Intraabdominal Enfeksiyonlara Yaklaşım

Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Uzmanı Gözüyle

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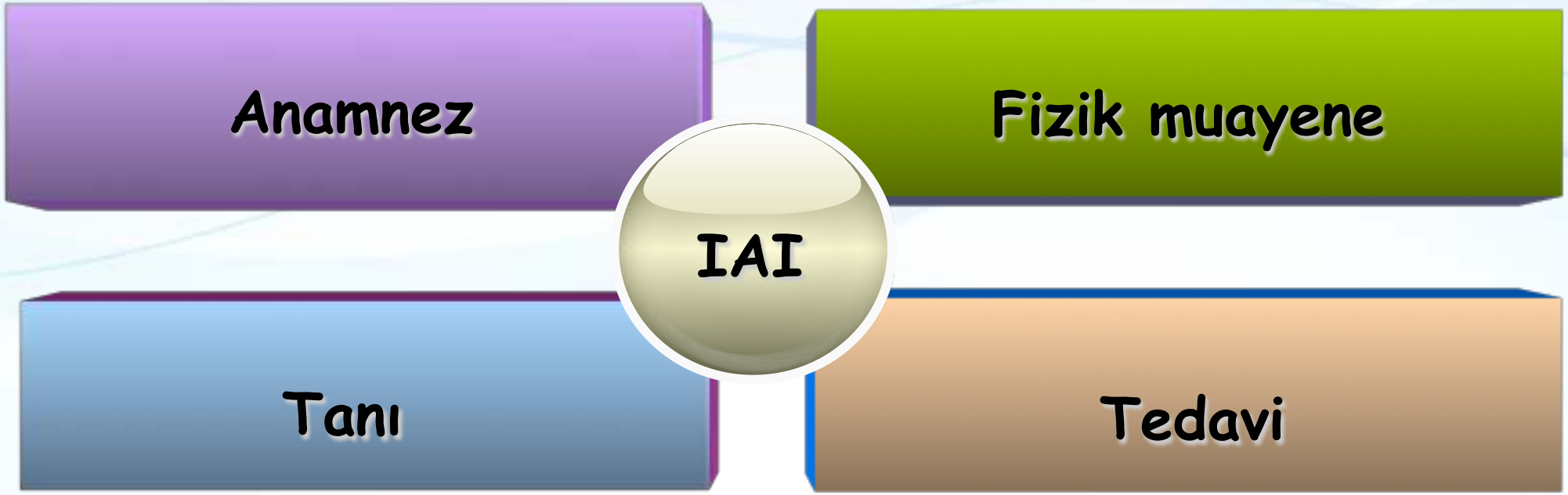
Intraabdominal Enfeksiyonlar

- Yoğun bakım ünitelerinde enfeksiyon ilişkili ölümlerin en sık ikinci nedeni

- Komplike olmayan IAI
  - Tek organı tutan enfeksiyon
  - Periton boşluğuna yayılım yok
- Komplike IAI
  - Periton boşluğuna yayılım
  - Abdominal boşluktaki normalde steril olan diğer bölgelere yayılım

İlk değerlendirme



Genel prensip

Kaynak kontrolü

Destek tedavi

Antibiyotik tedavisi

- İlk müdahalede gecikme (>24 saat)
- Yüksek şiddette hastalık (APACHE II skoru ≥15)
- İleri yaş
- Komorbidite ve organ disfonksiyonunun derecesi
- Düşük albümin düzeyi
- Kötü beslenme durumu
- Periton tutulumu ya da diffüz peritonitin derecesi
- Yeterli debridman veya drenaj kontrolünün sağlanamaması
- Malignite varlığı

Antibiyoterapi

- Empirik tedavide kapsanmalı:
  - Enterik aerobik Gram negatifler
  - Fakültatif anaerobik basiller
  - Enterik Gram pozitif streptokoklar
  - Zorunlu anaerobik basiller
    - Distal İB, apendiks, kolon tutulumu

Solomkin JS. *CID* 2010; 50: 133-64

- *Escherichia coli*
- *Klebsiella* sp
- *Enterobacter* sp
- *Pseudomonas aeruginosa*
- Streptokoklar
  - Viridans!
- Enterokoklar
  - *E. faecalis*

- *Bacteroides fragilis*
- *Peptostreptococcus*
- *Peptococcus*
- *Eubacteria*
- *Fusobacterium*
- *Clostridia* sp…

- Fungal
  - *C. albicans*→ HK

Mazuski JE. *Surg Clin N Am* 2009; 89: 421-37

Randomize prospektif üç çalışma

Organism	Patients, % (n = 1237)
Facultative and aerobic gram-negative	
Escherichia coli	71
Klebsiella species	14
Pseudomonas aeruginosa	14
Proteus mirabilis	5
Enterobacter species	5
Anaerobic	
Bacteroides fragilis	35
Other *Bacteroides* species	71
Clostridium species	29
Prevotella species	12
Peptostreptococcus species	17
Fusobacterium species	9
Eubacterium species	17
Gram-positive aerobic cocci	
Streptococcus species	38
Enterococcus faecalis	12
Enterococcus faecium	3
Enterococcus species	8
Staphylococcus aureus	4

Solomkin JS. *CID* 2010; 50: 133-64

- Kan kültürü
  - TK-IAI' da klinik olarak ek bilgi sağlamayacağı için rutin önerilmez
  - Toksik kliniği olan ya da immunkompromize olanlarda yardımcı
- Gram boyama
  - TK-IAI' da önerilmez
  - HK-IAI' da mantar tanımlamasında yardımcı
- Aerobik ve anaerobik kültürler
  - Düşük riskli TK-IAI' da opsiyonel
    - Epidemiyolojik değişiklikler, direnç paterni, ardışık oral tedavi planı için yardımcı
  - HK ya da direnç riski olan TK-IAI' da önerilir

Solomkin JS. *CID* 2010; 50: 133-64
Sartelli M. *World J Emerg Surg* 2013; 8:3

Komplike olmayan IAI

- En sık
  - Apandisit
  - Divertikülit
  - Kolesistit

- Cerrahi ile enfeksiyonun ortadan kaldırıldığı durumlarda perioperatif 24 saatlik antibiyotik tedavisi etkilidir
  - Konservatif antibiyoterapiyle de tedavi sağlanabilir

Sartelli M. *World J Emerg Surg* 2013; 8:3

Apandisit

- TK-IAI en sık nedeni
- Çocukluk çağında ve 15-25 yaşta daha sık
- ABD 300.000/yıl apandektomi
- Sıklıkla polimikrobiyal
- Komplike IAI' da kolonik mikroflora

Apandisit

- 2008-2010 yılları
- 1.720 Gram negatif basil
  - *E. coli* %68.3
  - *K. pneumoniae* %10.1
  - *P. aeruginosa* %6.9
- ESBL oranları apandisit dışı IAI etkenlerine göre daha düşük
  - Normal barsak florası etkenleri

Lob SH. *Surg Infect* 2013; 14: 203-8

Apandisit

- Intraoperatif kültürün rutin olarak alınması önerilmemekte
  - Klinik önemi gösterilememiş
- Kan kültürleri de ek bilgi vermemekte
- Bölgesel epidemiyolojik veriler empirik tedaviyi belirlemeli

- Tedavi
  - Cerrahi
  - Sıvı tedavisi
  - Antibiyotik tedavisi*

*"antibiotics first"

Meta-analiz

Sistematik review

Diğer

Komplike olmayan apandisit

Apendektomi vs antibiyotik

Flum DR. *N Engl J Med* 2015; 372: 1937-43

Vons C. *Lancet* 2011; 377: 1573-9

Salminen P. *JAMA* 2015; 313: 2340-8

Varadhan KK. *World J Surgery* 2010; 34: 199-209

Ansaloni L. *Dig Surg* 2011; 28: 210-21

Liu K. *Surgery* 2011; 150: 673-83

Varadhan KK. *BMJ* 2012; 344: e2156…

Antibiyoterapi "non-inferiority" karşılamıyor
Uzun dönemde rekürrens oranları fazla
Çalışmalarda kısıtlılıklar var
Cerrahi prosedürlerin risklerine karşılık rekürren apandisit risk tartılmalı

Divertikülit

- İleri yaşlarda daha sık
  - Seksen yaşına kadar ~%70 erişkin farklı seviyelerde divertiküler hastalıkla karşılaşıyor
    - Sadece %10-25' i klinik olarak anlamlı hale geliyor

- Polimikrobiyal
  - *E. coli*
  - *B. fragilis*
  - Alfa hemolitik streptokoklar
  - Gamma hemolitik streptokoklar

Tursi A. *Ailment Pharmcol* 2009; 30: 532-46

Brook I. *J Med Microbiol* 2000; 49:827-30

Diagnosis and Management of Complicated Intra-abdominal Infection in Adults and Children: Guidelines by the Surgical Infection Society and the Infectious Diseases Society of America

IDSA **Agents and Regimens that May Be Used for the Initial Empiric Treatment of Extra-biliary Complicated Intra-abdominal Infection**

		Community-acquired infection in adults	
Regimen	Community-acquired infection in pediatric patients	Mild-to-moderate severity: perforated or abscessed appendicitis and other infections of mild-to-moderate severity	High risk or severity: severe physiologic disturbance, advanced age, or immunocompromised state
Single agent	Ertapenem, meropenem, imipenem-cilastatin, ticarcillin-clavulanate, and piperacillin-tazobactam	Cefoxitin, ertapenem, moxifloxacin, tigecycline, and ticarcillin-clavulanic acid	Imipenem-cilastatin, meropenem, doripenem, and piperacillin-tazobactam
Combination	Ceftriaxone, cefotaxime, cefepime, or ceftazidime, each in combination with metronidazole; gentamicin or tobramycin, each in combination with metronidazole or clindamycin, and with or without ampicillin	Cefazolin, cefuroxime, ceftriaxone, cefotaxime, ciprofloxacin, or levofloxacin, each in combination with metronidazole[a]	Cefepime, ceftazidime, ciprofloxacin, or levofloxacin, each in combination with metronidazole[a]

[a] Because of increasing resistance of *Escherichia coli* to fluoroquinolones, local population susceptibility profiles and, if available, isolate susceptibility should be reviewed.

Solomkin JS. *CID* 2010; 50: 133-64

IDSA

Önerilmez!

- Ampisilin-sulbaktam kullanımı TK *E.coli*' de yüksek direnç oranları nedeniyle,
- Sefotetan ve klindamisin kullanımı *Bacteroides fragilis* grubunda artan direnç oranları nedeniyle,
- ErişkinTK-IAI' da rutin amikasin kullanımı en az amikasin kadar etkili ancak daha az toksik ajanların olması nedeniyle,
- TK-IAI' da empirik tedavide
  - Enterokokların kapsanması,
  - Antifungal tedavi önerilmez.

Solomkin JS. *CID* 2010; 50: 133-64

IAI-Antifungal kullanımı

Clinical Practice Guideline for the Management of Candidiasis: 2016 Update by the Infectious Diseases Society of America

Peter G. Pappas,[1] Carol A. Kauffman,[2] David R. Andes,[3] Cornelius J. Clancy,[4] Kieren A. Marr,[5] Luis Ostrosky-Zeichner,[6] Annette C. Reboli,[7] Mindy G. Schuster,[8] Jose A. Vazquez,[9] Thomas J. Walsh,[10] Theoklis E. Zaoutis,[11] and Jack D. Sobel[12]

[1]University of Alabama at Birmingham; [2]Veterans Affairs Ann Arbor Healthcare System and University of Michigan Medical School, Ann Arbor; [3]University of Wisconsin, Madison; [4]University of Pittsburgh, Pennsylvania; [5]Johns Hopkins University School of Medicine, Baltimore, Maryland; [6]University of Texas Health Science Center, Houston; [7]Cooper Medical School of Rowan University, Camden, New Jersey; [8]University of Pennsylvania, Philadelphia; [9]Georgia Regents University, Augusta; [10]Weill Cornell Medical Center and Cornell University, New York, New York; [11]Children's Hospital of Pennsylvania, Philadelphia; and [12]Harper University Hospital and Wayne State University, Detroit, Michigan

- Empirik tedavi intraabdominal kandidiyaz için risk faktörleri olan hastalarda önerilir (güçlü öneri; orta nitelikte kanıt)
  - Tekrarlayan –laparoskopi dahil- cerrahi girişimler
  - Anastomoz kaçakları
  - Nekrotizan pankreatit
  - Gastroduodenal perforasyonlar

- Tedavi kaynak kontrolüyle drenaj ve/veya debritmanı da içermeli (Güçlü öneri; orta nitelikte kanıt)

- Antifungaller
  - Ekinokandinler (Güçlü öneri; yüksek nitelikte kanıt)
  - Flukonazol (Güçlü öneri; yüksek nitelikte kanıt)
    - Kritik hastalar ve azol dirençli kandida türleri hariç
  - Lf-AmpB(Güçlü öneri; yüksek nitelikte kanıt)
    - Diğer antifungallere direnç, ulaşamama, intolerans durumlarında alternatif

Pappas et al. *CID* 2016; 1-50

- IAI' da surrogate markerların ve kandida risk skorlamasının rolü henüz belirlenmemiştir

- Steril olması gereken abdominal kültürde ya da klinik bulgusu olan hastada dren takıldıktan sonra ilk 24 saat içinde alınan kültürde *Candida* spp üremesi durumunda tedavi önerilir

- Tedavi süresi klinik yanıta ve kaynak kontrolü sağlanmasına göre belirlenmelidir

Pappas et al. *CID* 2016; 1-50

REVIEW Open Access

2013 WSES guidelines for management of intra-abdominal infections

Massimo Sartelli[1*], Pierluigi Viale[2], Fausto Catena[3], Luca Ansaloni[4], Ernest Moore[5], Mark Malangoni[6], Frederick A Moore[7], George Velmahos[8], Raul Coimbra[9], Rao Ivatury[10], Andrew Peitzman[11], Kaoru Koike[12], Ari Leppaniemi[13], Walter Biffl[5], Clay Cothren Burlew[5], Zsolt J Balogh[14], Ken Boffard[15], Cino Bendinelli[14], Sanjay Gupta[16], Yoram Kluger[17], Ferdinando Agresta[18], Salomone Di Saverio[19], Imtiaz Wani[20], Alex Escalona[21], Carlos Ordonez[22], Gustavo P Fraga[23], Gerson Alves Pereira Junior[24], Miklosh Bala[25], Yunfeng Cui[26], Sanjay Marwah[27], Boris Sakakushev[28], Victor Kong[29], Noel Naidoo[30], Adamu Ahmed[31], Ashraf Abbas[32], Gianluca Guercioni[33], Nereo Vettoretto[34], Rafael Díaz-Nieto[35], Ihor Gerych[36], Cristian Tranà[37], Mario Paulo Faro[38], Kuo-Ching Yuan[39], Kenneth Yuh Yen Kok[40], Alain Chichom Mefire[41], Jae Gil Lee[42], Suk-Kyung Hong[43], Waqih Ghnnam[44], Boonying Siribumrungwong[45], Norio Sato[11], Kiyoshi Murata[46], Takayuki Irahara[47], Federico Coccolini[4], Helmut A Segovia Lohse[48], Alfredo Verni[49] and Tomohisa Shoko[50]

Abstract

Despite advances in diagnosis, surgery, and antimicrobial therapy, mortality rates associated with complicated intra-abdominal infections remain exceedingly high.

The 2013 update of the World Society of Emergency Surgery (WSES) guidelines for the management of intra-abdominal infections contains evidence-based recommendations for management of patients with intra-abdominal infections.

WSES

Indication	Treatment
Community-acquired extra-biliary IAIs	Stable, non-critical patients with no risk factors for ESBL pathogens [b] ▪ Amoxcillin-clavulanate IV ▪ Ciprofloxacin plus metronidazole
	Stable, non-critical patients with risk factors for ESBL pathogens [b] ▪ Ertapenem ▪ Tigecycline
	Critically ill patients with no risk factors for ESBL pathogens [b] ▪ Piperacillin-tazobactam
	Critically ill patients with risk factors for ESBL pathogens [b] ▪ Meropenem ▪ Imipenem-cilastatin +/− Fluconazole
Hospital-acquired extra-biliary IAIs	Stable, non-critical patients with risk factors for MDR pathogens [c] ▪ Piperacillin plus tigecycline plus fluconazole
	Critically ill patients with risk factors for MDR pathogens [c] ▪ Piperacillin plus tigecycline plus echinocandin ▪ [Imipenem-cilastatin, meropenem or doripenem] plus teicoplanin plus echinocandin

Sartelli M. *World J Emerg Surg* 2013; 8:3

Kolesistit

- Akut kolesistit %2-4
  - Taş → %90
- Safra kesesi steril ya da düşük inokulum bakteri
  - Asendan yolla
  - Hematojen yolla
- Semptom, bulgu ve sağlık hizmeti ilişkili patojenlere göre sınıflandırma (TG13*)
  - Grade I-II-III

*TG13 Tokyo Guidelines

Kolesistit

TK

- *E. coli*
- *Klebsiella* sp.
- *Enterobacter* sp.
- *Enterococcus* sp.
- *Streptococcus* sp.

- Anaeroplar
  - Amfizematöz kolesistitte

HK

- *E. coli*
- *Klebsiella* sp.
- *Pseudomonas* sp.
- *Enterococcus* sp.

Direnç !!!

Toplum kökenli

SIS-IDSA [2]	WSES [3]	TG13 [4]
Acute cholecystitis, mild-to-moderate severity ▪ Cefazolin ▪ Cefuroxime ▪ Ceftriaxone	Biliary IAI, stable, non-critical patients with no risk factors for ESBL pathogens [a] ▪ Amoxicillin-clavulanic acid IV ▪ Ciprofloxacin plus metronidazole	Grade I [b] ▪ Cefazolin ▪ Cefuroxime ▪ Ceftriaxone ▪ Cefotaxime ▪ Ciprofloxacin ▪ Levofloxacin (Each +/– metronidazole [e]) ▪ Ertapenem ▪ Cefoxitin ▪ Moxifloxacin ▪ Ampicillin/sulbactam plus aminoglycoside
	Biliary IAI, stable, non-critical patients with risk factors for ESBL pathogens [a] ▪ Tigecycline	Grade II [c] ▪ Ceftriaxone ▪ Cefotaxime ▪ Cefepime ▪ Ceftazidime ▪ Ciprofloxacin ▪ Levofloxacin (Each +/– metronidazole [e]) ▪ Ertapenem ▪ Piperacillin-tazobactam ▪ Moxifloxacin
Acute cholecystitis with severe physiologic disturbance, advance age or immunocompromised ▪ Imipenem-cilastatin, meropenem or doripenem ▪ Piperacillin-tazobactam ▪ Ciprofloxacin ▪ Levofloxacin ▪ Cefepime (Each plus metronidazole [e])	Biliary IAI, critically ill patients with no risk factors for ESBL pathogens [a] ▪ Piperacillin-tazobactam	Grade III [d] ▪ Carbapenem (ertapenem, imipenem-cilastatin, meropenem or doripenem) ▪ Piperacillin-tazobactam ▪ Cefepime ▪ Ceftazidime ▪ Aztreonam (Each +/– metronidazole [e]) ▪ Vancomycin to be added to selected regimen o Linezolid or daptomycin to be substituted if patient known VRE colonized, if previous treatment included vancomycin or if VRE is common in community
	Biliary IAI, critically ill patients with risk factors for ESBL pathogens [a] ▪ Piperacillin plus tigecycline (+/– Fluconazole)	

Biliyer-enterik anastomoz varsa

Hoffmann C. *Antibiotics* 2016; 5: 1-19

Hastane kökenli

Indication	SIS-IDSA [2]	WSES [3]	TG13 [4]
Health-care associated	Biliary infection of any severity ▪ Imipenem-cilastatin, meropenem or doripenem ▪ Piperacillin-tazobactam ▪ Ciprofloxacin, Levofloxacin, Cefepime — each plus metronidazole [f] ▪ Vancomycin to be added to selected regimen		Health-care associated ▪ Carbapenem (ertapenem, imipenem-cilastatin, meropenem or doripenem) ▪ Piperacillin-tazobactam ▪ Cefepime, Ceftazidime, Aztreonam — each +/– metronidazole [e] ▪ Vancomycin to be added to selected regimen o Linezolid or daptomycin to be substituted if patient known VRE colonized, if previous treatment included vancomycin or if VRE is common in community
Other	Acute cholangitis following bilio-enteric anastomosis of any severity ▪ Imipenem-cilastatin, meropenem or doripenem ▪ Piperacillin-tazobactam ▪ Ciprofloxacin, Levofloxacin, Cefepime — each plus metronidazole		

Hoffmann C. *Antibiotics* 2016; 5: 1-19

IDSA **Recommendations for Empiric Antimicrobial Therapy for Health Care–Associated Complicated Intra-abdominal Infection**

Organisms seen in health care–associated infection at the local institution	Regimen				
	Carbapenem[a]	Piperacillin-tazobactam	Ceftazidime or cefepime, each with metronidazole	Aminoglycoside	Vancomycin
<20% Resistant *Pseudomonas aeruginosa*, ESBL-producing Enterobacteriaceae, *Acinetobacter*, or other MDR GNB	Recommended	Recommended	Recommended	Not recommended	Not recommended
ESBL-producing Enterobacteriaceae	Recommended	Recommended	Not recommended	Recommended	Not recommended
P. aeruginosa >20% resistant to ceftazidime	Recommended	Recommended	Not recommended	Recommended	Not recommended
MRSA	Not recommended	Not recommended	Not recommended	Not recommended	Recommended

NOTE. ESBL, extended-spectrum β-lactamase; GNB, gram-negative bacilli; MDR, multidrug resistant; MRSA, methicillin-resistant *Staphylococcus aureus*. "Recommended" indicates that the listed agent or class is recommended for empiric use, before culture and susceptibility data are available, at institutions that encounter these isolates from other health care–associated infections. These may be unit- or hospital-specific.

[a] Imipenem-cilastatin, meropenem, or doripenem

Solomkin JS. *CID* 2010; 50: 133-64

- IDSA
  - Sadece biliyer-enterik anastomozu olanlarda anaerop kapsama önermekte
  - Ampisilin-sulbaktamı -*E. coli* direnç nedeniyle- empirik olarak önermemekte
  - Florokinolonları sadece kültürde duyarlı olduğu bilinen etkenlerle enfeksiyonlarda ya da ciddi betalaktam alerjisi olanlarda önermekte (+TG13)

Solomkin JS. *CID* 2010; 50: 133-64

- WSES
  - Toplum kaynaklı bile olsa IAI etkenlerinde ESBL oranında artışa dikkat çekmekte
    - Hastanın önceden antibiyotik kullanım öyküsünü ve toplumdaki ESBL oranlarını bilmek empirik tedaviye rehberlik eder
  - ESBL için risk faktörlerini taşıyan stabil toplum kökenli enfeksiyonlarda, karbapenemaz üreten *Enterobacteriaceae* riskini azalmaya yardımcı olabileceği için tigesiklin+karbapenem kullanımını önermekte

Sartelli M. *World J Emerg Surg* 2013; 8:3

ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, July 2010, p. 3043–3046 Vol. 54, No. 7
0066-4804/10/$12.00 doi:10.1128/AAC.00265-10

Incidence and Antimicrobial Susceptibility of *Escherichia coli* and *Klebsiella pneumoniae* with Extended-Spectrum β-Lactamases in Community- and Hospital-Associated Intra-Abdominal Infections in Europe: Results of the 2008 Study for Monitoring Antimicrobial Resistance Trends (SMART)▽

Stephen P. Hawser,[1]* Samuel K. Bouchillon,[2] Daryl J. Hoban,[2] Robert E. Badal,[2] Rafael Cantón,[3,4] and Fernando Baquero[3,4]

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- Avrupa
  - Oniki ülke, 37 merkez
- Hem toplum kaynaklı hem de hastane kaynaklı IAI
- ESBL
  - *E. coli*
  - *K. pneumoniae*
- 2002-2008

- *E. coli*
  - TK→ % 38.5
  - HK→ % 57.9
- *K. pneumoniae*
  - TK→ % 23.9
  - HK→ % 70.8

E. coli için %3.6; *K. pneumoniae* için %5.3→ numunelerin toplanma zamanı, kalış süreleri bilinmeyen hastalar

TABLE 1. Percentages of ESBL-positive *E. coli* and *K. pneumoniae* isolates from HA and CA IAIs from 2002 to 2008 in Europe[a]

Yr of isolation	*E. coli*						*K. pneumoniae*					
	HA only			CA only			HA only			CA only		
	% ESBL pos	95% CI	No. of isolates	% ESBL pos	95% CI	No. of isolates	% ESBL pos	95% CI	No. of isolates	% ESBL pos	95% CI	No. of isolates
2002	4.80	2.2–9.7	146	4.00	1.9–7.8	200	28.60	15.1–47.2	28	3.70	0–19.8	27
2003	13.70	11.1–16.8	555	5.70	3.9–8.3	456	19.00	13.0–27.0	121	4.40	1.0–12.7	68
2004	11.80	9.7–14.3	754	7.00	5.1–9.5	530	13.00	8.3–19.8	138	8.40	3.9–16.7	83
2005	8.30	6.4–10.7	637	4.40	3.1–6.3	680	14.90	9.8–22.0	134	10.10	5.2–18.3	89
2006	7.60	5.8–9.9	660	5.50	4.1–7.4	776	23.80	17.8–30.9	160	11.00	6.4–18.1	118
2007	12.30	9.9–15.1	604	7.40	5.7–9.7	686	16.10	10.9–23.0	143	8.90	4.7–15.7	113
2008	14.00	11.9–16.5	863	6.50	4.7–8.8	574	20.90	16.1–26.7	225	5.30	1.7–13.2	76

[a] pos, positive; 95% CI, 95% confidence interval.

Hawser SP. *Antimicrob Agents Chemother* 2010; 54: 3043-6

TABLE 2. Percentages of HA and CA *E. coli* and *K. pneumoniae* isolates identified as ESBL positive in Europe in 2008, by country[a]

Country	Infection source	*E. coli*			*K. pneumoniae*		
		No. of isolates	% ESBL pos	95% CI	No. of isolates	% ESBL pos	95% CI
Estonia	HA	0			0		
	CA	20	5.0	0–25.4	1	0.0	0–83.3
France	HA	73	9.6	4.4–18.8	13	7.7	0–35.4
	CA	122	6.6	3.2–12.6	11	0.0	0–30.0
Germany	HA	103	18.5	12.1–27.1	40	17.5	8.4–32.3
	CA	46	6.5	1.6–18.2	11	18.2	4.0–48.9
Greece	HA	20	30.0	14.3–52.1	21	28.6	13.6–50.2
	CA	7	14.3	0.5–53.4	1	0.0	0–83.3
Italy	HA	138	10.9	6.6–17.3	25	56.0	37.1–73.4
	CA	25	24.0	11.2–43.8	2	0.0	0–71.0
Latvia	HA	22	27.3	12.9–48.4	10	50.0	23.7–76.3
	CA	27	0.0	0–14.8	2	0.0	0–71.0
Lithuania	HA	14	0.0	0–25.2	2	50.0	9.5–91.0
	CA	37	0.0	0–11.2	4	0.0	0–54.6
Portugal	HA	77	20.8	13.1–31.2	28	3.6	0–19.2
	CA	31	9.7	2.6–25.7	2	0.0	0–71.0
Spain	HA	332	9.3	6.6–13.0	60	13.3	6.7–24.4
	CA	227	5.7	3.3–9.6	37	5.4	0.6–18.6
Switzerland	HA	4	0.0	0–54.6	4	0.0	0–54.6
	CA	0			0		
Turkey	HA	51	25.5	15.4–39.0	15	20.0	6.3–46.0
	CA	3	0.0	0–61.8	0		
United Kingdom	HA	29	27.6	14.5–44.3	7	14.3	0.5–53.4
	CA	29	6.9	0.1–23.0	5	0.0	0–48.9

[a] pos, positive; 95% CI, 95% confidence interval.

3

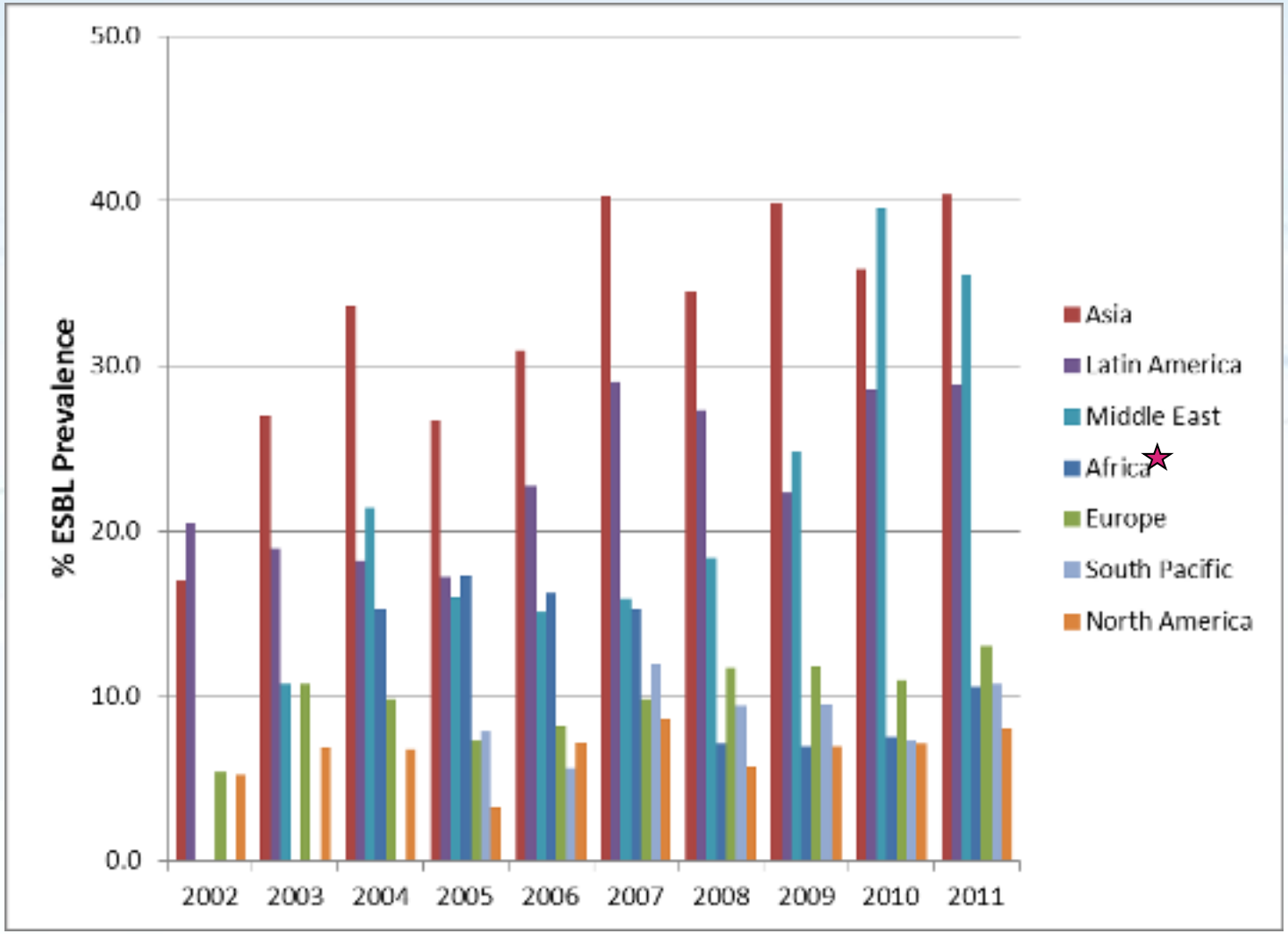
Hawser SP. *Antimicrob Agents Chemother* 2010; 54: 3043-6

A Review of Ten Years of the Study for Monitoring Antimicrobial Resistance Trends (SMART) from 2002 to 2011

Ian Morrissey [1,*], Meredith Hackel [2], Robert Badal [2], Sam Bouchillon [2], Stephen Hawser [1] and Douglas Biedenbach [2]

IAI Pathogen	N	%
Escherichia coli	43,973	47.8
Klebsiella pneumoniae	13,385	14.5
Pseudomonas aeruginosa	8,674	9.4
Enterobacter cloacae	5,564	6.0
Proteus mirabilis	3,282	3.6
Other	17,208	18.7
Total	92,086	100.0

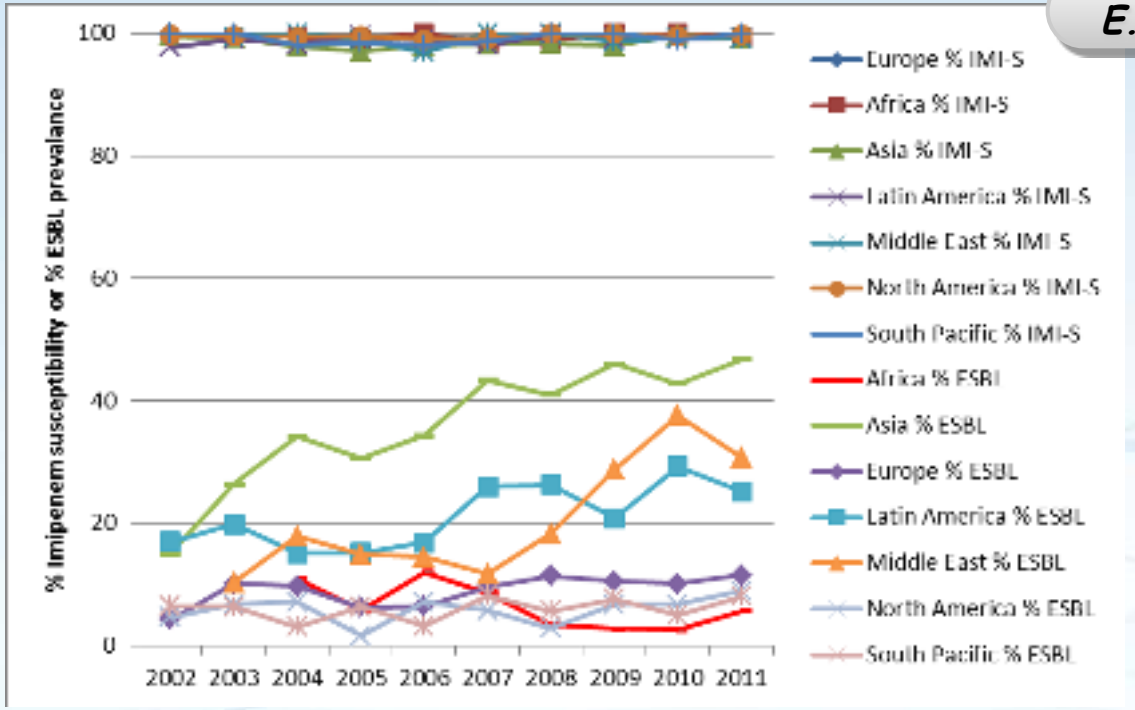
IAI ve ÜSİ etkeni olan hem toplum kaynaklı hem de hastane kaynaklı Gram negatif basillerde ESBL ve karbapenem direncinin on yıllık verileri



E. coli, K. pneumoniae, K. oxytoca, P. mirabilis

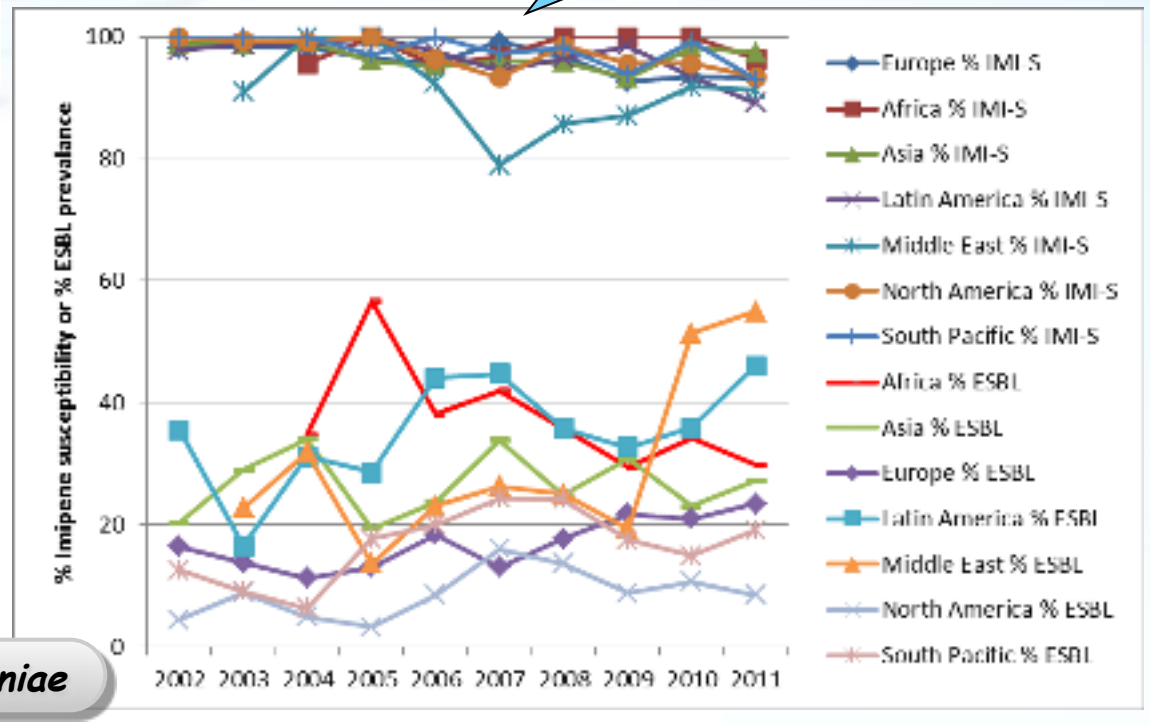
Morrissey I. *Pharmaceuticals* 2013; 6: 1335-46

E. coli



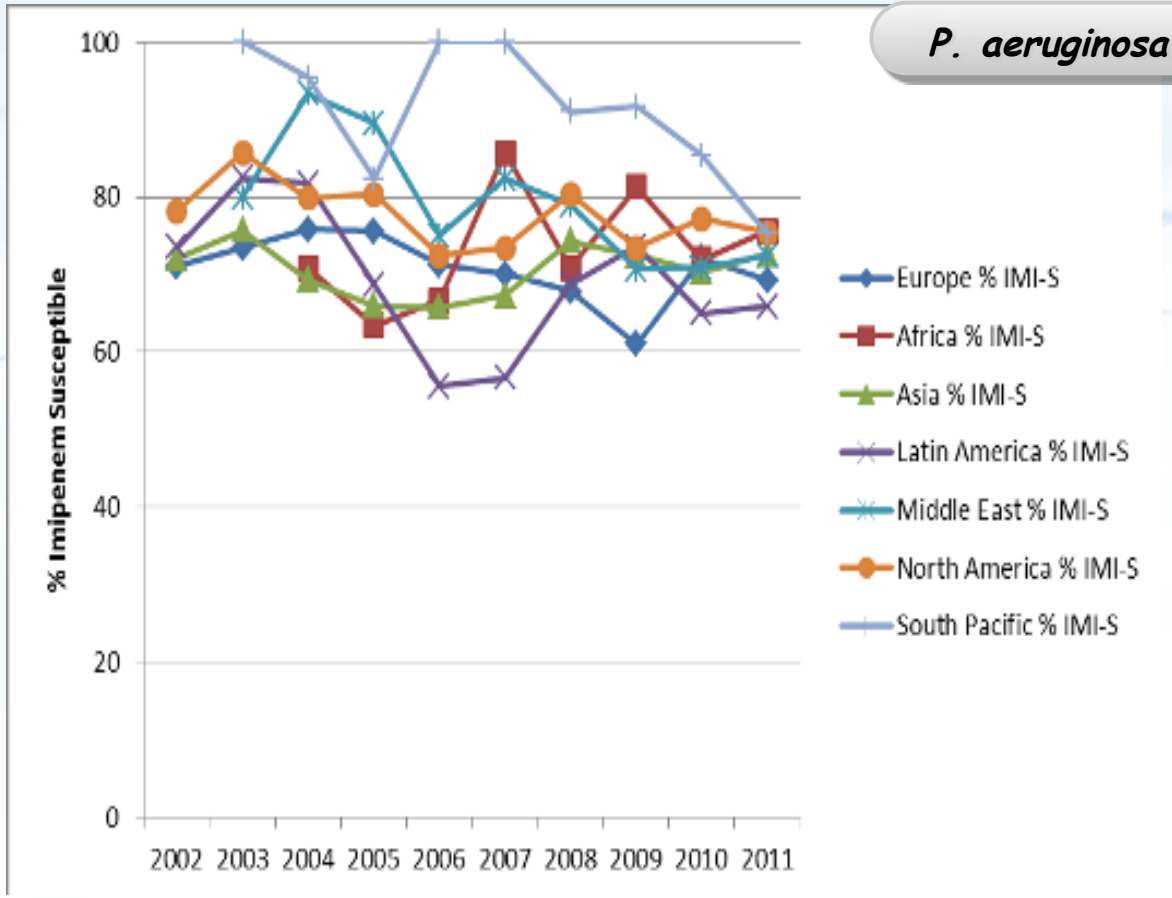
Karbapenemazlar

- NDM-1
- KPC
- SHV…



K. pneumoniae

P. aeruginosa

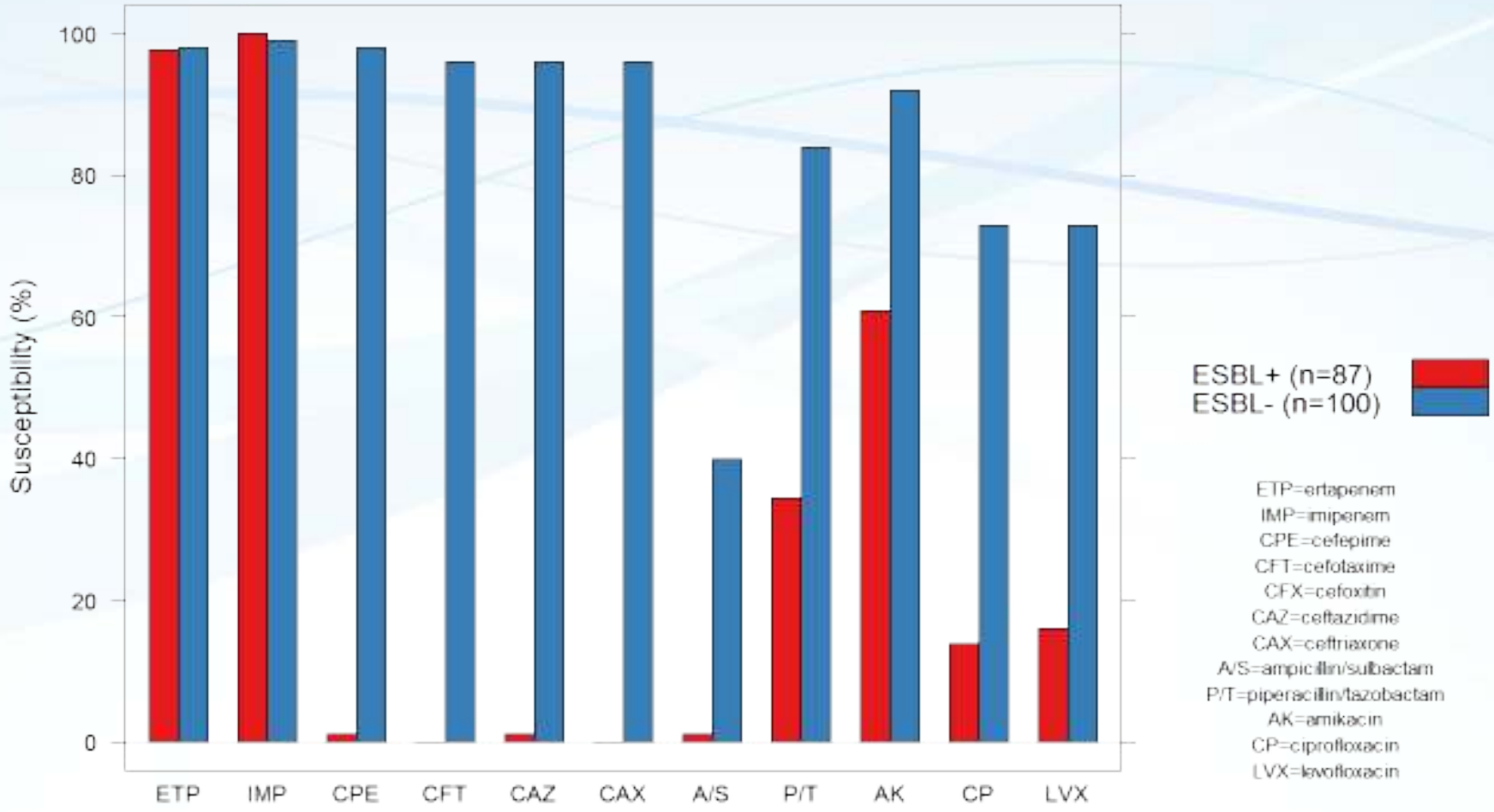


Morrissey I. *Pharmaceuticals* 2013; 6: 1335-46

SMART *E. coli* 2007-2011

Includes: IAIs and UTIs. Based on EUCAST 2012 breakpoints.

SMART *E. coli* 2011



Includes IAIs and UTIs. Based on EUCAST 2012 breakpoints

SMART *K.pneumoniae* 2007-2011

Includes: IAIs and UTIs. Based on EUCAST 2012 breakpoints.

SMART Study: 2002-2011, Turkey and Europe

ESBL Producing *E.coli* Isolates
SMART Study Results

Region	2003	2011
Turkey	39%	47%
Europe	10%	15%

ESBL Producing *Klebsiella* Isolates
SMART Study Results

Region	2003	2011
Turkey	47%	50%
Europe	18%	37%

Türkiye EARSS Verileri

European Antimicrobial Resistance Surveillance System

Üçüncü kuşak sefalosporinlere direnç oranları

	Escherichia coli	*Klebsiella pneumoniae*
2005	30.9%	46.2%
2006	32.9%	42.7%
2007	40.2%	44.4%
2008	42,0% (23% MDR)	45% (10% MDR)

Türkiye EARSS Verileri

European Antimicrobial Resistance Surveillance System

Florokinolonlara direnç oranları

	Escherichia coli	*Klebsiella pneumoniae*
2005	43.9%	46.2%
2006	47.9%	23.3%
2007	53.2%	23.2 %
2008	52,0%	26 %

Sonuç olarak…

Bölgesel verilerimiz eşliğinde akılcı antibiyotik kullanımı ve kaynak kontrolü

TEŞEKKÜRLER