MSS İnfeksiyonları Menenjit-Ventrikülit Tedavi

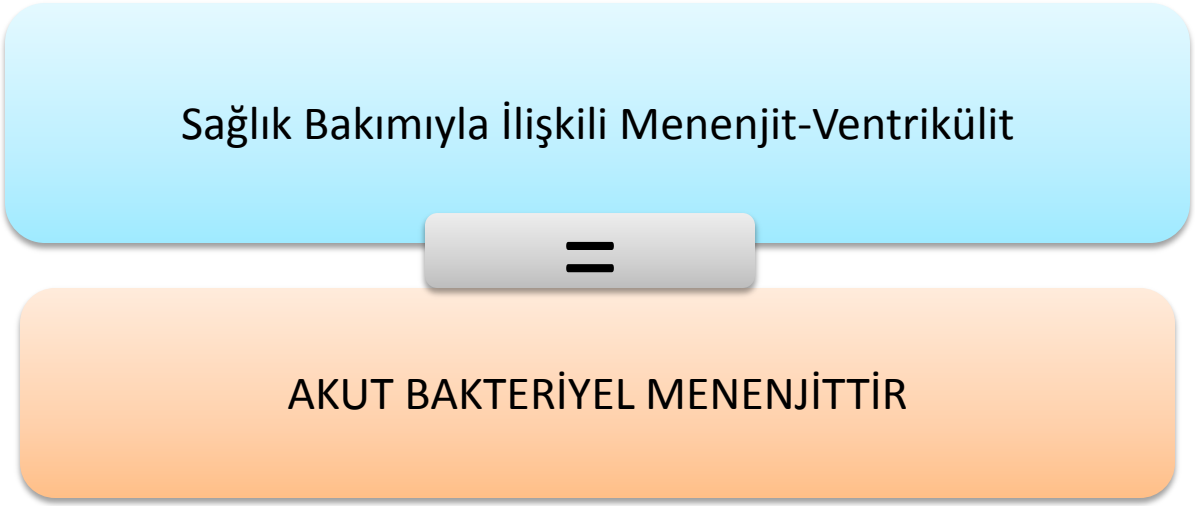
Dr Emel YILMAZ

UÜTF-Enf Hast ve Kl Mik AD

KLİMİK-2018

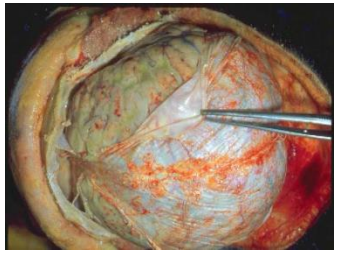
Nozokomiyal Menenjit-Ventrikülit

- Travma ya da invazif işlemler sonucunda olabilir
- Klinik semptomlar hastanede yatarken ya da taburculuk sonrası veya yıllar sonra gelişebilir



SBİ MSS İnfeksiyonları

- Kraniyotomi %0,8-1,5
  - 1/3 ilk hafta; 1/3 2. hafta, 1/3 haftalar aylar…
- İntraventriküler katater %4-17
- EVDS %8
  - 5. günden sonra risk yüksek
- Eksternal lomber katater ~%5
- Kafa travması %2-11 (kafa tabanı? Açık kırık)
- Lomber ponksiyon 1/50.000



Nozokomiyal menenjit

Sorular

Sorunlar

Her ateş SSS infeksiyonu mu?

Her BOS da üreme SSS infeksiyonu mu?
Kontaminasyon?
Kolonizasyon?
Etken??

Her pleositoz SSS infeksiyonu mu?

Yanıt bazen yok

BOS'da pleositoz

- Serebellar köşe tümörü
- Operasyon (kan, kemik parçaları, cerrahi manüpilasyon)
- Tümör operasyonu
- Ratke's cleft kist operasyonu (kist duvarındaki kolesterol kristalleri)
- Posterior Fossa Sendromu
- İntratekal ilaç uygulamaları
- Jeneralize nöbet (<80/ mm^3)
- Adipoz doku ya da fasiya greft uygulamaları*

Ateş

- Santral ateş (infeksiyon dışı)

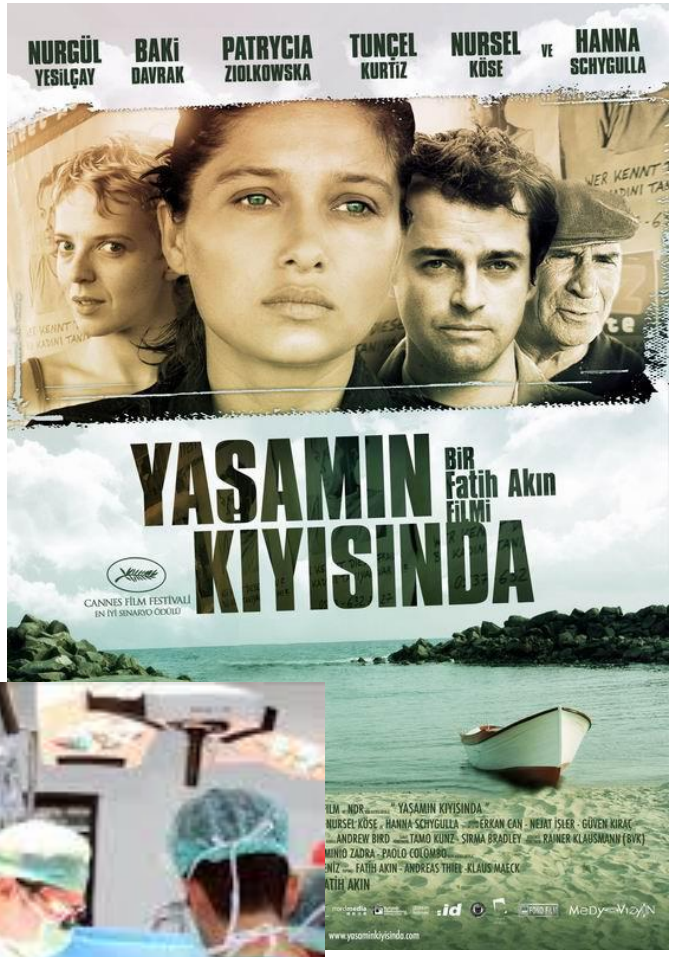
MIB olmayabilir
Çoğu sedatize
Uyutuluyor

Akut faz????
CRP, PCT?, lökositoz??

Steroid alımı

Şuur durumu !!!!


"MICHELLE WILLIAMS GÖZ ALICI"
Los Angeles Times
"YILIN EN İYİ FİLMİ"
The ChronicleHerald
BİR KENNETH LONERGAN FİLMİ
YAŞAMIN KIYISINDA
MANCHESTER BY THE SEA
SUNDANCE
tiff.
TELLURIDE
NEW YORK
97%
91
8.4
YAKINDA SİNEMALARDA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BAKİ DAVRAK
PATRYCIA ZIOLKOWSKA
TUNÇEL KURTİZ
NURSEL KÖSE
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HANNA SCHYGULLA
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Şüphe durumunda

Tedavi

BOS/kan kültürü alınmalı
hemen tedavi başlanmalı

- Tedavi ampirik başlanır
- Kombine verilir (Antipseudomonal + antistafilokoksik)
  - En sık olası etkenler düşünülmeli
- Lokal direnç göz önünde bulundurulmalı
- İlaçlar nöbet eşiğini düşürmemeli???

G(-) basiller ile mortalite daha yüksek (p=0,0034)
Kurtaran B et al Türk Neurosurg 2017; 1-7

SURGICAL INFECTIONS
Volume 17, Number 4, 2016

DOI: 10.1089/sur.2015.060

Empirical Combination Antibiotic Therapy Improves the Outcome of Nosocomial Meningitis or Ventriculitis in Neuro-Critical Care Unit Patients

Zhiqi Li, Xing Wu, Jian Yu, Xuehai Wu, Zhuoying Du, Yirui

Abstract

Background: Nosocomial meningitis and ventriculitis (MEN) are ser
unit (NCCU) patients. Few data are available on the risk factors and m
these disorders caused by multi-drug-resistant (MDR) pathogens. Ou

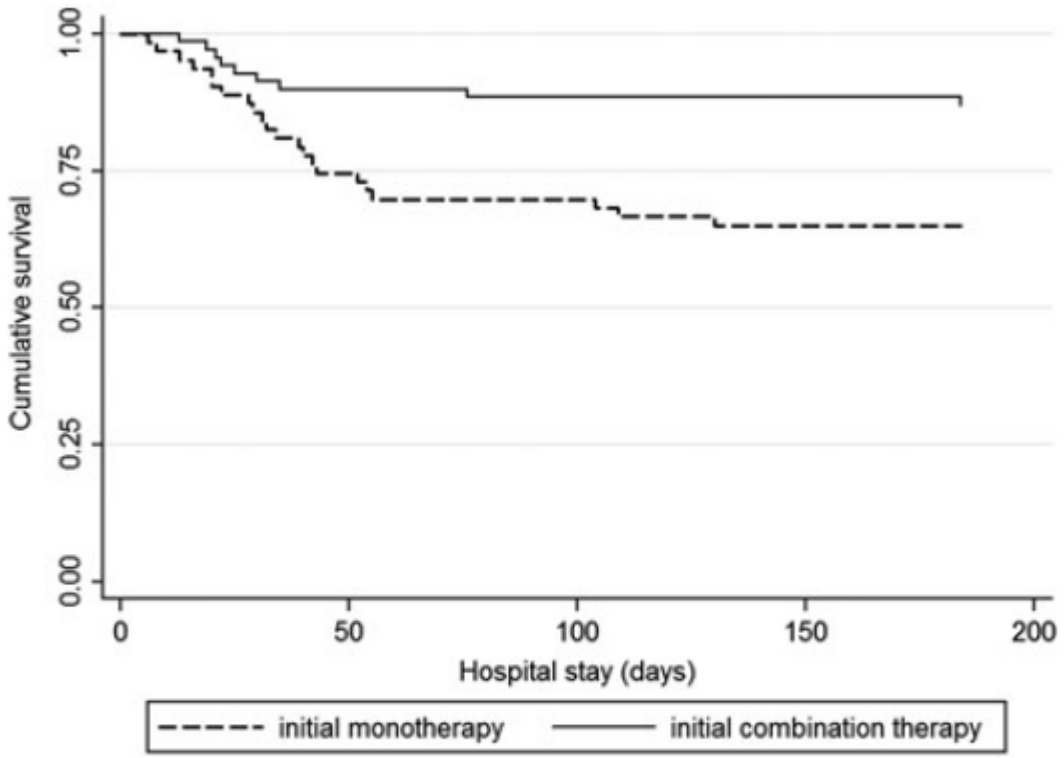


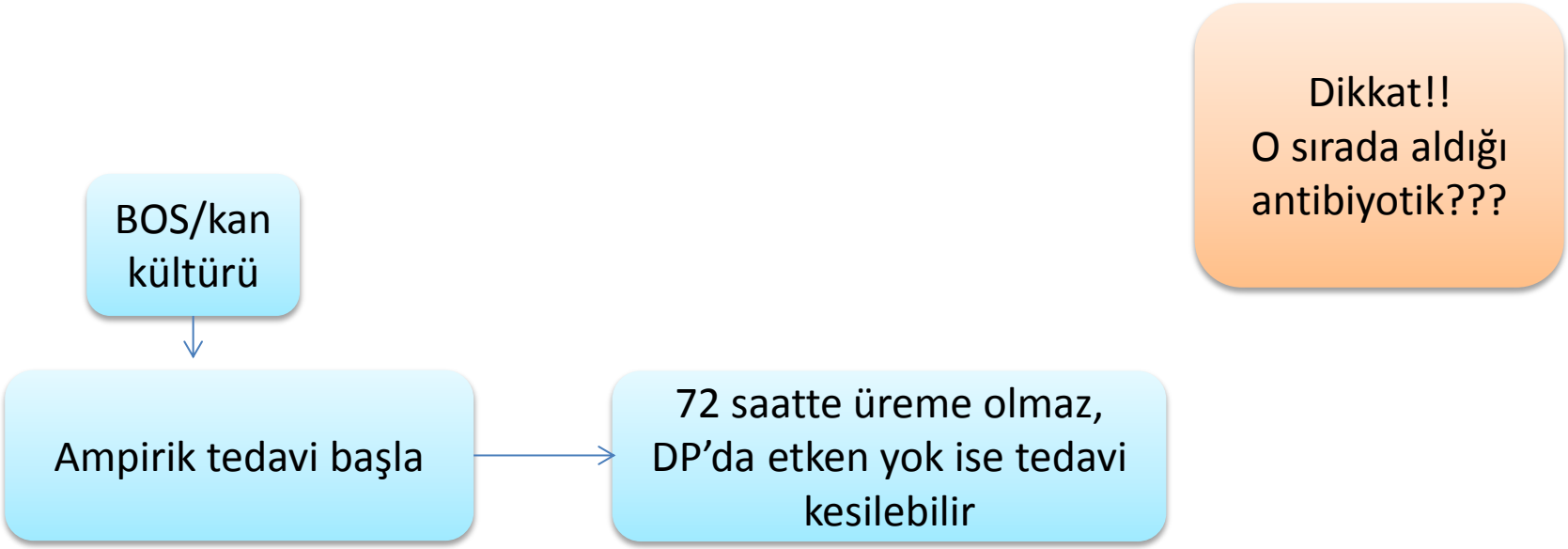
FIG. 2. Cumulative survival curves of patients receiving combined antibiotic therapy compared with patients having monotherapy in the empiric phase of treatment. (Log-rank test, $p = 0.0035$.)

Tedavide Genel Yaklaşım

- BOS'a iyi geçen
- BOS'da yeterli konsantrasyonda olacak şekilde uygun dozda
- Bakterisidal etkili olmalı
- Şant/katater biofilm???

Randomize kontrollü çalışma yok
Olgu sunumları yada olgu serileri
Retrospektif çalışmalar

Ampirik Tedavi



Van de Beek D et al NEJM 2010; 362: 146-54

- Stafilokoklar SBİ menenjitlerde en sık etkenler arasında
  - Vankomisin 1. seçenek ancak BOS'da yeterli konsantrasyonda olabilmesi için serum düzeyi 15-20 µg/mL olmalı
  - MIC değeri≥1 ise alternatif tedavi düşünülmeli

- Beta laktam alerjisi varsa (anafilaksi)
  - Aztreonam ya da siprofloksasin yüksek dozda verilmeli

Clinical Infectious Diseases

IDSA GUIDELINE

2017 Infectious Diseases Society of America's Clinical Practice Guidelines for Healthcare-Associated Ventriculitis and Meningitis*

Allan R. Tunkel,[1] Rodrigo Hasbun,[2] Adarsh Bhimraj,[3] Karin Byers,[4] Sheldon L. Kaplan,[5] W. Michael Scheld,[6] Diederik van de Beek,[7] Thomas P. Bleck,[8] Hugh J. L. Garton,[9] and Joseph R. Zunt[10]

[1]Department of Internal Medicine—Infectious Diseases, Warren Alpert Medical School of Brown University, Providence, Rhode Island; [2]Department of Infectious Diseases, the University of Texas Health Science Center at Houston, Texas; [3]Department of Infectious Diseases, Cleveland Clinic, Ohio; [4]Division of Infectious Diseases, University of Pittsburgh Medical Center, Pennsylvania; [5]Department of Pediatrics—Section of Infectious Diseases, Baylor College of Medicine, Houston, Texas; [6]Division of Infectious Diseases, University of Virginia, Charlottesville; [7]Department of Neurology, Academic Medical Center, Amsterdam Neuroscience, University of Amsterdam, The Netherlands; [8]Departments of Neurological Sciences, Neurosurgery, Anesthesiology, and Medicine, Rush Medical College, Chicago, Illinois; [9]Department of Neurological Surgery, University of Michigan, Ann Arbor; and [10]Departments of Neurology, Global Health, Medicine—Infectious Diseases, and Epidemiology, University of Washington, Seattle.

Table 1. Recommended Antimicrobial Therapy in Patients With Healthcare-Associated Ventriculitis and Meningitis Based on Isolated Pathogen and In Vitro Susceptibility Testing

Microorganism	Standard Therapy	Alternative Therapies
Staphylococci[a]		
Methicillin sensitive	Nafcillin or oxacillin	Vancomycin
Methicillin resistant	Vancomycin	Daptomycin, trimethoprim-sulfamethoxazole, or linezolid
Propionibacterium acnes	Penicillin G	Third-generation cephalosporin,[b] vancomycin, daptomycin, or linezolid
Streptococcus pneumoniae		
Penicillin MIC ≤0.06 μg/mL	Penicillin G	Third-generation cephalosporin[b]
Penicillin MIC ≥0.12 μg/mL		
Cefotaxime or ceftriaxone MIC <1.0 μg/mL	Third-generation cephalosporin[b]	Cefepime or meropenem
Cefotaxime or ceftriaxone MIC ≥1.0 μg/mL	Vancomycin plus a third-generation cephalosporin[b,c]	Moxifloxacin[d]
Pseudomonas aeruginosa	Cefepime, ceftazidime, or meropenem	Aztreonam or ciprofloxacin
Haemophilus influenzae		
β-lactamase negative	Ampicillin	Third-generation cephalosporin,[b] cefepime, or a fluoroquinolone
β-lactamase positive	Third-generation cephalosporin[b]	Cefepime, aztreonam, or a fluoroquinolone
Extended spectrum β-lactamase-producing gram-negative bacilli	Meropenem	Cefepime or a fluoroquinolone
Acinetobacter baumannii	Meropenem	Colistin (usually formulated as colistimethate sodium)[e] or polymyxin B[e]
Other Enterobacteriaceae[f]	Third-generation cephalosporin[b]	Meropenem, aztreonam, trimethoprim-sulfamethoxazole, or ciprofloxacin
Candida species[g]	Lipid formulation of amphotericin B ± flucytosine	Fluconazole or voriconazole
Aspergillus species	Voriconazole	Lipid formulation of amphotericin B or posaconazole

Table 2. Recommended Dosages of Antimicrobial Agents in Infants and Children and in Adults With Normal Renal and Hepatic Function

	Total Daily Dose (Dosing Interval in Hours)	
Antimicrobial Agent	Infants and Children	Adults
Amikacin[a]	22.5 mg/kg (8)	15 mg/kg (8)
Amphotericin B lipid complex	5 mg/kg (24)	5 mg/kg (24)
Ampicillin	300–400 mg/kg (6)	12 g (4)
Aztreonam	120 mg/kg (6–8)	6–8 g (6–8)
Cefepime	150 mg/kg (8)	6 g (8)
Cefotaxime	300 mg/kg (6–8)	8–12 g (4–6)
Ceftazidime	200 mg/kg (8)	6 g (8)
Ceftriaxone	100 mg/kg (12–24)	4 g (12)
Ciprofloxacin	30 mg/kg (8–12)	800–1200 mg (8–12)
Daptomycin	Dose not established[b]	6–10 mg/kg (24)
Fluconazole	12 mg/kg (24)	400–800 mg (24)
Gentamicin[a]	7.5 mg/kg (8)	5 mg/kg (8)
Linezolid	Age <12 years: 30 mg/kg (8)[c] Age ≥12 years: 20 mg/kg (12)[c]	1200 mg (12)
Liposomal amphotericin B	3–5 mg/kg (24)	3–5 mg/kg (24)[d]
Meropenem	120 mg/kg (8)	6 g (8)
Moxifloxacin[e]	Dose not established	400 mg (24)
Nafcillin	200 mg/kg (6)	12 g (4)
Oxacillin	200 mg/kg (6)	12 g (4)
Penicillin G	300 000 units/kg (4–6)	24 million units (4)
Posaconazole	—	800 mg (6–12)[f]
Rifampin	20 mg/kg (24)[g]	600 mg (24)
Tobramycin[a]	7.5 mg/kg (8)	5 mg/kg (8)
Trimethoprim-sulfamethoxazole[h]	10–20 mg/kg (6–12)	10–20 mg/kg (6–12)
Vancomycin[i]	60 mg/kg (6)	30–60 mg/kg (8–12)
Voriconazole	16 mg/kg (12)[j,k,l]	8 mg/kg (12)[j,k]

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

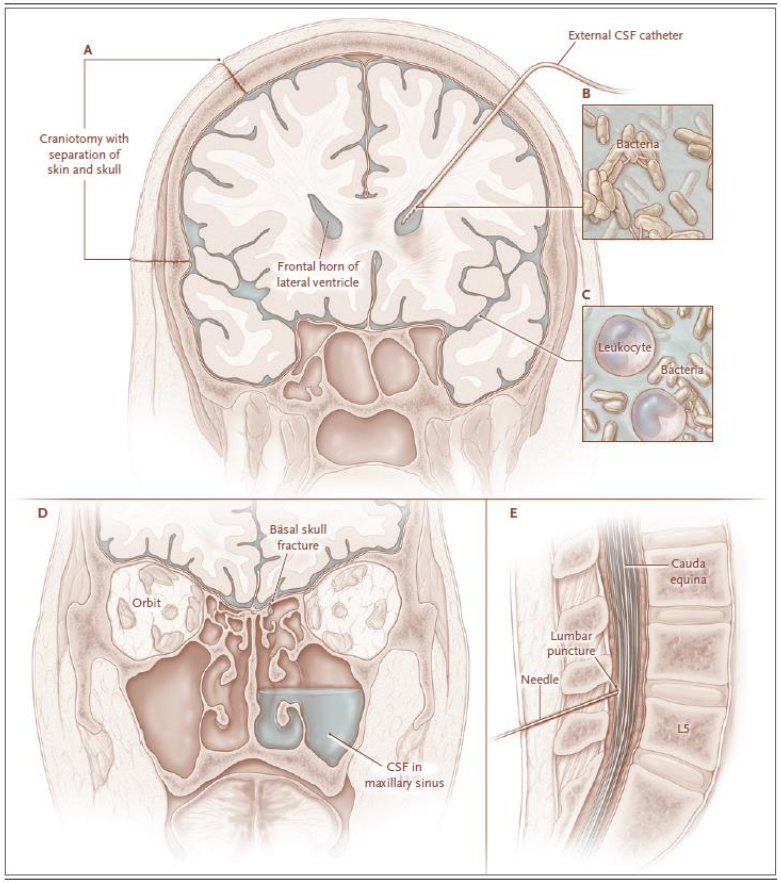
CURRENT CONCEPTS

Nosocomial Bacterial Meningitis

Diederik van de Beek, M.D., Ph.D., James M. Drake, M.B., B.Ch., and Allan R. Tunkel, M.D., Ph.D.

From the Department of Neurology, Center of Infection and Immunity Amsterdam, Academic Medical Center, University of Amsterdam, Amsterdam (D.B.); the Division of Neurosurgery, Department of Surgery, Hospital for Sick Children, University of Toronto, Toronto (J.M.D.); and the Department of Medicine, Monmouth

NOSOCOMIAL BACTERIAL MENINGITIS MAY RESULT FROM INVASIVE PROcedures (e.g., craniotomy, placement of internal or external ventricular catheters, lumbar puncture, intrathecal infusions of medications, or spinal anes-
thesia), complicated head trauma, or in rare cases, metastatic infection in patients
w y a differ-
e tting, and



N Engl J Med 2010;362:146-54.

Journal of Hospital Infection (2006) 62, 94-97

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Nosocomial meningitis in a university hospital between 1993 and 2002

I. Palabiyikoglu*, E. Tekeli, F. Cokca, O. Akan, N. Unal, I. Erberktas, S. Lale, S. Kiraz

Infection Control Committee, Medical Faculty of Ankara University, 06 100 Samanpazari/Ankara, Turkey

Table IV Distribution of causative micro-organisms

Causative micro-organism	No. of isolates	No. of shunt patients' isolates
Staphylococci	20	11
CNS	7	6
MRSA	7	2
MSSA	6	3
Non-fermentative Gram-negative bacilli	15	9
Escherichia coli	9	7
Klebsiella spp.	9	5
Enterobacter spp. and *Proteus* spp.	5	2
Pseudomonas spp.	3	2
Candida spp.	3	0
Enterococcus spp.	2	2
α-haemolytic streptococci	1	0
Total	67	38

CNS, coagulase-negative staphylococci; MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-sensitive *S. aureus*.

Original Article

Clinical features, laboratory data, management and the risk factors that affect the mortality in patients with postoperative meningitis

Ilknur Erdem[1], Tayfun Hakan[2], Nurgul Ceran[1], Fatma Metin[1], Seniha Senbayrak Akcay[3], Metin Kucukercan[3], M. Zafer Berkman[2], Pasa Goktas[1]

[1]Department of Infectious Disease and Clinical Microbiology, [2]Neurosurgery, Microbiology and [3]Clinical Microbiology, Haydarpasa Numune Training and Research Hospital, Istanbul, Turkey

Background: Nosocomial meningitis is a rare complication following neurosurgical procedures and is associated with high morbidity and mortality. **Aim:** The aim of this study was to describe the clinical characteristics and

Introduction

Nosocomial meningitis is an uncommon hospital-acquired infection and is more frequently seen in

Table 2: The distribution of isolated 56 microorganisms from CSF cultures

Microorganism	n (%)
*S. aureus**	20 (35.7)
Acinetobacter spp.	17 (30.3)
*P. aeruginosa***	6 (10.7)
CoNS***	5 (8.9)
Enterobacter spp.	3 (5.4)
*E. coli****	2 (3.6)
Candida spp.	3 (5.4)

**Staphylococcus aureus*; ***Pseudomonas aeruginosa*; ***Coagulase negative staphylococci; ****Escherichia coli*

Patogenez	Olası Etkenler	Tedavi
Kraniyotomi	Gram negatif basiller (*Pseudomonas aeruginosa* dahil) *S aureus* KNS (*S epidermidis*)	Vankomisin + Meropenem/ Sefepim/ Seftazidim
Ventriküler-lomber kateter	KNS (*S epidermidis*) *S aureus* Gram negatif basiller *P acnes*	
Penetran yaralanma anaeroblar	*S aureus* KNS Gram negatif basiller (*Pseudomonas aeruginosa* dahil)	
Kafa tabanı kırığı	*S pneumoniae* *H influenzae* AGBHS	Vankomisin + 3. kuşak sefalosporin (CRO/CTX)

Journal of Antimicrobial Chemotherapy (2007) **60**, 1097–1103
doi:10.1093/jac/dkm351
Advance Access publication 17 September 2007

JAC

Propionibacterium acnes: an under-appreciated cause of post-neurosurgical infection

M. Nisbet[1]*, S. Briggs[1], R. Ellis-Pegler[1], M. Thomas[1] and D. Holland[2]

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[2]*Department of Microbiology, LabPlus, Auckland City Hospital, Private Bag 92024, Auckland, New Zealand*

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***Background*: *Propionibacterium acnes* is increasingly recognized as a cause of post-neurosurgical infection. This review of patients with *P. acnes* neurosurgical infection was carried out in order to determine clinical characteristics and outcomes in relation to duration of antimicrobial treatment.**

***Methods*: We retrospectively reviewed the charts of consecutive patients with *P. acnes* isolated from neurosurgical specimens from 1 January 1999 to 30 June 2005. We defined *P. acnes* neurosurgical infection as isolation of *P. acnes* alone from a sterile neurosurgical site in a patient who clinically improved following treatment with an appropriate antibiotic.**

Kraniyotomilerde, katater ilişkili MSS infeksiyonlarında düşünülmeli
Sefalosporin/karbapenem/vankomisin yetmeyebilir
Tedavisi Penisilin IV

bacilli on Gram stain should not be discounted as a contaminant in neurosurgical specimens. Associated bone flaps should be removed. Intravenous benzyl penicillin ± oral penicillin VK remains effective treatment.

Cerebrospinal Fluid Penetration of High Doses of Intravenous Ciprofloxacin in Meningitis

J. Lipman,[1,3] A. Allworth,[2,4] and S. C. Wallis[3]

[1]*Intensive Care Facility and* [2]*Infectious Diseases Unit, Royal Brisbane Hospital, and Departments of* [3]*Anaesthesiology and Critical Care and* [4]*Medicine, University of Queensland, Herston, Australia*

Nosocomial meningitis due to gram-negative organisms is a difficult clinical problem to manage because of both antibiotic resistance and poor penetration of many antimicrobials across the blood-brain barrier. Ciprofloxacin has potential in treating this condition when used in high doses. We investigated the plasma and cerebrospinal fluid (CSF) levels of ciprofloxacin in a patient with *Pseudomonas aeruginosa* meningitis who was treated with 400 mg of intravenous ciprofloxacin every 8 hours. Ciprofloxacin levels in plasma peaked at 10.29 mg/L without resulting in accumulation (8-hour trough levels, <1 mg/L), whereas the CSF level increased to 0.9 mg/L. This CSF level was confirmed to be similar 1 week later. After 1 week of therapy, during which there were no side effects attributable to ciprofloxacin, the organism was eradicated, and there was some clinical improvement. We recommend that 400 mg of intravenous ciprofloxacin every 8 hours be considered for treatment of difficult-to-treat gram-negative bacillary meningitis.

Nöbet !!!!!
Literatürde çok görülmüyor diyor

Beta laktam alerjisi/
MDR *P aeruginosa 'da*

Siprofloksasin 3x400 mg
Bir seçenek

Table 1. Concentrations of ciprofloxacin in plasma and CSF samples from a patient with *Pseudomonas aeruginosa* meningitis.

Date, time	Hours after dose	Plasma concentration, mg/L	CSF concentration, mg/L
7 August 1999			
9:00 AM	5	1.28	0.049
10:00 AM	6	1.05	0.520
11:00 AM	7	0.78	0.913
12:00 PM	8[a]	0.67	0.922
1:00 PM	1	10.29	0.914
2:00 PM	2	3.23	
14 August 1999			
2:00 PM	2	2.98	0.955
15 August 1999			
12:00 PM	8[a]	0.47	

[a] Trough level is measured at this time.

Table 2. Selected results of hematologic, chemical pathological, and microbiological analyses of CSF samples from a patient with *Pseudomonas aeruginosa* meningitis.

Date	WBC count, $\times 10^6$/L	Neutrophils, %	Protein level, g/L[a]	Glucose level, mmol/L[b]	Gram stain[c]	Culture[d]
30 May 1999	8040	88	1.398	0.7	−	+
4 August 1999	960	92	>3	1.1	+	+
5 August 1999	47	63	2.8	0.9	+	+
6 August 1999	150	60	4.2	1.3	+	+
7 August 1999	220	ND	5.48	1.2	+	+
14 August 1999	70	10	1.8	2.9	−	−

NOTE. ND, not determined; −, negative; +, positive.
[a] Normal range, 0.15–0.5 g/L.
[b] Normal range, 2.5–4.0 mmol/L.
[c] For the presence of gram-negative bacilli.
[d] For *P. aeruginosa*.

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Central nervous system infections due to vancomycin-resistant enterococci: case series and review of the literature

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SUMMARY

Objectives: To evaluate reported cases of central nervous system (CNS) infections due to vancomycin-resistant enterococci (VRE) and describe the data necessary to better understand clinical characteristics of this rare disease process.
Methods: We report two cases of VRE CNS infection and review 36 cases reported in the literature.
Results: Eighty-two percent (31/38) of cases were due to *Enterococcus faecium*. The median length of stay prior to diagnosis was 14 days (interquartile range 9–33). Fifty-eight percent (22/38) of cases had significant underlying non-malignant CNS disease processes and 63% (24/38) had CNS devices in situ.

Table 1
Characteristics of patients with central nervous system (CNS) infections due to vancomycin-resistant enterococci (VRE)

[Ref.] year	Age, sex	Underlying condition(s)	Clinical features	Treatment	CNS device and management	Outcome
[14] 1994	6 years, M	Seizure disorder s/p brain grid placement	Fever, AMS, headache, meningeal signs, seizures	Am IV × 7 days; Cm and Rf × 14 days; Tc IT × 14 days	Brain grid removed, lumbar drain placed then removed at a later date	Clinical and microbiological cure
[15] 1995	8 months, F	Intraventricular bleed, shunt infections	Fever, AMS	Ch IV and Gn IV and VT; Q/D IV and Q/D VT × 28 days	Shunt removed, Ommaya placed, intraventricular lavage	Clinical and microbiological cure
[16] 1996	71 years, F	Ethmoid sinus invasive	NR	Q/D IV × 22 days	NA	Death, microbiological cure
		metastasis, EVD to VPS, MI, pneumonia		weeks; Gn IV × 7 days; Gn VT		cancer, microbiological cure
[24] 2002	7 months, M	Pulmonary HTN, hydrocephalus s/p VPS	Fever, seizures	Lz × 21 days	VPS removed then replaced after 10 days of Lz	Clinical and microbiological cure
[25] 2003	67 years, M	CNS lymphoma s/p reservoir and chemotherapy	Fever	Q/D IV × 9 weeks; Lz IV × 6 weeks; Q/D VT × 3 doses	Ommaya reservoir replaced	Clinical and microbiological cure
[26] 2004	38 years, M	Oligoastrocytoma s/p resection, abscess, hydrocephalus s/p EVD	Fever, seizures	Ch IV × 4 days	Frontal abscess resected, EVD replaced	Death, microbiological cure
[27] 2005	46 years, M	SAH s/p craniotomy and aneurysm clipping	Fever	Ch IV × 47 days; Ch VT × 35 days	EVD placed on day 12 of Ch	Clinical and microbiological cure
[28] 2006	69 years, M	COPD on chronic steroids, Klebsiella pneumonia, UTI	Fever, AMS, meningeal signs	Cf × 2 days; Cp × 2 days; Lz IV × 2 weeks	NA	Clinical and microbiological cure
[29] 2006	7 months, M	Hydrocephalus s/p VPS, non-VRE meningitis, EVD	Fever	Ch, Rf, and Mp × 9 days	One week after diagnosis EVD replaced with Rf + Cl impregnated EVD	Clinical and microbiological cure
[30] 2006	51 years, F	Cribriform plate defect s/p lumbar drain placement	Fever, headache	Am and Rf × 3 weeks	Lumbar drain removed on diagnosis, replaced with lumboperitoneal shunt	Clinical and microbiological cure

VRE'de bir çok kombinasyon var
1994-2005 arası Kloramfenikol IV+IT/IVT

2005 sonrası Linezolid/Daptomisin/Quinopristin-Dalfopristin
± Genta IT/IVT /Rifampisin NG/PO

~28 gün

Tedavi Süresi?

- KNS ve *P acnes*
  - Klinik düzelme ve BOS bulguları düzelme varsa
    - ~10 gün
  - Düzelme hemen olmazsa (birden fazla üreme)
    - 10-14 gün
- *S aureus* ve Gram negatif üremelerde
  - Klinik ve BOS bulguları düzelmişse
    - 10-14 gün
  - Bazı klinisyenler özellikle gram negatifler için 21 gün (rekürrens sık)

Özellikle *Pseudomonas spp* 'de

Tekrarlayan kültürlerde üreme varsa son üremeden sonra 10-14 gün

- Beyin apsesi
- Subdural ampiyem
- Kraniyal-epidural apse
- Süpüratif kraniyal flebit

6 hafta
Boyut ??
Drenaj???

- Ventrikülit
  - G (+) IV+IVT 1-2 hafta !!!!!
  - G(-) IV± IVT 2-3 hafta !!!!!

Apse varlığında kesme kriteri
Radyolojik iyileşme?
(kontrast tutulumu??? Devam ediyor)
Drenaja uygun değilse ve apsenin boyutu büyükse!!!!)

İntraventriküler/İntratekal Tedavi

İyi geçenler	Çok az geçenler	Enflamasyonda geçenler	Hiç geçmeyenler
Kloramfenikol Sikloserin ETB INH Metronidazol TMP-SMZ	Aminoglikozidler Amfoterisin B Sefoksitin 1. Kuşak sefalosporinler Klindamisin	Asiklovir Penisilin G Ampisilin 3 kuşak sefalosporinler 4 kuşak sefalopsorinler Vankomisin Penemler	Basitrasin Ketakonazol Polimiksin B Kolistin

Steroid alıyorsa beklenenden daha az BOS'a geçiş

İntraventriküler/İntratekal Tedavi

- Sistemik antibiyotik BOS'a geçmiyor, yeterli BOS konsantrasyonuna ulaşılamıyorsa
- Tedaviye rağmen üremeler devam ediyorsa uygulanır
- Lateral ventrikül ya da lomber drenajdan antibiyotik uygulanır

Kan beyin bariyeri by-pass edilmiş olur

İntraventriküler/İntratekal Tedavi

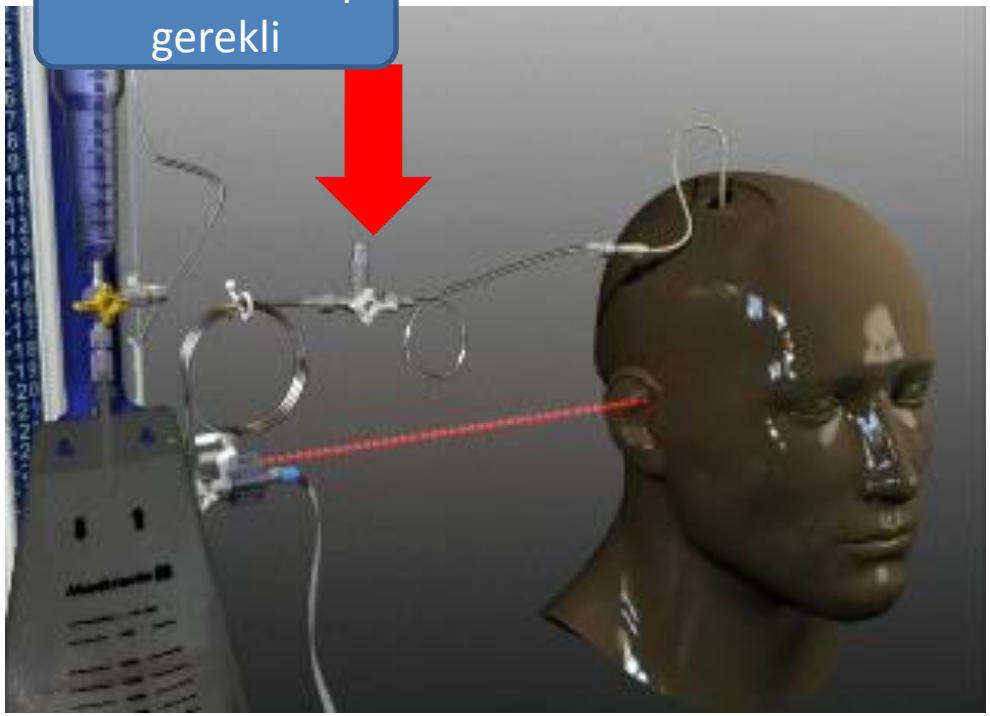
- Antibiyotiğin etkili olabilmesi için BOS'da MIC'in en az 10-20 katı olması gerekli
- Ventrikül hacmi ve günlük ventrikül drenajına göre değişir!!

BOS'a geçen antibiyotik sayısı az

Antibiyotiklere duyarlılık giderek azalıyor

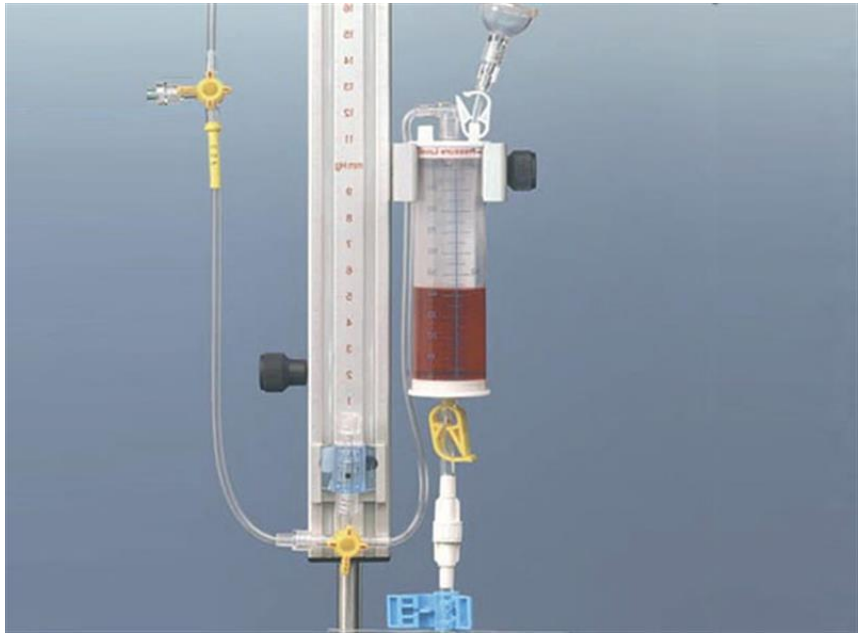
Önemli bir sorun
Yeni bir etken??? Kontaminasyon riski

15-60 dk klemp gerekli



Sistemik yan etki daha az!!!

Randomize kontrollü çalışma yok
Olgu sunumları yada olgu serileri
Retrospektif çalışmalar



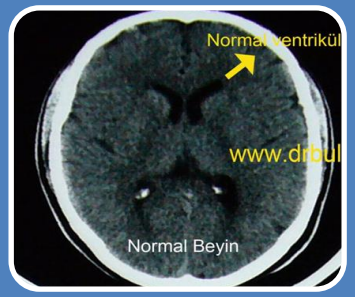
FDA onayı yok

Penisilin ve sefalosporinler nörotoksik olduğundan uygulanmaz

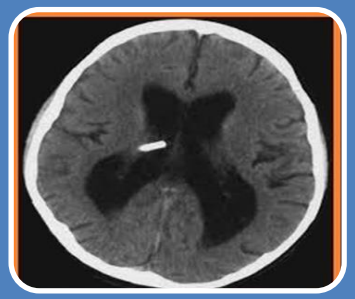
Table 3. Recommended Dosages of Antimicrobial Agents Administered by the Intraventricular Route

Antimicrobial Agent	Daily Intraventricular Dose
Amikacin	5–50 mg[a]
Amphotericin B deoxycholate[b]	0.01–0.5 mg in 2 mL of 5% dextrose in water
Colistin (formulated as colistimethate sodium)	10 mg
Daptomycin	2–5 mg[c]
Gentamicin	1–8 mg[d,e,f]
Polymyxin B	5 mg[g]
Quinupristin/dalfopristin	2–5 mg
Tobramycin	5–20 mg
Vancomycin	5–20 mg[e,f,h]

Slit ventrikül:
Vankomisin 5 mg
Gentamisin 2 mg



Normal:
Vankomisin 10 mg
Gentamisin 3 mg



Genişlemiş:
Vankomisin 15-20 mg
Gentamisin 4-5 mg

Vankomisin ve Gentamisinde BOS eksternal ventriküler drenaj miktarına göre uygulama sıklığı

<50 ml/gün ise üç günde bir
50-100 ml/gün ise iki günde bir
100-150 ml/gün ise her gün
150-200 ml/gün ise günlük vankomisin dozu 5 mg, gentamisin dozu 1 mg artırılmalı
200-250 mg/gün ise vankomisin dozu 10 mg, gentamisin dozu 2 mg artırılmalı

Journal of Medical Microbiology (2010), **59**, 1371–1374 DOI 10.1099/jmm.0.022921-0

Case Report

Successful treatment of vancomycin-resistant *Enterococcus faecium* ventriculitis with combined intravenous and intraventricular chloramphenicol in a newborn

Carolin Hartmann,[1] Corinna Peter,[1] Elvis Hermann,[2] Benno Ure,[3] Ludwig Sedlacek,[4] Gesine Hansen[1] and Bettina Bohnhorst[1]

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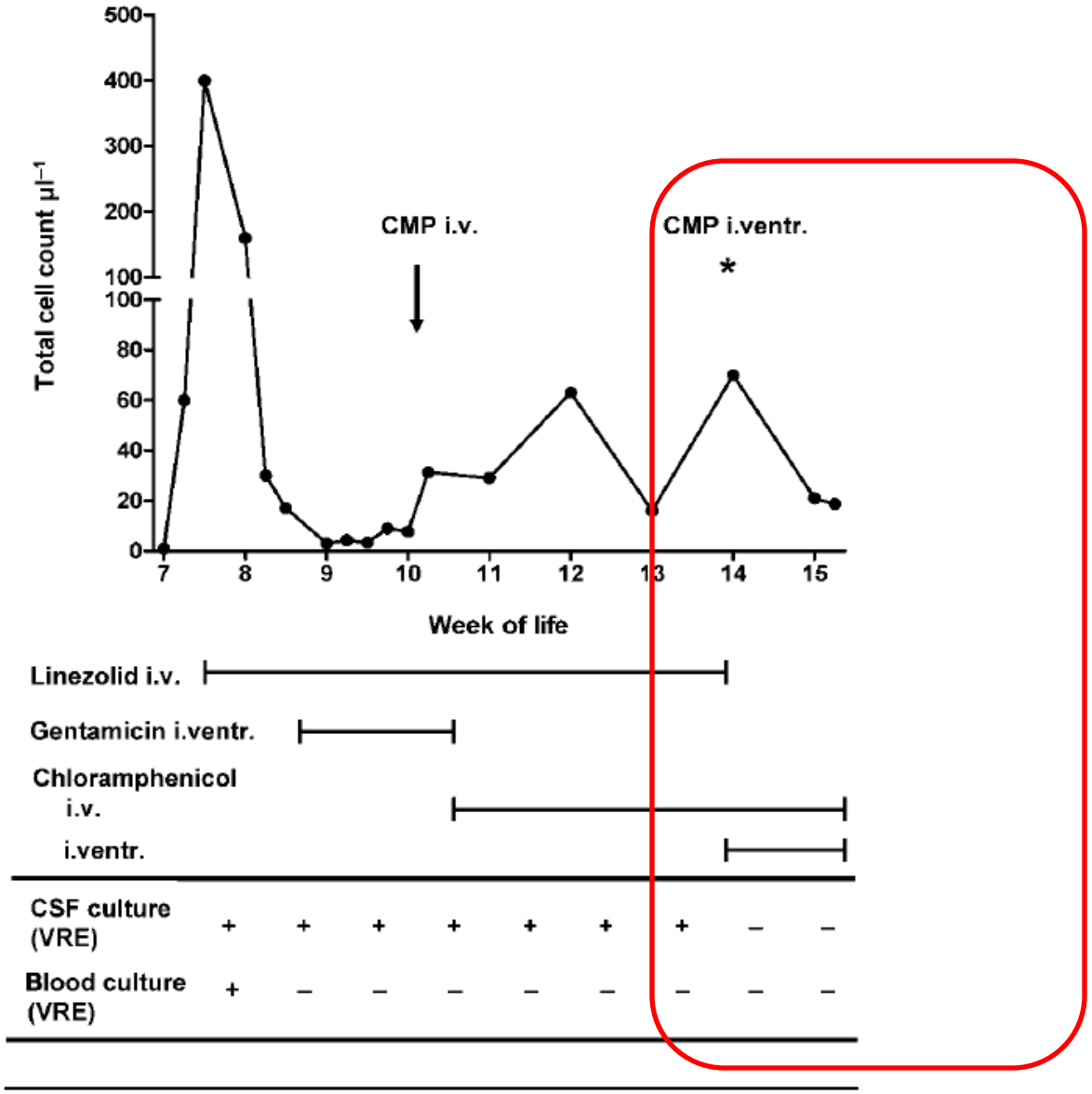
500
400
300
200
100
100
80
60
40
20
0
Total cell count µl⁻¹
CMP i.v.
CMP i.ventr.
*
7
8
9
10
11
12
13
14
15
Week of life
Linezolid i.v.
Gentamicin i.ventr.
Chloramphenicol
i.v.
i.ventr.
CSF culture (VRE) + + + + + + + – –
Blood culture (VRE) + – – – – – – – –

International Journal of Infectious Diseases 14 (2010) e572–e579

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Review

Post-neurosurgical multidrug-resistant *Acinetobacter baumannii* meningitis successfully treated with intrathecal colistin. A new case and a systematic review of the literature

Antonio Cascio [a,*], Alfredo Conti [b], Luca Sinardi [c], Chiara Iaria [d], Filippo Flavio Angileri [b], Giovanna Stassi [e], Teresa David [c], Antonio Versaci [c], Maurizio Iaria [f], Antonio David [c]

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[b] *Department of Neurosurgery, University of Messina, Messina, Italy*
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[e] *Microbiology Unit, University of Messina, Messina, Italy*
[f] *Division of General Surgery, Department of Human Pathology, University of Messina, Messina, Italy*

45 literatür taranmış
32 hasta 33 epizod

Table 1
Clinical characteristics, therapy and outcome of patients with *Acinetobacter spp* meningitis treated with intraventricular or intrathecal colistin[a]

Authors, year, country (notes) [Ref.]	Age/sex	Primary diagnosis	Foreign bodies	Acinetobacter susceptibility	Initial regimens used	Final regimen	Dosage of intrathecal colistin (colistimethate)[b]	Toxicity	Outcome (comment)
Kaplan and Patrick, 1990, USA [4]	4/NR	Meningitis	EVD	MDR	None	Cefotaxime and aminoglycoside IV, colistin IVR	20 unspecified doses	None	Cure
Fernandez-Viladrich et al., 1999, Spain (2 cases) [5]	16/M	Hemangioblastoma	EVD	Susceptible only to colistin and sulbactam; intermediate to tobramycin and imipenem	Meropenem, tobramycin and, sulbactam IV; tobramycin IVR	Tobramycin IV and colistin IVR	5 mg q12h for 19 days	None	Culture-negative after 2 days Cure
	3								Died of cardiac arrest 40 days later Culture-negative after 6 days
Vasen et al., 2000, Argentina [6]	4								Cure Follow-up 4 months Culture-negative after 1 day
Benifla et al., 2004, Israel (*Staphylococcus aureus* was also isolated in one of the cultures) [7]	49/F	Recurrent meningioma, recurrent episodes of meningitis	VP shunt	Susceptible only to colistin and sulbactam	Ceftriaxone IV, co-amoxiclav IV and meropenem IV, ampicillin/ sulbactam and vancomycin	Ampicillin/ sulbactam and vancomycin IV, Colistin IVR	3.2 mg q24h for 17 days	None	Cure Follow-up 6 weeks Culture-negative after 6 days
Sueke et al., 2005, UK [8]	38/F								Cure Follow-up 4 years Cure
Bukhary et al., 2005, Saudi Arabia [9]	23/F								(Authors do not report total duration of therapy and follow-up) Culture-negative after 7 days
		craniotomy and upper cervical laminectomy			moxifloxacin and colistin IV				Cure

Meropenem IV+Kolistin IV+kolistin IT/IVT
Meropenem IV+ Rifampisin+ Kolistin IT/IVT
Yalnız Kolistin IT/IVT (8 olgu)
Kolistin IV+Kolistin IT/IVT…..

~4,1 günde BOS steril olmuş

5/32 eksitus (hiç biri menenjit nedeniyle değil)
5'inde yan etki (geriye dönüşümlü)

Grubu :	Beyin ve Sinir Cerrahisi	**Grup Türü :**	Yatarak
Branşı :	2400-Beyin ve Sinir Cerrahisi	**Provizyon Tipi :**	Normal
Takip Tarihi :	14.09.2017	**Protokol No :**	12374136
Takip Tipi :	Normal	**Taburcu Kodu :**	Hastane içinde başka bir branşa sevk
Tedavi Türü :	Yatarak Tedavi	**Tedavi Tipi :**	Normal Sorgu
İlk Takip No :	2CJIUU7	**Donör TCK :**	0
Hasta Telefon :	2245535160	**Hasta Adres :**	HAMZABEY MAH. ŞEHİT ZEKİ GÖKGÖZ SK. 15/1 MUSTAFAKEMALPAŞA BURSA
Sevk Edilmiş :	Hayır	**Sevk Ediliş Tarihi :**	
Yeşil Kart Sevkli :	Hayır	**Yeşil Kart Sevke Bağlı :**	Hayır
Yatış Başlangıç Tarihi :	12.09.2017	**Taburcu Tarihi :**	25.10.2017
Açıklama :	Öyküsü:Kronik sinüzit nedeniyle dış merkezde operasyon planlanan ve ani başlayan ajitasyon, saldırganlık ve uygunsuz konuşma şikayetleri ile 18.(servise başvuran tarafımızca Lomber Ponksiyon yapılan ve menenjit tedavisi başlanan dış merkeze sevki sonrasında sol gözde görme kaybı gelişen kliniğine yatırılmış. Radyolojik görüntülemeleri ile tarafımıza konsülte edilen hasta yatağında değerlendirildi. Sol frontal sinus ve sol frontoorbital böl yaygın ödemli abse görünümlü lezyonlara yönelik operasyon planlanarak Nöroşirürji kliniğine yatırıldı. 2 - Cerrahi Tedavi:18/09/2017 - Uygulanan C 615410 BEYİN APSESİ CERRAHİSİ,KRANİOTOMİ İLE Çıkarılan Materyaller :apse Ulaşılan Bulgular :... Kullanılan Kan Ve Kan Ürün Miktarı :- Kanama Ameliyat Başlangıç ve Bitiş Zamanları :18/09/2017 12:00 18/09/2017 16:00 Yapılan Anestezi:ANESTEZİ BAKIMIAnestezi Notu : ht Anestezi Veren D HÜLYA,YALDIZ MEHMET,KIZILKALE G		

		1.0	20,82	20,82	SONUCUNDA DİRENÇ BELİRTİLMİŞ.
İlaç	8699814270536-MOPEM 1 GR IV ENJEKTABL TOZ ICEREN 1 FLK	1.0	20,82	20,82	22.09.2017 TAR.KÜLTÜR ANTİYOGRAM SONUCUNDA DİRENÇ BELİRTİLMİŞ.
İlaç	8699814270536-MOPEM 1 GR IV ENJEKTABL TOZ ICEREN 1 FLK	1.0	20,82	20,82	22.09.2017 TAR.KÜLTÜR ANTİYOGRAM SONUCUNDA DİRENÇ BELİRTİLMİŞ.
İlaç	8699814270536-MOPEM 1 GR IV ENJEKTABL TOZ ICEREN 1 FLK	1.0	20,82	20,82	22.09.2017 TAR.KÜLTÜR ANTİYOGRAM SONUCUNDA DİRENÇ BELİRTİLMİŞ.
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İlaç	8699814270536-MOPEM 1 GR IV ENJEKTABL TOZ ICEREN 1 FLK	1.0	20,82	20,82	22.09.2017 TAR.KÜLTÜR ANTİYOGRAM SONUCUNDA DİRENÇ BELİRTİLMİŞ.
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İlaç					22.09.2017 TAR.KÜLTÜR ANTİYOGRAM

Meropenem IV+Kolistin IV+ Kolistin IVT

ÖRNEK GRUBU: STERIL VÜCUT SIVILARI
ÖRNEK: BOS
VÜCUT BÖLGESİ: LOMBER

İŞLEM : BEYİN OMURİLİK SIVISI (BOS) KÜLTÜRÜ

SONUÇ : **Pozitif**

Üreyen Organizma : 1) ACINETOBACTER BAUMANNII

Yorum : MAKI VE BROTH YONTEMIYLE YOGUN UREDI

Amikacin	>16	R	Ciprofloxacin	>2	R
Colistin	<=1	S	Gentamicin	>4	R
Imipenem	>8	R	Meropenem	>8	R
Netilmicin	>4	R	Trimethoprim-Sulfamethoxazole	>4/76	R

- 39 yaşında kadın hasta, FM (Temmuz 2016)
- İntrakraniyal kitle ile opere oldu
- EVDS+ICP var
- Postop 14. günde ventrikülit gelişti

ÖRNEK GRUBU: STERIL VÜCUT SIVILARI
ÖRNEK: BOS
VÜCUT BÖLGESİ: LOMBER

İŞLEM : BEYİN OMURİLİK SIVISI (BOS) KÜLTÜRÜ İşlem Tarihi : 06/08/2016

SONUÇ : ÜREME VAR

Üreyen Organizma : 1) KLEBSIELLA PNEUMONIAE SSP PNEUMONIAE

Amikacin	<=4	S	Amoxicillin-Clavulanate (F)	<=2/2	S
Ampicillin	>8	R	Aztreonam	<=1	S
Cefepime	<=1	S	Ceftazidime	<=0.5	S
Ceftriaxone	<=0.5	S	Cefuroxime	<=2	S
Ciprofloxacin	<=0.125	S	Colistin	<=1	S
Ertapenem	<=0.25	S	Gentamicin	<=1	S
Imipenem	<=0.25	S	Meropenem	<=0.125	S
Netilmicin	1	S	Piperacillin	8	S
Piperacillin-Tazobactam	<=4/4	S	Tigecycline	1	S
Trimethoprim-Sulfamethoxazole	<=1/19	S			

Üreyen Organizma : 3) ENTEROBACTER CLOACAE

Amikacin	<=4	S	Amoxicillin-Clavulanate (F)	>32/2	R
Ampicillin	>8	R	Aztreonam	<=1	S
Cefepime	<=1	S	Ceftazidime	<=0.5	S
Ceftriaxone	<=0.5	S	Ciprofloxacin	<=0.125	S
Colistin	<=1	S	Ertapenem	<=0.25	S
Gentamicin	<=1	S	Imipenem	<=0.25	S
Meropenem	<=0.125	S	Netilmicin	1	S
Piperacillin	<=4	S	Piperacillin-Tazobactam	<=4/4	S
Tigecycline	2	I	Trimethoprim-Sulfamethoxazole	<=1/19	S

- Meropenem (3x2 g IV)+Vankomisin (3x1 g IV)
  - Yanıt yok
- Kolistin IV+IVT eklendi

ÖRNEK GRUBU: KATATER
ÖRNEK: SANTRAL SİNİR SİSTEMİ

İŞLEM : YARA KÜLTÜRÜ İşlem Tarihi : 12/08/2016

SONUÇ : Pozitif

Üreyen Organizma : 1) ACINETOBACTER BAUMANIII Yorum : MAKI VE BROTH YONTEMIYLE YOGUN UREDI

Amikacin	>16	R	Ciprofloxacin	>2	R
Colistin	<=1	S	Gentamicin	>4	R
Imipenem	>8	R	Meropenem	>8	R
Netilmicin	>4	R	Trimethoprim-Sulfamethoxazole	>4/76	R

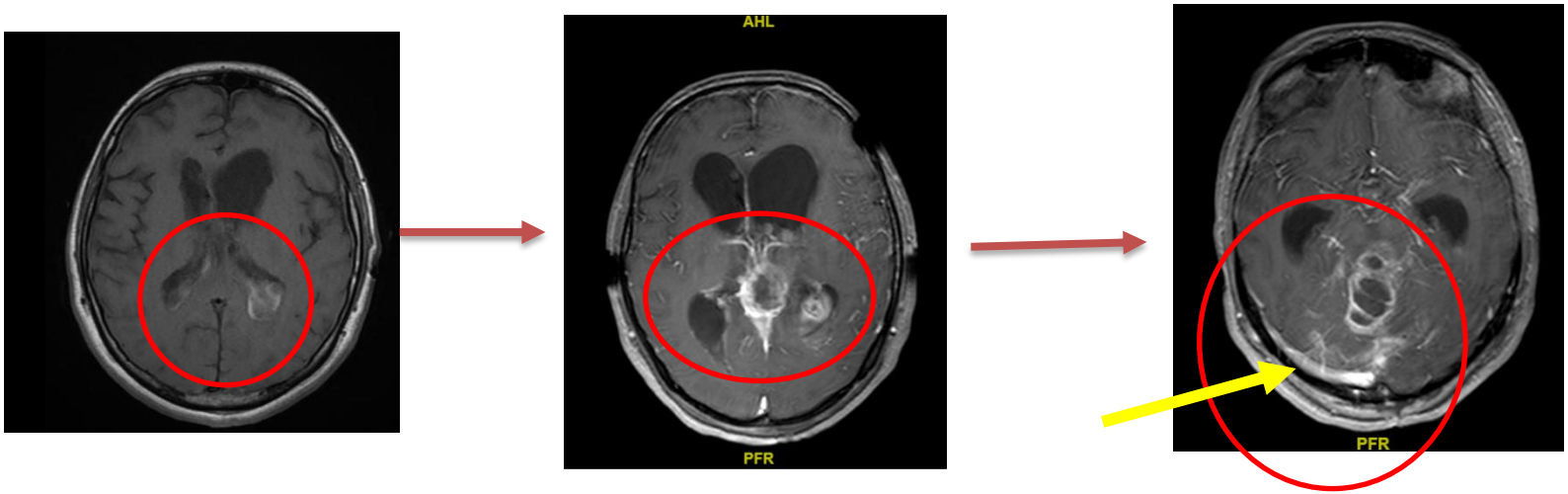
ÖRNEK GRUBU: KATATER
ÖRNEK: EVDS UCU

İŞLEM : YARA KÜLTÜRÜ İşlem Tarihi : 15/08/2016

SONUÇ : Pozitif

Üreyen Organizma : 1) ACINETOBACTER BAUMANIII

Amikacin	>16	R	Ciprofloxacin	>2	R
Colistin	<=1	S	Gentamicin	>4	R
Imipenem	>8	R	Meropenem	>8	R
Netilmicin	>4	R	Trimethoprim-Sulfamethoxazole	>4/76	R


AHL
PFR
PFR

Klinik ve BOS bulguları düzelmedi

2 kez EVDS revizyonu
Birkaç defa operasyon…

Flukonazol

TMP-SMZ

Meropenem+Kolistin IV+IVT eklendi

Vankomisin/linezolid

Yüksek doz kinolon

- Meropenem 37 gün, kolistin 28. gün, Linezolid 17. günde Rifampisin 3x300 mg (NG) ekledi
- Hastanın 5. gününde ateşi düştü, BOS steril oldu

- Meropenem (86 gün)+Kolistin (77 gün)+Rifampisin (28. günde) BOS bulgusu normal, 3 kültür negatif
  - VP şant takıldı
  - Şant sonrası 10. gün tüm tedaviler kesildi
  - Tedavi kesildikten 10 gün sonra taburcu edildi
  - Aralık 2017'de poliklinik kontrollerine en son geldi

Gerçekler

Masallar

IVT/IT Süre??

- BOS kültürü negatifleşinceye kadar
- <7 gün nüks fazla
- Ortalama 10 gün yeterli
- Ancak standart süre yok

Journal of Microbiology, Immunology and Infection (2014) 47, 204–210
Available online at www.sciencedirect.com
SciVerse ScienceDirect
journal homepage: www.e-jmii.com
ELSEVIER

ORIGINAL ARTICLE

Intraventricular antimicrobial therapy in postneurosurgical Gram-negative bacillary meningitis or ventriculitis: A hospital-based retrospective study

Jui-Hsing Wang [a], Po-Chang Lin [a], Chia-Hui Chou [a], Cheng-Mao Ho [a], Kuo-Hsi Lin [a], Chia-Ta Tsai [a], Jen-Hsien Wang [a,b], Chih-Yu Chi [a,b,*], Mao-Wang Ho [a,b,*]

IT süre: 3-27 gün
Genelde BOS steril olduktan sonra 6,6 gün daha

Table 4 Clinical characteristics and microorganisms isolated from cerebrospinal fluid (CSF) and treatment and outcomes for 15 episodes of postneurosurgical Gram-negative bacillary meningitis and ventriculitis treated with sequential intraventricular therapy (IVT)

Episode	Age (y) /sex	CSF culture	Concurrent IV antibiotics	IVT therapy			Medical condition	APACHE II score	Length of hospital stay (d)	Outcome
				Daily dose	IVT duration (d)	Elapsed period[b] (d)				
1[a]	79/F	*Acinetobacter baumannii*	Imipenem	Amikacin 50 mg	9	32	Brain infarction s/p Ommaya	6	213	Cured
2	28/M	CR *Acinetobacter baumannii*	Meropenem	Amikacin 30 mg	11	10	ICH s/p EVD	10	139	Cured
3	39/M	CR *Acinetobacter baumannii*[c]	Meropenem/colistin	Amikacin 10 mg	18	21	Hydrocephalus s/p VP shunt AIDS	9	136	Cured
4	31/M	CR *Acinetobacter baumannii*	Imipenem/colistin	Colistin 6.4 mg	27	28	TBI/ICH s/p EVD	11	116	Cured
5	70/F	CR *Acinetobacter baumannii*	Imipenem/sulbactam/ colistin	Colistin 3.2 mg	20	23	Brain infarction s/p VP shunt	18	98	Death
6	60/M	CR *Acinetobacter baumannii*	Meropenem/colistin	Colistin 16 mg	7	30	ICH s/p VP shunt	16	83	Cured
7	15/M	CR *Acinetobacter baumannii*	Meropenem/colistin	Colistin 2 mg	10	14	Hydrocephalus s/p EVD Hypertensive nephrosclerosis	21	98	Cured
8	53/M	*Escherichia coli*[d]	Cefepime/ceftazidime	Gentamicin 10 mg	3	19	TBI/ICH s/p EVD	14	177	Cured
9[a]	79/F	*Escherichia coli* (ESBL)	Imipenem	Amikacin 10 mg	3	48	Brain infarction s/p VP shunt	6	81	Cured
10	57/M	*Klebsiella pneumoniae*	Ceftriaxone	Amikacin 30 mg	17	5	Hydrocephalus s/p EVD DM	22	128	Cured
11	77/F	*Pseudomonas aeruginosa*	Ceftazidime	Amikacin 10 mg	15	12	Intracranial tumor s/p VP shunt	19	172	Death
12	48/F	*Pseudomonas aeruginosa*	Cefepime	Amikacin 50 mg	10	13	Communicated hydrocephalus s/p Ommaya	7	66	Death
13	25/M	CR *Pseudomonas aeruginosa*	Ceftazidime Meropenem	Gentamicin 4 mg	15	55	TBI/ICH s/p craniotomy	9	147	Death
14	68/M	*Serratia marcescens*	Ceftazidime/cefepime	Gentamicin 8 mg	14	8	ICH s/p EVD	15	59	Cured
15	35/M	*Sphingobacterium multivorum*	Imipenem/ trimethoprim/ sulfamethoxazole	Gentamicin 8 mg	21	63	TBI/ICH s/p VP shunt	16	124	Cured

[a] Two separate episodes in one patient.
[b] Period from when bacteria were first isolated in the CSF specimen to the initiation of IVT therapy.
[c] Mixed infection with *Candida tropicalis*.
[d] Mixed infection with methicillin-resistant *Staphylococcus aureus*.

Yan etki
Şimik menenjit
Eozinofilik pleositoz??
İşitme kaybı

neurocritical care society Neurocrit Care (2016) 25:492–507
DOI 10.1007/s12028-016-0269-3

REVIEW ARTICLE

Systematic Review of Efficacy, Pharmacokinetics, and Administration of Intraventricular Aminoglycosides in Adults

neurocritical care society Neurocrit Care (2014) 20:158–171
DOI 10.1007/s12028-012-9784-z

REVIEW ARTICLE

Systematic Review of Efficacy, Pharmacokinetics, and Administration of Intraventricular Vancomycin in Adults

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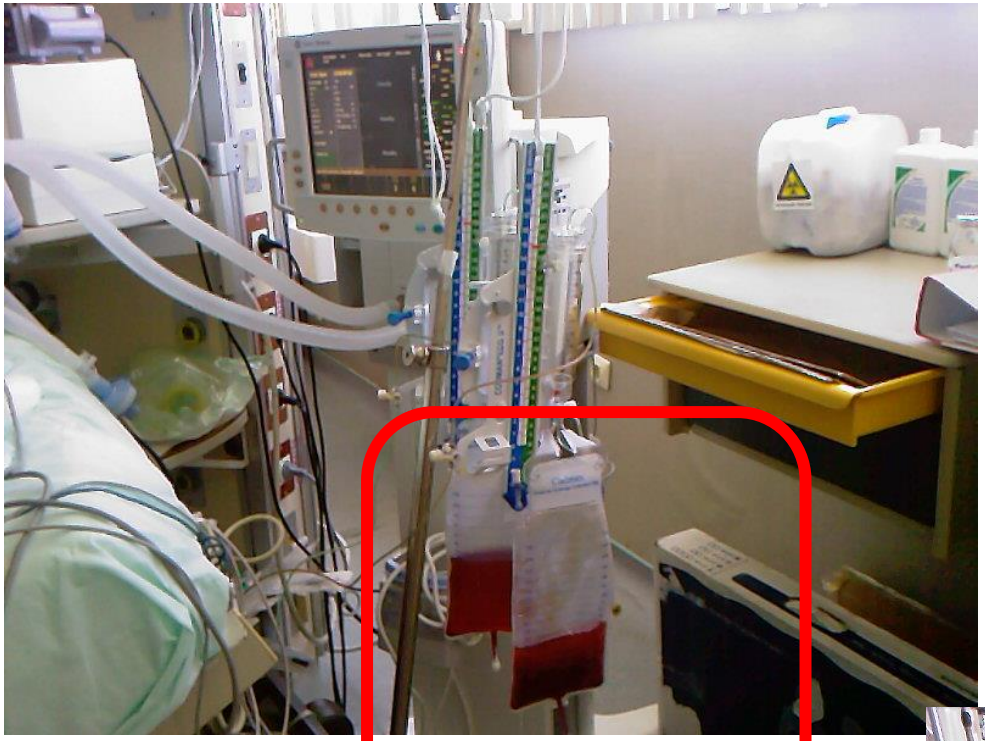
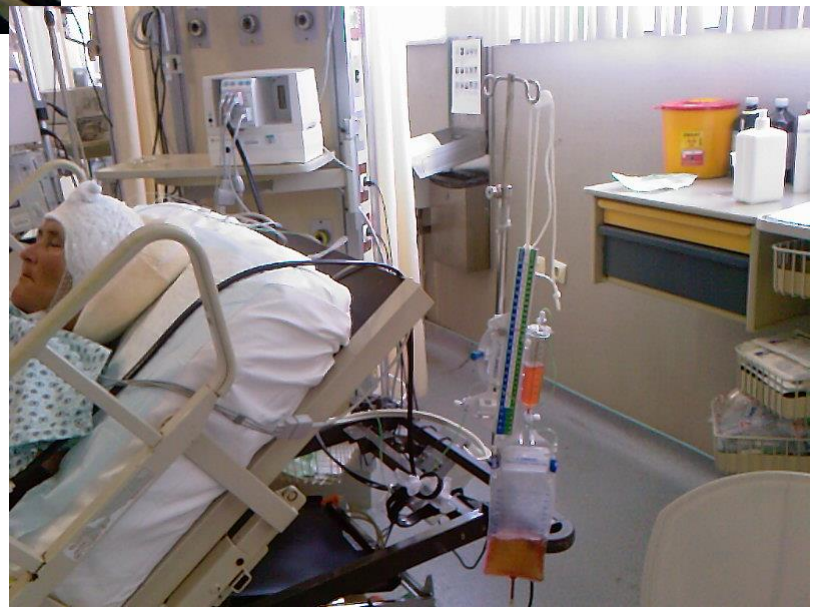
Antibiyotik dozu yaşa, kiloya göre değil ventrikül ve BOS hacmine
İlaç PK'i BOS miktarına
İlaç klirensi BOS üretimi, BOS drenajına bağlı
BOS'da ki düzeyine bakılsın mı (başlangıçta EVET)

External Ventriküler Drenaj Seti (EVDS)-menenjit/ventrikülit

- EVDS süresi >11 gün (>5 gün) enfeksiyon riski
- Sık BOS örneği almak
- İntraventriküler hemoraji
- Cerrahi teknikte aksamalar

S epidermidis %70
S aureus %10
Diğer <%20
Gram negatif basil %15
Anaerob nadir
Candida spp çok nadir





Katater-Şant İnfeksiyonu??

- Tedavinin başarısı için antibiyotik tedavisi ve infekte şant/dren/infüzyon pompası çekilmeli
- Şant infekte ise çekilmeli , EVDS takılmalı (ağızlaştırma yapılıyor genelde)

İlk seçenek Vankomisin

Linezolid (başarılı ama ilk seçenek değil)

Daptomisin BOS'a geçişi çok az (%0,8) ama başarılı bulunmuş tek kullanılmaz (rifampisin ile kombine, 10 mg/kg)

Şant menejiti rifampisin (tabii duyarlı ise)

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REVIEW

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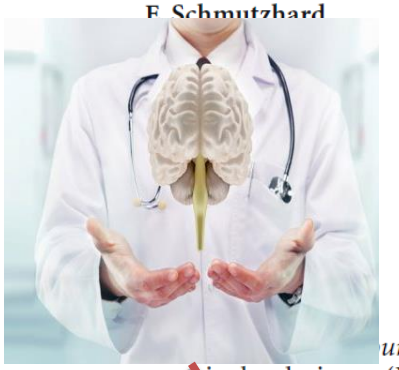
Nosocomial ventriculitis and meningitis in neurocritical care patients



und External ventricular drainage (EVD) is frequently necessary in neurological and neurosurgical intensive care

in providing an appropriate and timely diagnosis of this disease entity and (3) to propose an algorithm for both rapid diagnosis and

frequently impaired either by the presence of systemic inflammation due to the primary disease or because the hemorrhagic CSF itself

EVDS değişimi

Kanama?
Yeni enfeksiyon??
????

Tedavi başarısı için
EVDS/şant değişimi

neurocritical care society Neurocrit Care (2009) 10:363–367
DOI 10.1007/s12028-008-9155-y

PRACTICAL PEARL

Management of Nosocomial External Ventricular Drain-Related Ventriculomeningitis

Ronny Beer · Bettina Pfausler · Erich Schmutzhard

Published online: 4 November 2008

Abstract
Introduction Neurocritical care patients requiring external ventricular drainage are at risk for the development of a device-related infection. Infection rate of external ventriculostomy catheters is high with reported incidences ranging from 5% up to more than 20%. Nosocomial ventriculitis or ventriculomeningitis are potential life-threatening conditions which may contribute to a permanent adverse outcome of the patient. Reducing morbidity and mortality is strongly dependent on prompt diagnosis and on the ini-

Keywords Nosocomial infections · External ventricular drainage · Ventriculomeningitis · Antibiotics

Case Report

A 47-year-old Caucasian female with unremarkable medical history was admitted to the neurological intensive care unit because of spontaneous subarachnoid hemorrhage grade 2 according to WFNS. Digital subtraction angio-

- SBİ vetrikülit ? İle
  - BOS'da önce KNS üremiş
    - Vankomisin IV/IVT (7 gün)
  - Klinik yanıt yok ve BOS bulguları düzelmemiş 2. BOS'da sadece G (-) basil üremiş
    - Vankomisin kesilmiş, Meropenem başlanmış
  - Klinik kötüleşmiş, BOS bulguları tam düzelmemiş, katater çekilmiş (katater kx: KNS)
    - Vankomisin verilmiş yanıt var !!!

Tedavi Süresi?

- Klinik parametreler izlenmeli
- BOS kültürü negatifleşmeli
- BOS bulgusu düzelmeli
- Günlük EVDS ya da kataterden BOS analizi !!!

Klinik endikasyon yoksa öneri yok

Yeni şant ne zaman takılacak

Etken	Kültür	BOS bulguları	
S epidermidis	Tek kültür pozitif	Normal	3 gün tedavi sonrası kültür negatif ise yeni şant
	Tek kültür pozitif	Anormal	7 gün tedavi sonrası kültür negatif ise yeni şant
	Birden fazla kültür pozitif	Normal veya anormal	10 -14 gün veya BOS kültürü negatifleşene kadar tedavi sonrasında 3 gün daha kültür
Diğer etkenler (*S aureus*, Gram negatif basiller)	Tek ya da birden fazla kültür pozitif	Normal veya anormal	10-14 gün tedavi ve en az 10 günlük kültür negatifliği varsa yeni şant

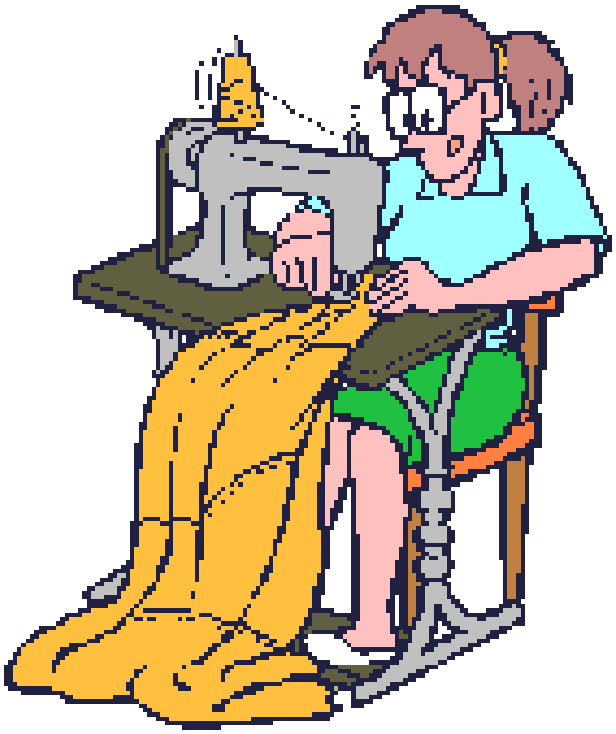
IDSA 2017

- Bazı yazarlar şant takılmadan önce peş peşe 3 kültür negatif olmalı der
  - Kültür üremedi olarak beklenmeli mi?
    - Ortalama 7 gün (+2/3?)
- Antibiyotik aldığı için geç ve güç üreyebilir
- Bu sürede tekrar infekte etme riski olabilir mi?

BOS kaçağı varlığında antibiyotik tedavisi/profilaksi

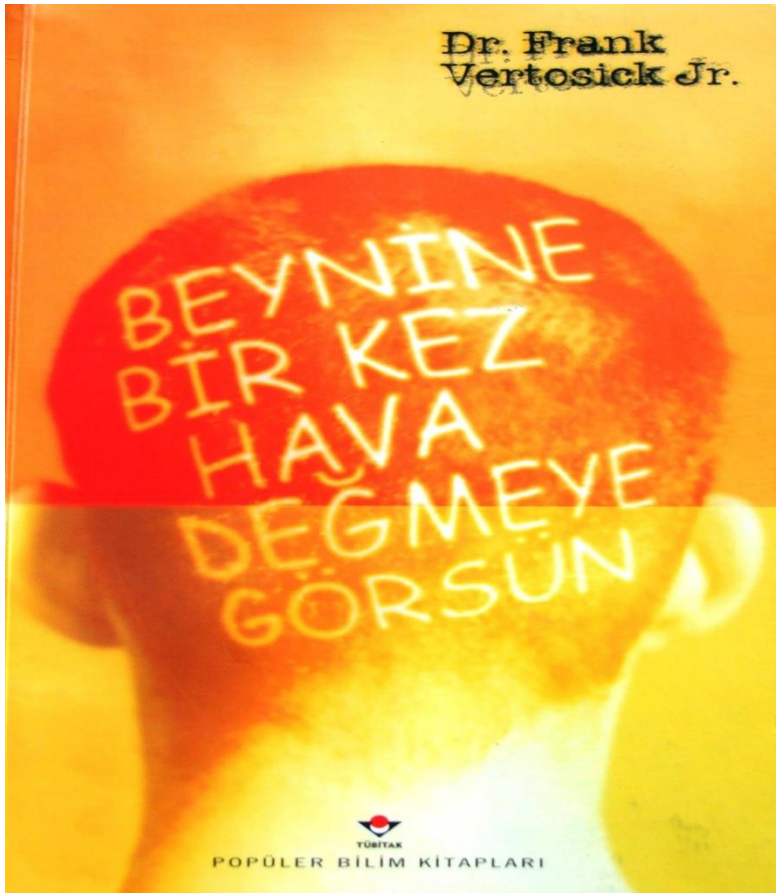
- İnfeksiyon tablosu yoksa
- Kafa tabanı kırığı ve/veya BOS kaçağında profilaksi önerisi yok
- BOS kaçağı >7 gün onarım yapılmalı
- BOS kaçağı, kafa tabanı kırığında mutlaka pnömokok aşısı önerilmeli


VICTORY
COMPACT
BINOCULARS
SEE EVERYTHING
10 TIMES
BIGGER
ZEISS



- Aslında standart bir protokol yok
- Giderek artan antibiyotik direnci
- BOS'a geçen antibiyotiklerin sayısı zaten azdı, şimdi !!!
- Erken tanı ve tedavi
- En iyisi ENFEKSİYON KONTROLÜ

Bir kez HAVA değmeye, SU kaçmaya görsün



Teşekkürler

- 1 mg kolistin baz = 30.000 IU
- 1 mg
- 1.0
  ko
- 50
  ko
- 150 mg kolistin baz =4.500.000 IU
- ~ 400 mg kolistimetat sodyum

1 mg kolistin baz=2,4 mg kolistimetat sodyum

Kolistin İntratekal (IT)/İntraventriküler (IVT) Uygulama

Yapılan çalışmalarda kolistimetat sodyum????;

1-2X5-10 mg/ gün ya da
1-2 X 40.000-125.000 IU

Uygulanacak ilaç miktarı kadar BOS alıp, hazırlanan antibiyotik IT/IVT uygulanır
1-2 saat (hastanın BOS drenaj ihtiyacına göre) klemplenmeli
IDSA: BOS kültürü negatifleşince 10-14 gün verilmeli
Kültür sonuçlanınca 48 saat içinde uygulanmaz ise mortalite artar

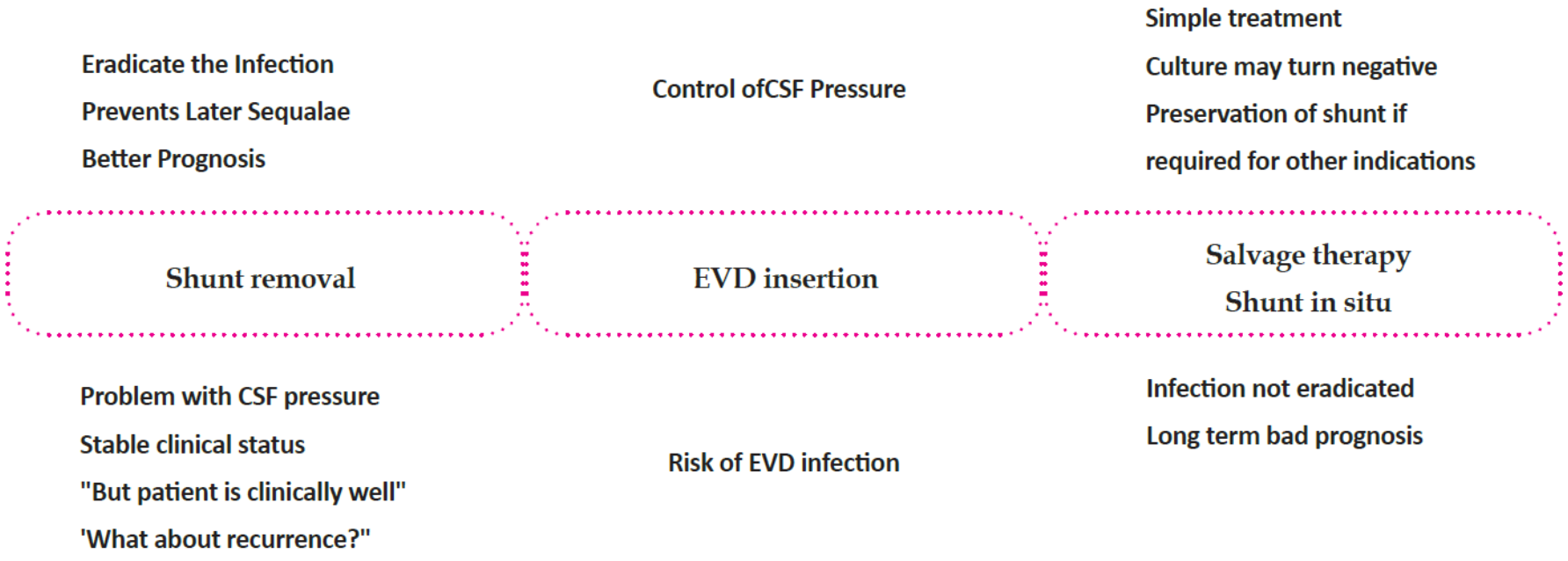


Figure 2. The clinical dilemma of an infected shunt

NEUROSCIENCE

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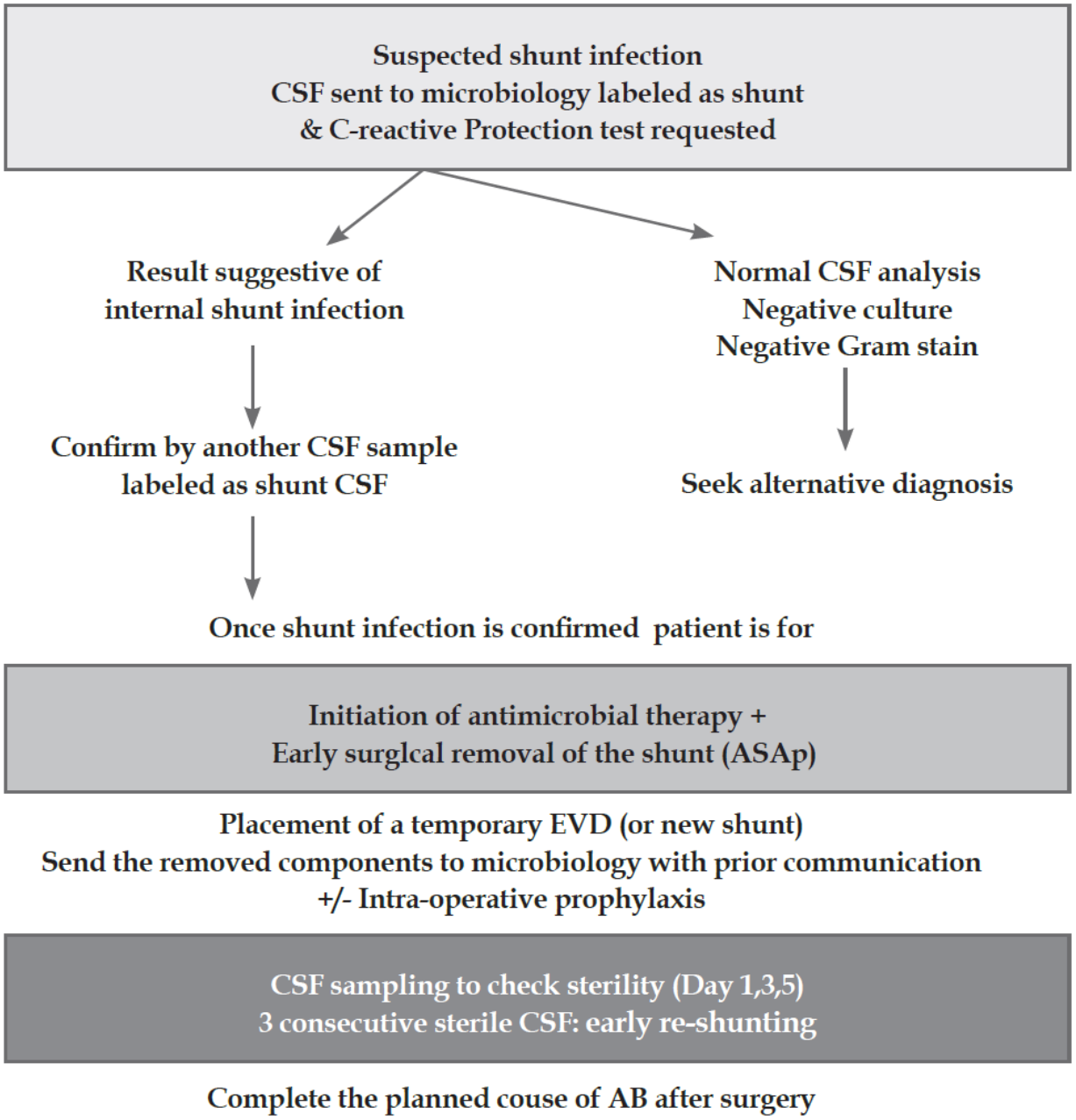
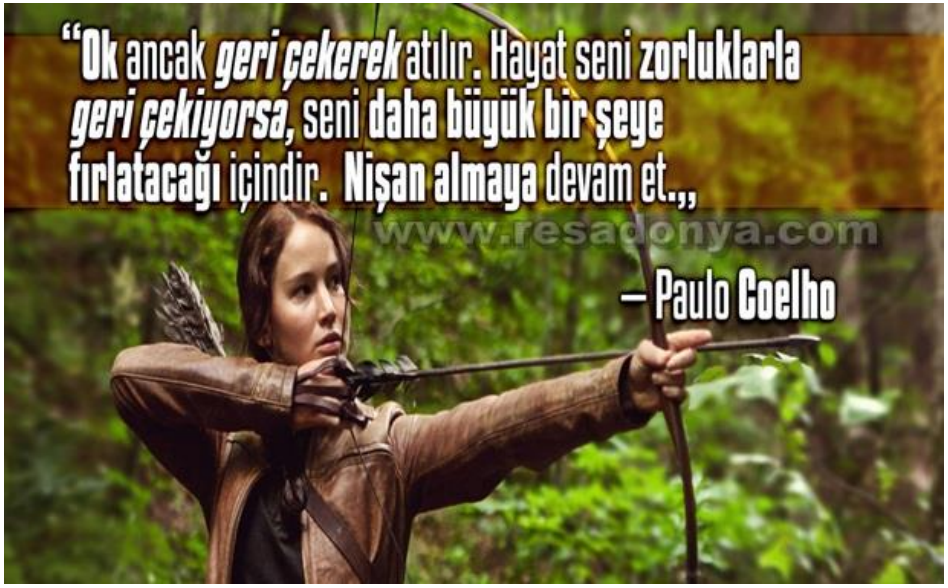
Amani Alnir

Basic and Clinical NEUROSCIENCE


Suspected shunt infection
CSF sent to microbiology labeled as shunt
& C-reactive Protection test requested
Result suggestive of
internal shunt infection
Normal CSF analysis
Negative culture
Negative Gram stain
Confirm by another CSF sample
labeled as shunt CSF
Seek alternative diagnosis
Once shunt infection is confirmed patient is for
Initiation of antimicrobial therapy +
Early surglcal removal of the shunt (ASAp)
Placement of a temporary EVD (or new shunt)
Send the removed components to microbiology with prior communication
+/- Intra-operative prophylaxis
CSF sampling to check sterility (Day 1,3,5)
3 consecutive sterile CSF: early re-shunting
Complete the planned couse of AB after surgery


"Ok ancak geri çekerek atılır. Hayat seni zorluklarla geri çekiyorsa, seni daha büyük bir şeye fırlatacağı içindir. Nişan almaya devam et.,,
www.resadonya.com
– Paulo Coelho


"Gitmeye değer yerlerin kestirmesi yoktur."
- Paulo Coelho