Among MRSA unknown, 1924 operations (79.8%) were MSSA unknown, 376 operations (15.6%) were MSSA noncarriers, and 111 operations (4.6%) were MSSA carriers.

[e] Fully adherent defined as patient received CHG bathing, mupirocin for 3 days or more, and cefazolin or cefuroxime prophylaxis.

[f] Fully adherent defined as patient received both CHG bathing and cefazolin or cefuroxime prophylaxis.

Figure 3. Bundled Intervention Adherence by Operation Scheduling and *Staphylococcus aureus* Carriage Status



CHG indicates chlorhexidine gluconate; MSSA, methicillin-susceptible *S aureus*; MRSA, m

[a] Include

[b] Fully ad prophy

[c] Fully ad or more

[d] Among MRSA unknown, 1924 operations (79.8%) were MSSA unknown, 376) were

or 3 days

azolin or

	Kompleks CAI
Tam uyum	RR, 0,26 [%95 CI, 0,10-0,69]
Kısmi uyum veya uyum yok	RR, 0,80 [%95 CI, 0,49-1,31]
Demetlere uyum gosteren Cerrah	RR, 0,54 [%95 CI, 0,34-0,88]
Demetlere uyum gostermeyen Cerrah	RR, 0,80 [%95 CI, 0,33-1,98]

SONUÇ

- Demet uygulamaları *S. aureus* CAI hızını azaltıyor.
- Başka bir etkenle CAI gelişiminde artışa yol açmıyor.
- Yan etki çok az (4 hastada klorhegzidine bağlı irritasyon).
- Tam uyum (%39) düşük, müdahale öncesi CAI oranı düşük (0,36|10000) ve müdahale öncesi olguların bir kısmında demet uygulaması olmasına rağmen, kompleks CAI hızında belirgin oranda azalma var.

Skin antisepsis with chlorhexidine–alcohol versus povidone iodine–alcohol, with and without skin scrubbing, for prevention of intravascular-catheter-related infection (CLEAN): an open-label, multicentre, randomised, controlled, two-by-two factorial trial

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Lancet Vol 386 November 21, 2015

Summary

Background Intravascular-catheter-related infections are frequent life-threatening events in health care, but incidence can be decreased by improvements in the quality of care. Optimisation of skin antisepsis is essential to prevent short-term catheter-related infections. We hypothesised that chlorhexidine–alcohol would be more effective than povidone iodine–alcohol as a skin antiseptic to prevent intravascular-catheter-related infections.

Methods In this open-label, randomised controlled trial with a two-by-two factorial design, we enrolled consecutive adults (age ≥18 years) admitted to one of 11 French intensive-care units and requiring at least one of central-venous, haemodialysis, or arterial catheters. Before catheter insertion, we randomly assigned (1:1:1:1) patients via a secure web-based random-number generator (permuted blocks of eight, stratified by centre) to have all intravascular catheters prepared with 2% chlorhexidine–70% isopropyl alcohol (chlorhexidine–alcohol) or 5% povidone iodine–69% ethanol (povidone iodine–alcohol), with or without scrubbing of the skin with detergent before antiseptic application. Physicians and nurses were not masked to group assignment but microbiologists and outcome assessors were. The primary outcome was the incidence of catheter-related infections with chlorhexidine–alcohol versus povidone iodine–alcohol in the intention-to-treat population. This study is registered with ClinicalTrials.gov, number NCT01629550 and is closed to new participants.

Findings Between Oct 26, 2012, and Feb 12, 2014, 2546 patients were eligible to participate in the study. We randomly assigned 1181 patients (2547 catheters) to chlorhexidine–alcohol (594 patients with scrubbing, 587 without) and 1168 (2612 catheters) to povidone iodine–alcohol (580 patients with scrubbing, 588 without). Chlorhexidine–alcohol was associated with lower incidence of catheter-related infections (0·28 *vs* 1·77 per 1000 catheter-days with povidone iodine–alcohol; hazard ratio 0·15, 95% CI 0·05–0·41; p=0·0002). Scrubbing was not associated with a significant difference in catheter colonisation (p=0·3877). No systemic adverse events were reported, but severe skin reactions occurred more frequently in those assigned to chlorhexidine–alcohol (27 [3%] patients *vs* seven [1%] with povidone iodine–alcohol; p=0·0017) and led to chlorhexidine discontinuation in two patients.

Interpretation For skin antisepsis, chlorhexidine–alcohol provides greater protection against short-term catheter-related infections than does povidone iodine–alcohol and should be included in all bundles for prevention of intravascular catheter-related infections.

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See Comment page 2034

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Çalışma Dizaynı

- **Hipotez:**
  - **Kataterle ilişkili infeksiyonları önlemede klorheksidin %70 – isopropil alkol %70, povidon iyot %5 – etanol %69 göre daha etkili.**
  - **Antiseptik uygulama öncesi cildin antiseptik deterjanlarla temizlenmesinin (ovulması) etkisi yok.**
- **Açık uçlu, çok merkezli, randomize, kontrollü, ikiye iki faktörlü çalışma planlandı.**
- **11 yoğun bakim ünitesi**
  - **5 dahili, 5 cerrahi, 1 genel**
- **48 saatten daha uzun en az 1 arteriyel, hemodiyaliz veya SVK**

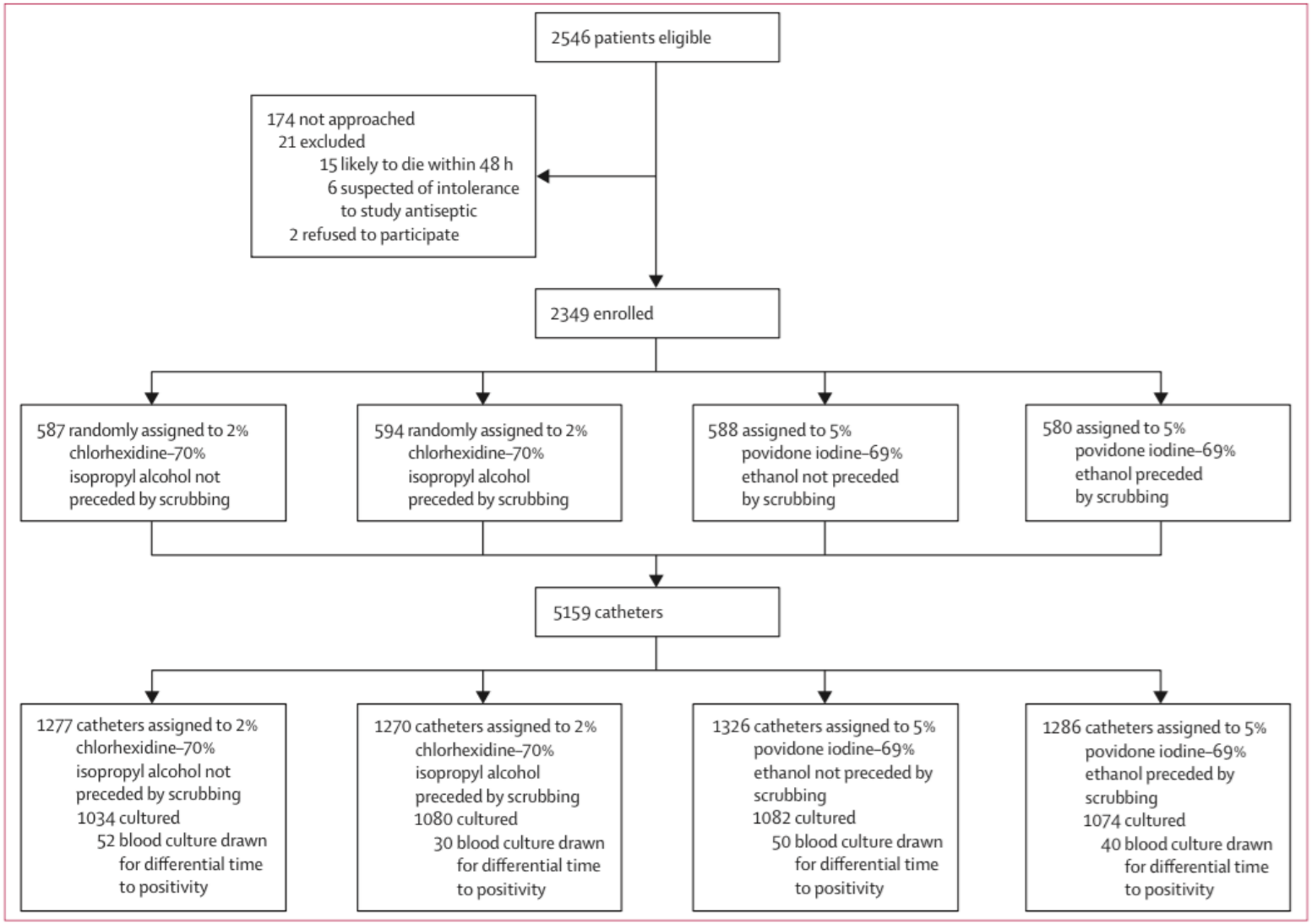
Çalışma Dizaynı

- Olgular YB'dan taburcu sonrası 48 saat izlendi
- Kültür
  - Kateter ucu kültür,
  - Kateter çıkarılmayanlarda: Kateter içinden ve diğer koldan kan kültürü,
  - Kateter çıkarmadan önce Count-tact (triptik soy agar) cilt kolonizasyonu için,
  - Kateterle ilişkili infeksiyon şüphesi varlığında, kültür alınıyor.

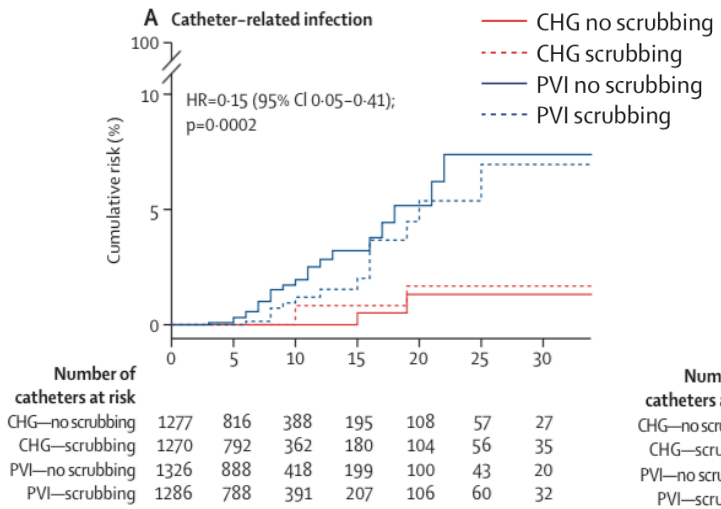
Tanılar

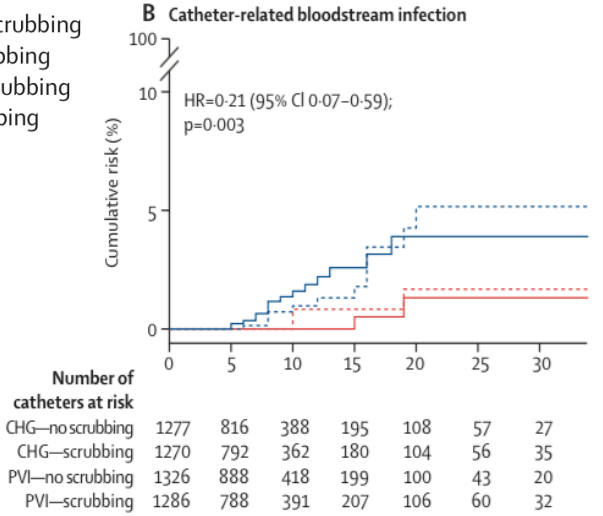
- **Kateter kolonizasyonu:**
  - **Kantitatif kateter ucu kültüründe 10^3 CFU|mL**
- **Kateterle ilişkili sepsis**
  - **Bakteriyemi yok**
  - **Ateş (>38 ^{0}C) veya hipotermi (<36)**
  - **Kateter kolonizasyonu**
  - **Kateter çıkarıldıktan 48 saat içinde semptomların gerilemesi ve antibiyotikle değişiklik olmaması**
  - **Başka bir yerde infeksiyon odağının olmaması**
- **Kateterle ilişkili bakteriyemi**
  - **Ateş veya hipotermi**
  - **1 veya daha fazla kan kültürü pozitifliği**
  - **Ayni mikroorganizmanın üremesi (kateter veya ciltten)**
  - **veya kateter içi kültürün diğer venden alınan kültürden >2 saat önce üremesi**
  - **Başka bir infeksiyon odağının olmaması**

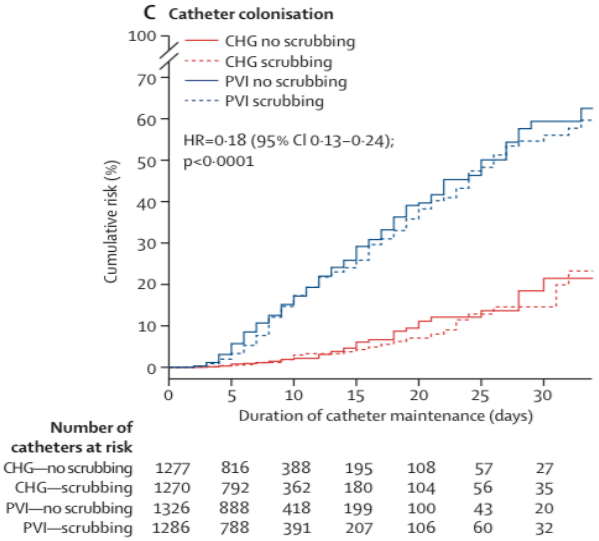
Çalışma Profili



CHG infeksiyonu önlemede daha etkili







CHG 0,28 | 1000 katater gun
PVI 1,77 | 1000 katater gun

CHG 0,28 | 1000 katater gun
PVI 1,32 | 1000 katater gun

CHG 3,34 | 1000 katater gun
PVI 18,74 | 1000 katater gun

Yatış kriterleri, SAPSII skoru, kateter tipi ve lokasyonu gibi faktörler etkisiz
Yatış süresi ve mortalite arasında fark yok

Sonuç

- Cilt antisepsisine %2 klorheksidin-alkol tercih edilmesi durumunda povidon iyot-alkole göre;
  - Kateter ile ilişkili infeksiyon ve kateter kolonozasyonunda 6 kat,
  - Kateterle ilişkili kan dolaşımı infeksyon hızında 5 kat azalama sağlıyor.
  - Etkinlik hastalık şiddeti, YB özelliği, kateter tipi ve lokasyonundan bağımsız ve gram pozitif ve negatif mikroorganizmaları kapsıyor.
- Antiseptik öncesi cilt temizliği faydalı değil.