지역사회폐렴의 외래진료

진단과 치료 시 놓치지 말아야할 사항들

성균관대학교 의과대학 삼성서울병원 호흡기내과

전 경 만

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SAMSUNG 삼성서울병원

국내 치료지침 권고안

대한의사
협회지

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지역사회획득 폐렴의 치료지침 권고안

Treatment Guidelines for Community-acquired Pneumonia in Korea: An Evidence-based Approach to Appropriate Antimicrobial Therapy

송 재 훈 | 성균관의대 내과/지역사회획득 폐렴 치료지침 제정위원회 공동위원장 | Jae-Hoon Song, MD
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J Korean Med Assoc 2010; 53(1): 20 - 42

국외 치료지침 권고안

AMERICAN THORACIC SOCIETY DOCUMENTS

Diagnosis and Treatment of Adults with Community-acquired Pneumonia

An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America

Joshua P. Metlay*, Grant W. Waterer*, Ann C. Long, Antonio Anzueto, Jan Brozek, Kristina Crothers, Laura A. Cooley, Nathan C. Dean, Michael J. Fine, Scott A. Flanders, Marie R. Griffin, Mark L. Metersky, Daniel M. Musher, Marcos I. Restrepo, and Cynthia G. Whitney; on behalf of the American Thoracic Society and Infectious Diseases Society of America

THIS OFFICIAL CLINICAL PRACTICE GUIDELINE WAS APPROVED BY THE AMERICAN THORACIC SOCIETY MAY 2019 AND THE INFECTIOUS DISEASES SOCIETY OF AMERICA AUGUST 2019

폐렴의 진단 ??

F/36

3일간의 **발열, 기침, 화농성 객담**:
감기약 먹을 때만 호전

39도 이상의 **발열**

오한

근육통

호흡곤란(-)

급성 병색

과거력(-)

증례 1. 5일간의 기침, 객담

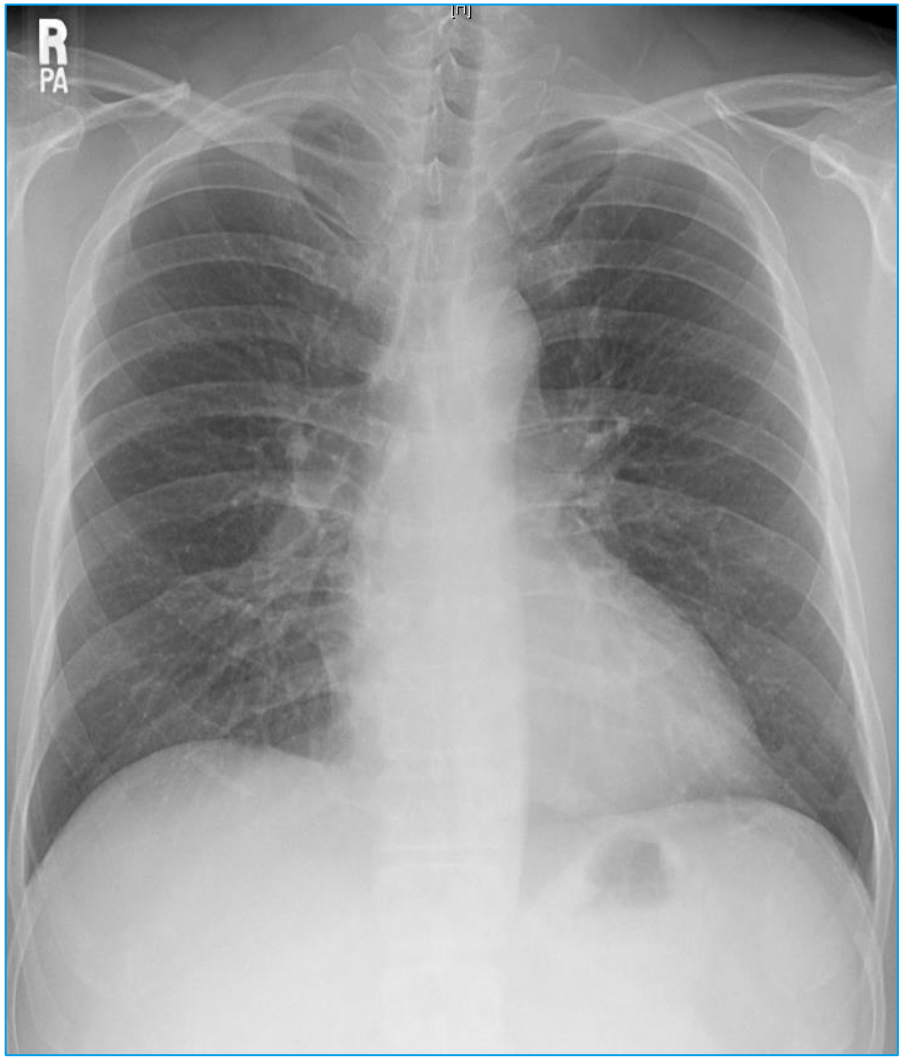
M/ 42

5일간의 기침, 객담을 주소로 내원한 42세 남자

- 발열(-)
- 오한(+)
- 화농성 객담(+)
- 그 외 감기증상(+) 두통, 콧물, 코막힘…

과거력 3년전 폐렴으로 입원 치료

흡연자



증례 2. 발열, 기침, 객담

F/54

약 1주전부터 감기 증상(몸살기, 오한)이 있다가 3-4일 전부터 기침, 객담이 심해져 내원

- 발열(+), 오한(+): 감기약 복용 후 호전
- 객담(+): 화농성
- 그 외 증상: 콧물(+), 코막힘(+), 후비루(+)

과거력(+) 비염, 기관지확장증

비흡연자

폐렴의 임상적 진단

Symptoms

General symptomes

fever | fatigue | headache | myalgias | arthralgias

Respiratory symptoms

Cough	nonproductive or productive of mucoid
Sputum	purulent, or blood-tinged sputum
Shortness of breath	

Pleuritic chest pain

Gastrointestinal symptoms nausea, vomiting, ± diarrhea

Findings on physical examinations

Vocal (tactile) fremitus increased or decreased

Percussion dull to flat

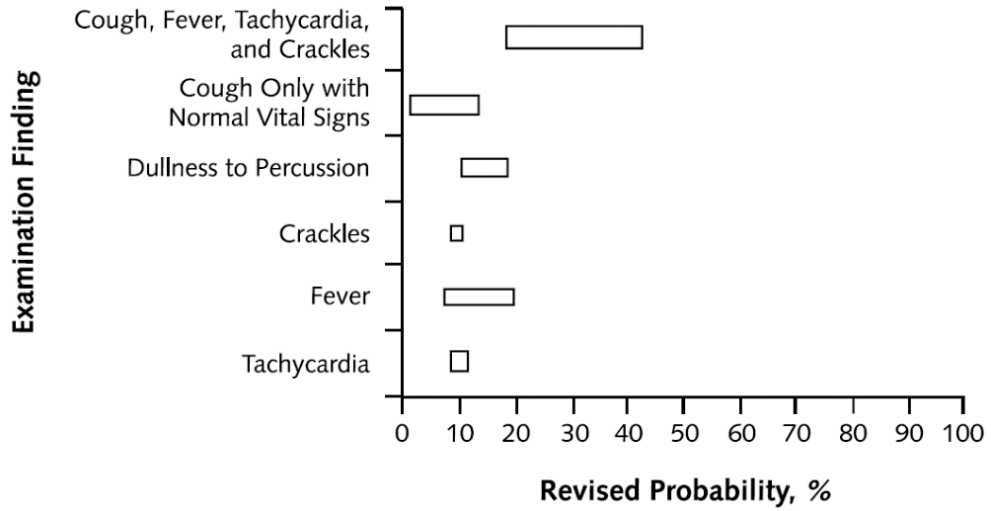
Auscultation bronchial breath sounds, crackle, friction rub

Combination of symptoms and signs:

sensitivity < 50%

Ann Intern Med 2003;138:109

폐렴의 진단



Revised pneumonia probabilities based on history and physical examination findings

Ann Intern Med 2003;138:109

GPs' judgment	Chest radiography		
	Pneumonia present	Pneumonia absent	Total
Including all countries			
Pneumonia present	41	31	72
Pneumonia absent	99	2639	2738
Total	140	2670	2810
Without including low-prevalence countries			
Pneumonia present	40	28	68
Pneumonia absent	94	1992	2086
Total	134	2020	2154

Data are presented as n.

General practitioner's (GPs') clinical judgment of pneumonia compared to chest radiography

Eur Respir J 2013;42:1076

흉부방사선사진상 새로운 폐침윤이 있으면서,

1. 체온>38.3ºC
2. 화농성 기관 및 기관지 분비물
3. 백혈구 증가 또는 감소 (<4000, >11000/mm3)

3가지 중 2가지 이상을 보일 때

증례 3. 2주간의 기침, 객담

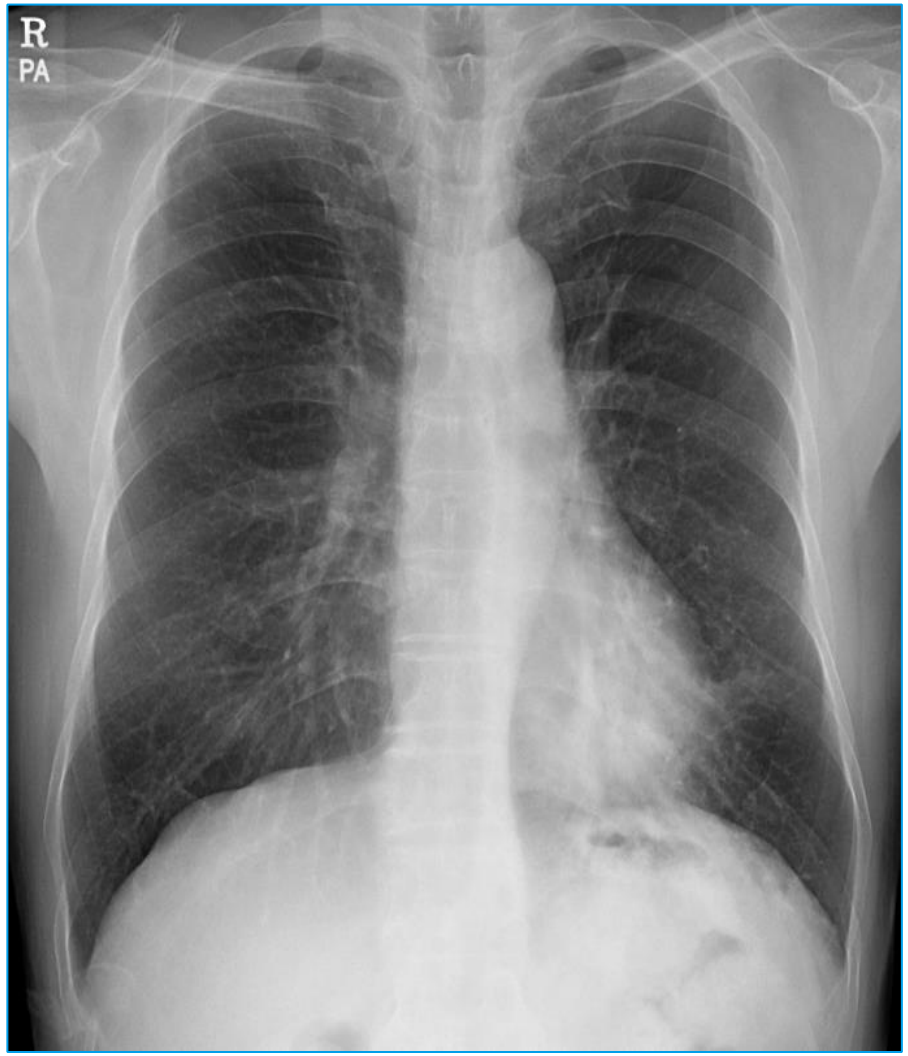
M/67

2주간의 기침, 객담을 주소로 내원한 67세 남자

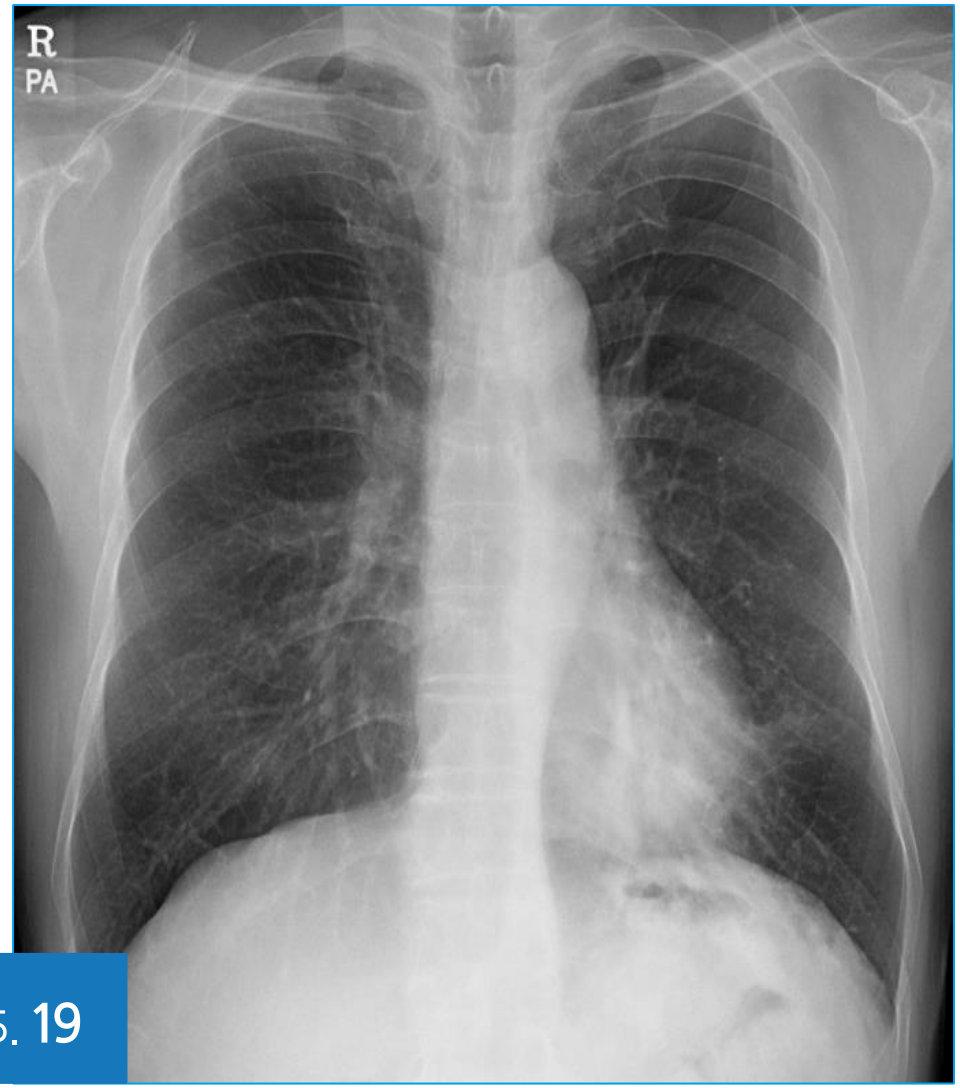
- **약 2주전부터 감기 증상(+):** 기침, 객담 등
- **발열(+):** 감기약 복용 후 호전
- 감기 증상은 좋아지나 기침, 객담이 지속되어 내원
- 그 외 특이 증상 없음

과거력(-)

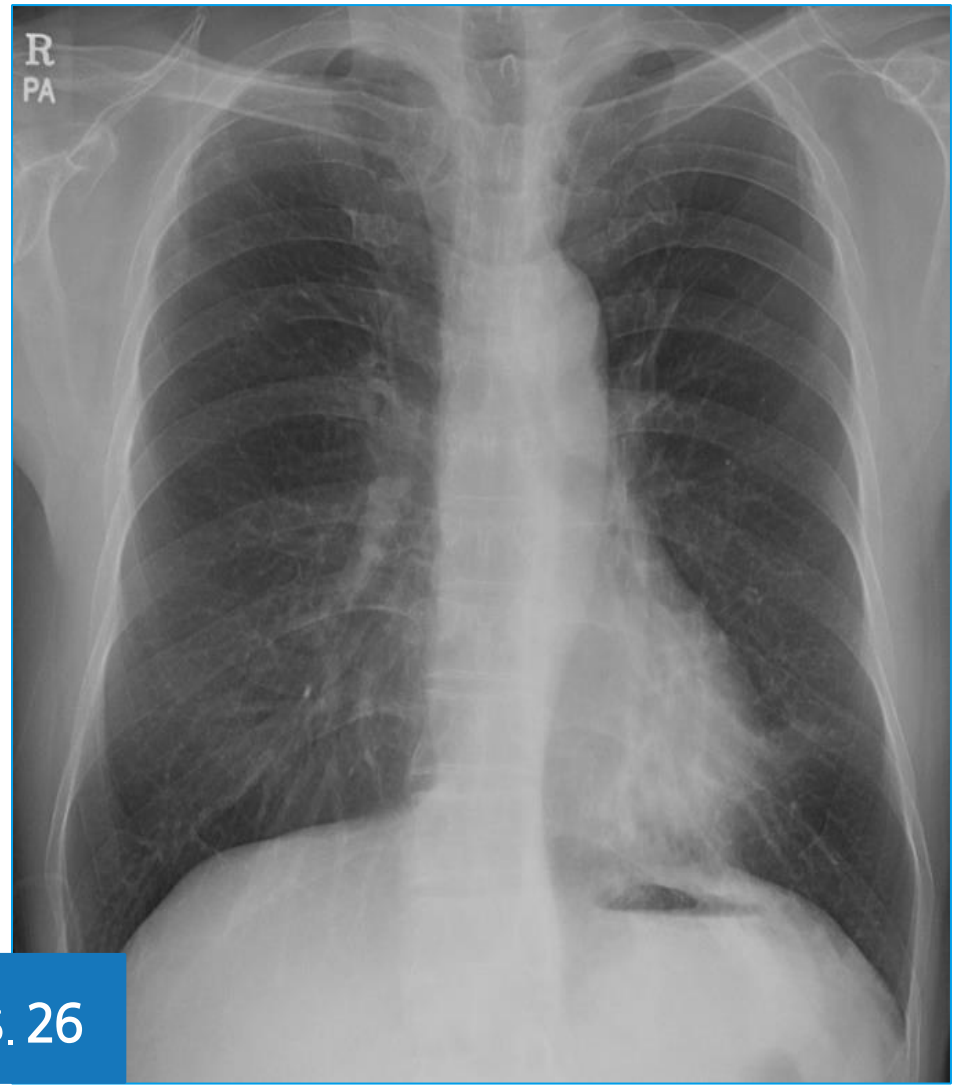
비흡연자



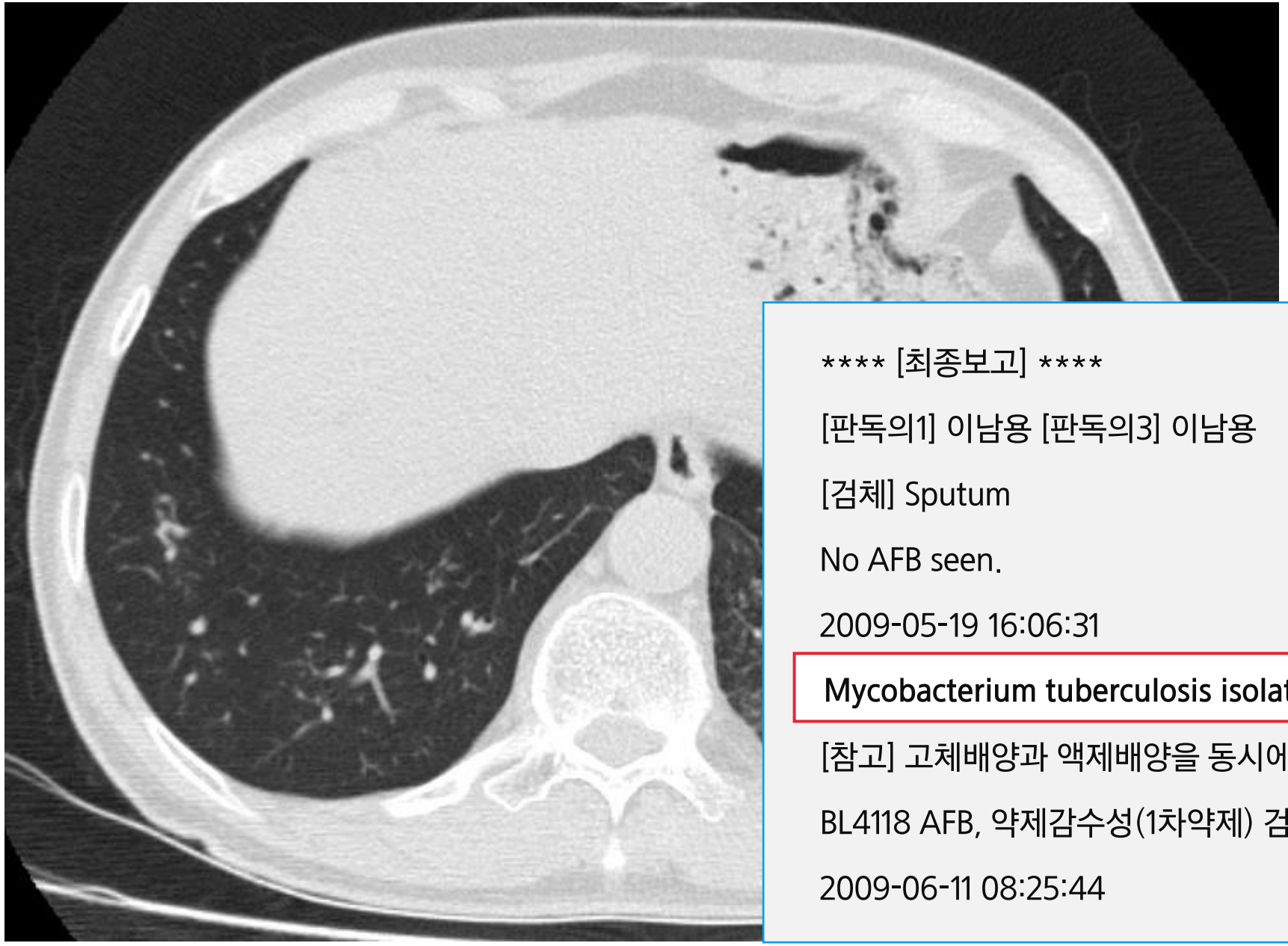
항생제 치료 1주 후



2009. 05. 19



2009. 05. 26



**** [최종보고] ****

[판독의1] 이남용 [판독의3] 이남용

[검체] Sputum

No AFB seen.

2009-05-19 16:06:31

Mycobacterium tuberculosis isolated (액체배양)

[참고] 고체배양과 액제배양을 동시에 실시한 결과입니다.

BL4118 AFB, 약제감수성(1차약제) 검사가 시행됩니다.

2009-06-11 08:25:44

적극적인 원인균 진단이 필요한가?

Pathogen directed therapy: not statistically superior to empirical therapy

- Exception: 2% of CAP admitted to ICU
- Identification of an unexpected pathogen: TB…
- Risk of resistance

Thorax 2005;60:672

➡ Reasons for attempting an etiologic diagnosis

원인균 진단

장점	• 개별화된 가장 적절한 치료 가능 • 초기치료 실패 시 적절한 항생제로 변경 가능
단점	• 절반 이상에서 원인균 증명 불가능 • 비용

외래환자에서 원인균 진단 치료지침 권고안, 2009

외래환자에서 원인균 진단을 위한 검사 (level III-3등급)

원인균 진단을 위한 **검사가 필수적이지 않음**

그람 염색 및 배양검사

일반적인 경험적 항생제 투여로 치료가 어려운 세균이 의심되는 경우

객담 항산균 검사

폐결핵이 의심되는 경우

레지오넬라증이나 인플루엔자 등이 임상적, 역학적으로 의심되는 경우에도 진단을 위한 검사 시행이 권장

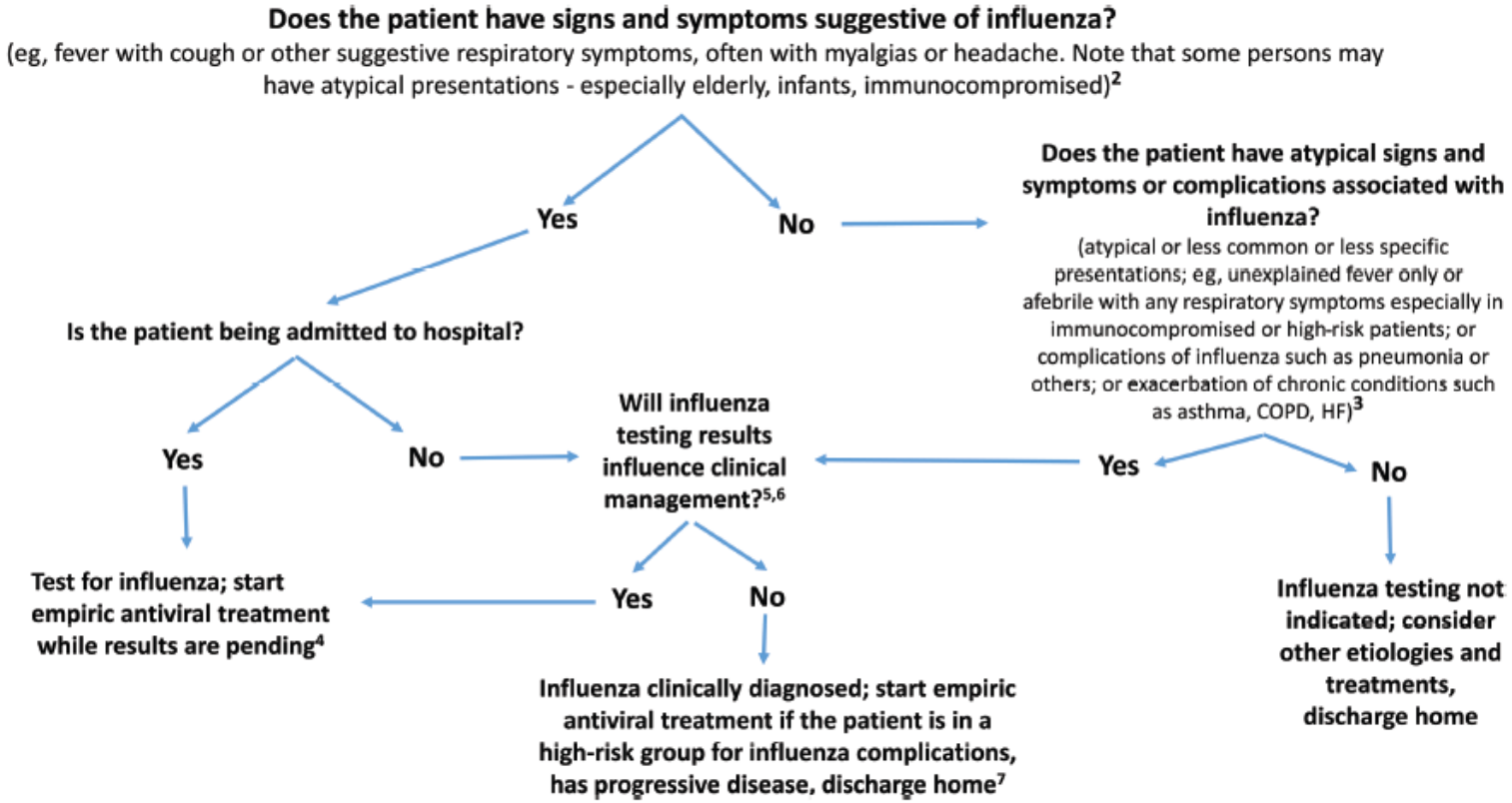
J Korean Med Assoc 2010;53:20

외래환자에서 원인균 진단 ATS/IDSA 2019

- We recommend not obtaining sputum Gram stain and culture routinely in adults with CAP managed in the outpatient setting (strong recommendation,very low quality of evidence).
- We recommend not obtaining blood cultures in adults with CAP managed in the outpatient setting (strong recommendation, very low quality of evidence).
- We suggest not routinely testing urine for pneumococcal antigen in adults with CAP (conditional recommendation, low quality of evidence), except in adults with severe CAP (conditional recommendation, low quality of evidence).
- We suggest not routinely testing urine for Legionella antigen in adults with CAP (conditional recommendation, low quality of evidence), except in cases where indicated by epidemiological factors.

Am J Respir Crit Care Med 2019;200:e45

Test for Influenza ATS/IDSA 2019



Clin Infect Dis 2019;68:e1

- When influenza viruses are circulating in the community, we recommend testing for influenza with a rapid influenza molecular assay (i.e., influenza nucleic acid amplification test), which is preferred over a rapid influenza diagnostic test (i.e., antigen test) (strong recommendation, moderate quality of evidence).

Am J Respir Crit Care Med 2019;200:e45

외래에서 치료 가능한가 ??

F/36

3일간의 발열, 기침, 화농성 객담:
감기약 먹을 때만 호전

39도 이상의 **발열**

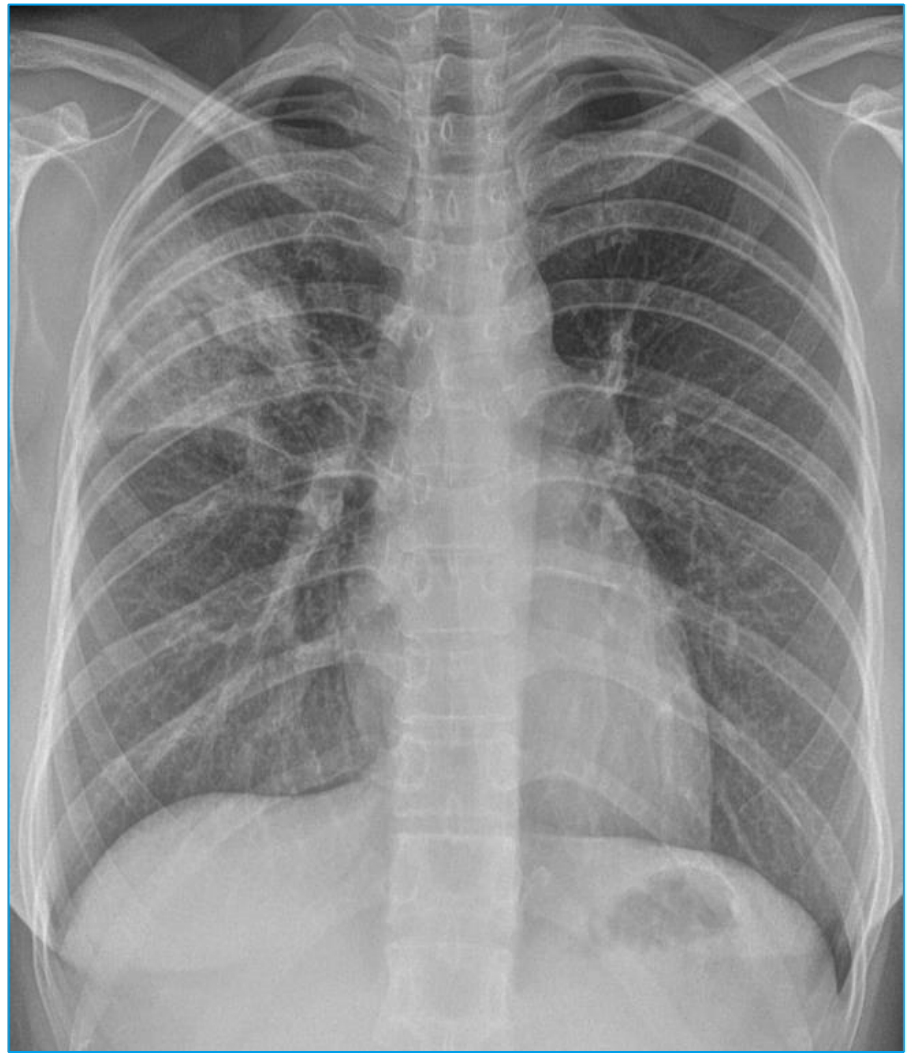
오한

근육통

호흡곤란(-)

급성 병색

과거력(-)



폐렴의 중증도 평가

Assessment of severity: most important & difficult evaluation

- Site of care
- Assessment of prognosis
- Choice of appropriate antibiotics

Severity scoring systems: objective criteria for admission

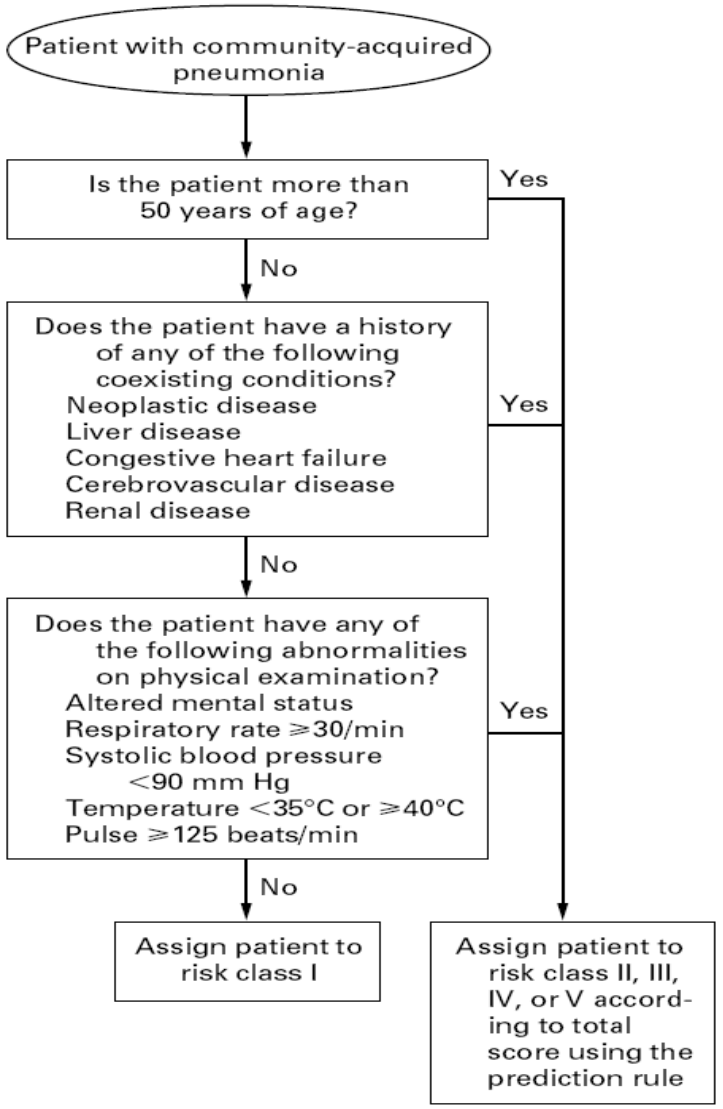
Pneumonia Severity Index (PSI): predicting mortality

to identify those patients at a low risk of mortality → be treated as outpatients safely

CURB-65: illness severity

identification of the more severely ill → provide objective support for clinical decision-making

Pneumonia Severity Index (PSI)



Characteristic	No. of Points Assigned
Demographic factors	
Age	
Men	Age (in yr)
Women	Age (in yr)−10
Nursing home resident	+10
Coexisting illnesses	
Neoplastic disease	+30
Liver disease	+20
Congestive heart failure	+10
Cerebrovascular disease	+10
Renal disease	+10
Findings on physical examination	
Altered mental status	+20
Respiratory rate ≥30/min	+20
Systolic blood pressure <90 mm Hg	+20
Temperature <35°C or ≥40°C	+15
Pulse ≥125 beats/min	+10
Laboratory and radiographic findings	
Arterial pH <7.35	+30
Blood urea nitrogen ≥30 mg/dl (11 mmol/liter)	+20
Sodium <130 mmol/liter	+20
Glucose ≥250 mg/dl (14 mmol/liter)	+10
Hematocrit <30%	+10
Partial pressure of arterial oxygen <60 mm Hg or oxygen saturation <90%	+10
Pleural effusion	+10

Stratification of Risk Score

Risk	Risk Class	Score	Mortality
Low	I	Based on algorithm	0.1%
Low	II	≤70	0.6%
Low	III	71–90	0.9%
Moderate	IV	91–130	9.3%
High	V	>130	27.0%

N Engl J Med 1997;336:243

CURB-65 Score

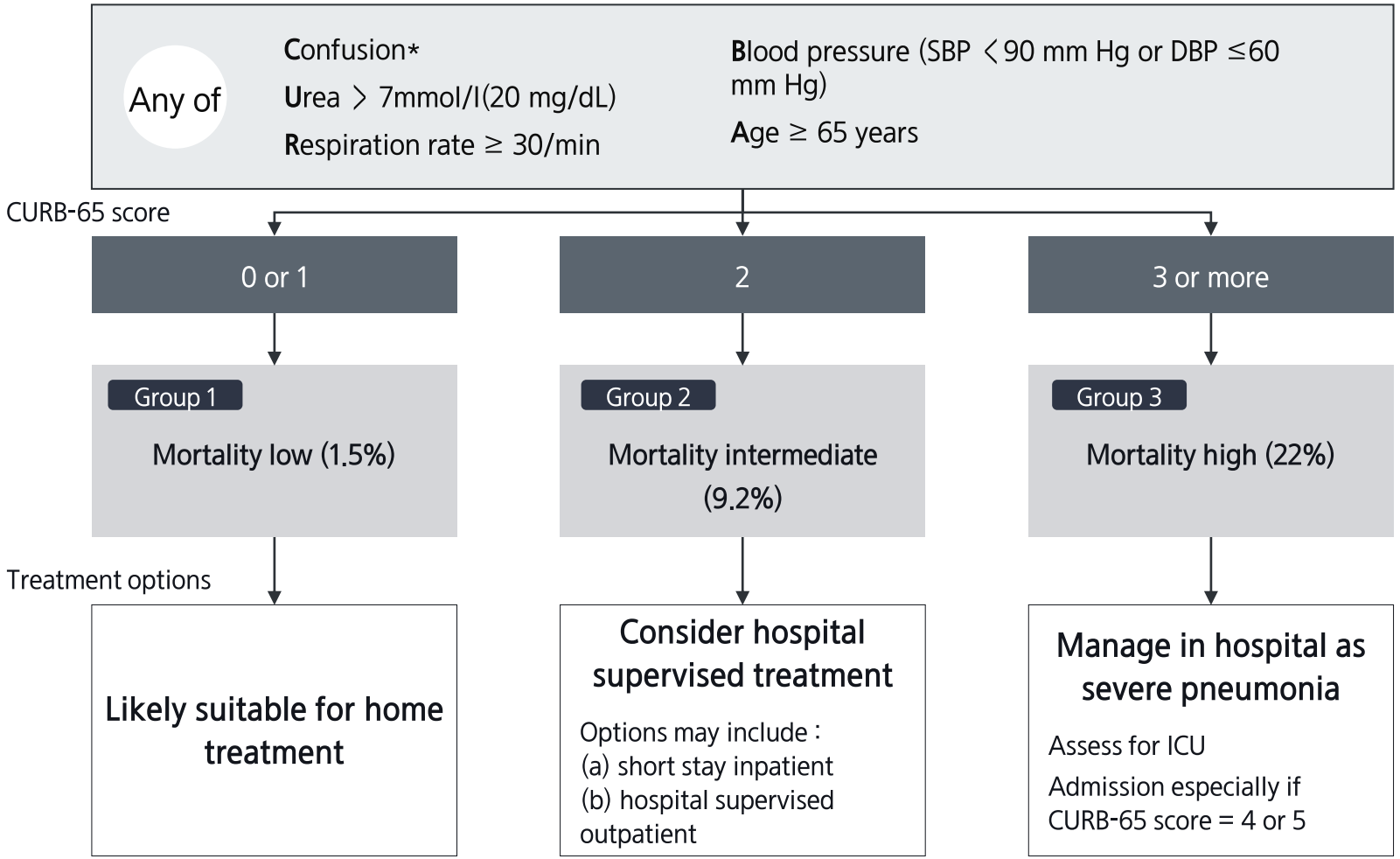
Confusion,

Urea,

Respiration,

Blood pressure,

Age 65



*defined as a Mental Test Score of 8 or less, or new disorientation in person, place or time

Thorax 2003;58:377

Comparison of 2 Prediction Rules

Sites	32 EDs in the US	1 ED in Australia	1 ED in Spain	1 ED in Hong Kong	1 ED in Sweden
Total no. of patients	3181 Immuno-competent adults	392 Immuno-competent adults	1776 Immuno-competent adults	1016 Immuno-competent adults	408 Immuno-competent adults
Patients classified as low risk, %					
PSI risk classes I–III	68	44	64	47	28
CURB-65 scores 0–1	61	59	57	43	29
30-Day mortality, %					
PSI risk classes I–III	1.4	0.6	0.7	2.9	3.5
CURB-65 scores 0–1	1.7	…	0.4	3.0	6.7
Sensitivity for 30-day mortality, %					
PSI risk classes IV–V	79	97	93	84	94
CURB-65 scores 2–5	77	…	97	85	87
Specificity for 30-day mortality, %					
PSI risk classes IV–V	70	48	67	50	32
CURB-65 scores 2–5	63	…	60	46	33
PPV for 30-day mortality, %					
PSI risk classes IV–V	11	16	18	14	20
CURB-65 scores 2–5	9	…	15	13	19
NPV for 30-day mortality, %					
PSI risk classes IV–V	99	99	99	97	97
CURB-65 scores 2–5	98	…	100	97	93
AUC for 30-day mortality					
PSI	0.81	0.82	0.89	0.74	0.72
CURB-65	0.76	0.82	0.87	0.73	0.69

Clin Infect Dis 2008;47:S133

IDSA/ATS Consensus Guideline, 2019 Hospital Admission Decisions

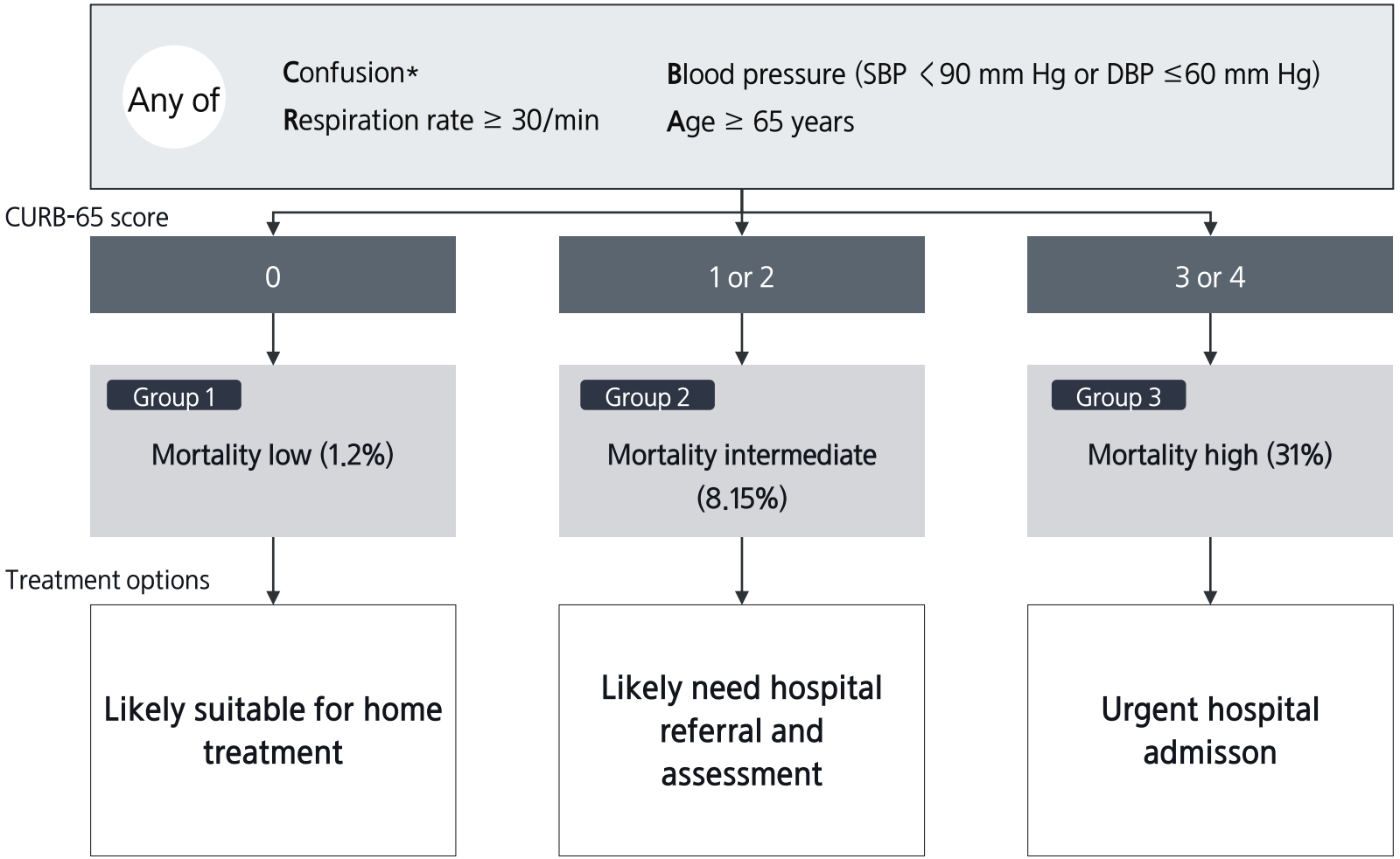
Severity-of-illness scores (CURB-65 criteria) or prognostic models (PSI), **can be used to identify patients with CAP who may be candidates for outpatient treatment.**

Objective criteria or scores **should always be supplemented with physician determination of subjective factors,** including the ability to safely and reliably take oral medication and the availability of outpatient support resources.

- In addition to clinical judgement, we recommend that clinicians use a validated clinical prediction rule for prognosis, preferentially the PSI (strong recommendation, moderate quality of evidence) over the CURB-65 (conditional recommendation, low quality of evidence), to determine the need for hospitalization in adults diagnosed with CAP.

Am J Respir Crit Care Med 2019;200:e45

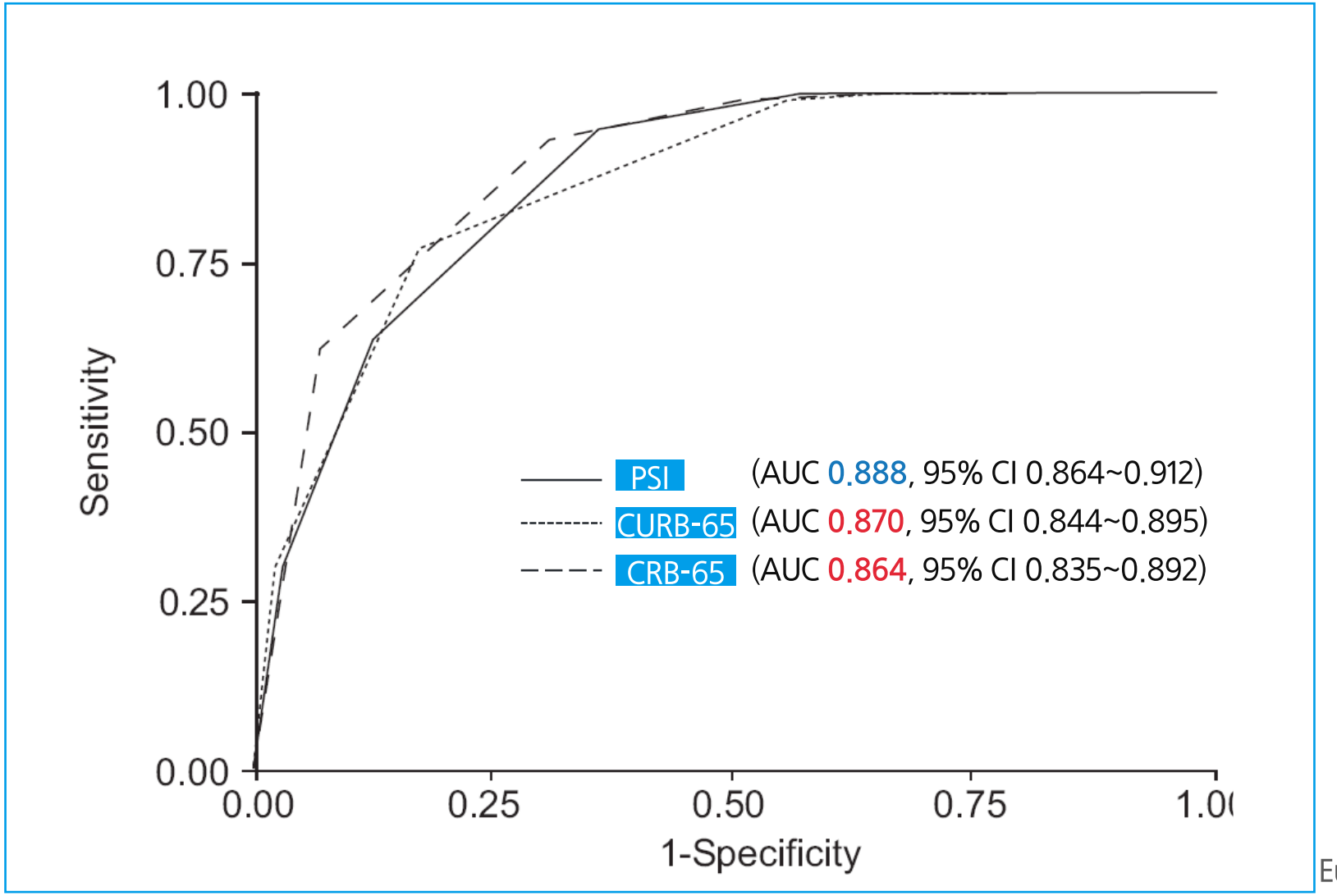
CRB-65



*defined as a Mental Test Score of 8 or less, or new disorientation in person, place or time

Thorax 2003;58:377

CURB-65 vs. CRB-65



Eur Respir J 2006;27:151

BTS Guideline, 2009 Update

Severity assessment of CAP in patients seen in the community

- **For all patients, clinical judgment supported by the CRB-65 score should be applied when deciding whether to treat at home or refer to hospital.**
- Patients who have a CRB-65 score of 0 are at low risk of death and do not normally require hospitalization for clinical reasons [B+].
- Patients who have a CRB-65 score of 1 or 2 are at increased risk of death and hospital referral and assessment should be considered, particularly with Score 2 [B+].
- Patients who have a CRB-65 score of 3 or more are at high risk of death and require urgent hospital admission [B+].

Admission of Low-Risk Patients

Reasons for admission of low risk patients

- Complication of pneumonia
- Exacerbation of underlying disease
- Inability to reliably take oral medication
- Multiple risk factors

Eur Respir J 2006;27:151

Proportion of low risk patients in admitted patients: 26 ~ 27%

Diag Microbiol Infect Dis 2006;54:267

Int J Immunopathol Pharmacol 2005;18:575

Prospective observational study (PSI class I & II)

- 586/3065 (19.1%) admitted
- 48.4% of whom stayed more than 5 days
- 19% suffered one or more complications
  - 2.4% required MV
  - 0.9% died

Am J Med 2005;118:1357

Importance of clinical judgment in assessing disease severity in the low-risk patients

Korean Guideline, 2009

입원 결정 기준

지역사회획득폐렴 환자의 입원치료 여부의 결정은 **의료진의 임상적 판단 (clinical judgement)에 의하되** 객관적 기준을 참고로 하여야 한다. (level II-3등급)

- 폐렴의 합병증 자체
- 기저질환의 악화
- 경구복용을 못하거나 외래간호를 받기 어려운 상황
- 점수체계상으로 여러 항목이 고위험군의 기준에 약간씩 못 미쳐 저위험군으로 판정되는 경우

객관적 기준으로는 **PSI** 혹은 **CURB-65** (혹은 유사한 **CURB**, **CRB**, **CRB-65**)를 선택하여 사용한다. (level I-3등급)

J Korean Med Assoc 2010;53:20

어떤 항생제를 선택 ??

F/36

3일간의 발열, 기침, 화농성 객담:
감기약 먹을 때만 호전

39도 이상의 **발열**

오한

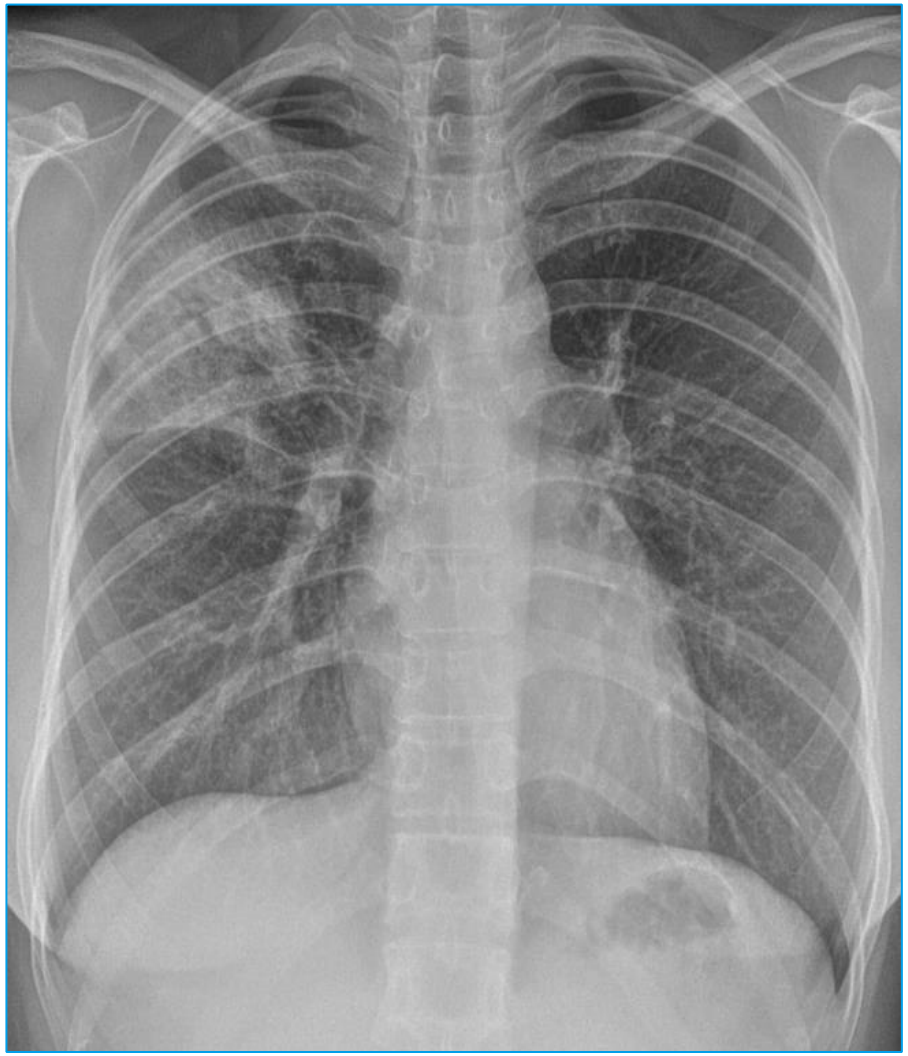
근육통

호흡곤란(-) : tachypnea(-)

급성 병색

의식혼란(-)

과거력(-)



Causative Pathogens of CAP in Korea

	No. (%)				
	우준희 등 (감염 2001) (N=219)	정문현 등 (감염 1997) (N=54)	유철웅 등 (감염 2000) (N=81)	손장욱 등 (JKMS 2006) (N=39)	송재훈 등* (Int J Antimicrob Agents 2008) (N=108)
그람양성균					
S. pneumoniae	59 (26.9)	19 (35.2)	27 (33.3)	17 (43.6)	38 (35.2)
S. aureus	25 (11.4)	5 (9.3)	13 (16.0)	1 (2.6)	12 (11.1)
Viridans group streptococci	12 (5.5)	1 (1.9)		4 (10.3)	4 (3.7)
ß-hemolytic streptococci	1 (0.5)	3 (5.6)			5 (4.6)
Others	2 (0.9)				2 (0.9)
그람음성균					
Klebsiella spp.	44 (20.0)	8 (14.8)	12 (14.8)	4 (10.3)	12 (11.1)
Pseudomonas spp.	28 (12.8)	1 (1.9)	5 (6.2)	4 (10.3)	7 (6.5)
Enterobacter	14 (6.4)	1 (1.9)		2 (5.1)	5 (4.6)
Haemophilus	11 (5.0)	12 (22.2)	11 (13.6)	1 (2.6)	3 (2.8)
Acinetobacter spp.	7 (3.2)	1 (1.9)		4 (10.3)	1 (0.9)
E. coli	6 (2.7)	2 (3.7)		2 (5.1)	4 (3.7)
Others	10 (4.6)	1 (1.9)	13 (16.0)		9 (8.3)
Anaerobes					3 (2.8)

*한국 자료만 재분석한 결과임

J Korean Med Assoc 2010;53:20

CAP Etiology Studies from Asia

Organism	Outpatient % (n=4)	Inpatient % (n=38)	Severe % (n=8)
Streptococcus pneumoniae	14.3	13.3	10.3
Haemophilus influenzae	9.5	6.9	3.9
Mycoplasma pneumoniae	22.9	8.3	-
Chlamydophila pneumoniae	23.6	6.9	-
Legionella spp.	3.7	3.0	-
Staphylococcus aureus	0.8	4.0	5.1
Gram-negative bacteria	2.9	13.0	21.5
Viruses	8.3	9.8	-

Trans R Soc Trop Med Hyg 2014;108:32

Distribution of Pathogens by PSI Risk Class

Pathogen	PSI risk class				
	I (n = 976)	II (n = 674)	III (n = 272)	IV (n = 175)	V (n = 31)
All pathogens	944	656	250	131	29
Streptococcus pneumoniae	154 (16)	111 (17)	57 (23)	24 (18)	7 (24)
Haemophilus influenzae	90 (10)	72 (11)	25 (10)	16 (12)	5 (17)
Staphylococcus aureus	98 (10)	51 (8)	17 (7)	12 (9)	3 (10)
Moraxella catarrhalis	17 (2)	22 (3)	11 (4)	5 (4)	2 (7)
Other gram-positive pathogens	60 (6)	60 (9)	16 (6)	7 (5)	4 (14)
Other gram-negative pathogens	109 (12)	110 (17)	38 (15)	18 (14)	2 (7)
Mycoplasma pneumoniae	270 (29)	108 (16)	32 (13)	20 (15)	3 (10)
Chlamydia pneumoniae	96 (10)	68 (10)	12 (5)	11 (8)	3 (10)
Legionella pneumoniae	50 (5)	54 (8)	12 (5)	11 (8)	0 (0)

Clin Infect Dis 2008;47:S166

Prevalence of DRSP in Asia

ANSORP Report

Country	No. of isolates	Penicillin			
		MIC (mg/liter)		% I	% R
		90%	Range		
Korea	31	4	<0.03–4	9.7	54.8
China	111	2	<0.03–8	19.8	23.4
Thailand	52	2	<0.03–4	26.9	26.9
Taiwan	57	4	<0.03–8	24.6	38.6
India	77	0.03	<0.03–1	7.8	0.0
Sri Lanka	42	2	<0.03–2	71.4	14.3
Singapore	35	2	<0.03–4	28.6	17.1
Malaysia	44	2	<0.03–4	9.1	29.5
Vietnam	64	4	0.03–8	20.6	71.4
Philippines	22	0.25	<0.03–0.25	21.3	0.0
Saudi Arabia	39	1	<0.03–2	20.5	10.3
Hong Kong	112	4	<0.03–4	25.3	43.2
Total	685	4	<0.03–8	23	29.4

Antimicrob Agents Chemother 2004; 48:2101

DRSP New Definition of Penicillin Resistance, CLSI 2008

Category	Non-meningeal isolates		Meningeal isolates
	Previous	2008*	
Susceptible	≤ 0.06 mg/L	≤ 2 mg/L	≤ 0.06 mg/L
Intermediate	0.12 - 1	4	-
Resistant	≥ 2	≥ 8	≥ 0.12

› Prevalence of PRSP in non-meningeal isolates will be < 10 % in all countries

From Prof J.H. Song

Changing Epidemiology of DRSP

Country	% resistance* (2008 breakpoint)		MIC90 (mg/L)	% resistance (previous breakpoint)	
	% I	% R		% I	%R
Vietnam	33.9	1.6	4	20.6	71.4
Korea	25.8	-	4	9.7	54.8
Taiwan	11.3	5.7	4	24.6	38.6
Hong Kong	15.2	-	4	25.3	43.2
China	9.3	0.9	2	19.8	23.4
Thailand	7.8	-	2	26.9	26.9
Singapore	5.9	-	2	28.6	17.1
Malaysia	2.5	-	2	9.1	29.5
India	-	-	0.03	7.8	-
Sri Lanka	-	-	2	71.4	14.3
Philippines	-	-	0.25	21.3	-
Total	11.1	0.7	4	23.0	29.4

From Prof J.H. Song

주요 폐렴 원인균의 항생제 내성 실태

국내 *Streptococcus pneumoniae*의 항생제 내성

발표 연도	균주수	수집 연도	기관	내성율 (%)						
				PEN*	AMX/CL	CFX	CRO	EM	LEVO	SXT
2001	99	1998-1999	SMC	31.3	0	63.6		77.8		62.6
2002	151	1996-2000	AMC (Blood)	49			21.6	62		44.7
2005	506	1999-2000	Severance, SMC	57.4-71.5				76.5-87.6		
2004	67	1998-2001	SMC					85.1		
2004	31	2000-2001	SMC	54.8	9.7	61.3	3.2	80.6		
2003	NA	1999-2002	Severance, SMC	43.2-44.1	3.7-6.3	49.7-52.4	0.5-1.2		3-3.2	59-62.4
2007	508	1999-2003	AMC (PRSP)			98.1	0.7	100	1.8	
2007	NA	2004	44 hospitals	68 (NS)				62		
2007	235	2002-2006	Pusan	67.2			3.4	80	3	59.1
2008	183	2004, 2007	SMC	0** (I: 15.8%)	18.6		1.6	74.3	2.2	48.6
Range				31.3-71.5	0-18.6	49.7-63.6	0.5-21.6	62-87.6	1.8-3.2	44.7-62.6

Abbreviations: PEN, Penicillin; AMX/CL, Amoxicillin/clavulanic acid; CFX, cefuroxime; CRO, Ceftriaxone; EM, Erythromycin; Levo, Levofloxacin, SXT, Trimethoprim-sufamethoxazole

* MIC breakpoint for susceptibility

S: ≤0.06 I: 0.1 ~ 1.0
R: ≥2.0 mg/mL

** MIC breakpoint for susceptibility

S: ≤2.0 I: 4.0
R: ≥8.0 mg/mL

From Prof J.H. Song

Atypical Pneumonia in Asia

	Ngeow et al. (n=926)	Song et al. (n=955)
Duration of study	Oct 2001 ~ Dec 2002	Jan 2002 ~ Dec 2004
Total incidence	221 (23.8 %)	25.5 %
M. pneumoniae	106 (11.4 %)	61/556 (11.0 %)
C. pneumoniae	54 (5.8 %)	55/411 (13.4 %)
Legionella spp.	61 (6.6 %)	7/648 (1.1 %)

Int J Infect Dis 2005;9:144
Int J Antimicrob Agents 2008;31:107

Atypical Pneumonia in Korea

	No. (%)				
	손장욱 등 (JKMS 2006) (N=126)	이승준 등 (Jpn J Infect Dis 2002) (N=81)	주철현 등 (감염 2001) (N=250)	김민자 등 (감염 2001) (N=431)	이대동 등 (대한진단검사의학회지 2005) (N=38)
M. pneumoniae	8 (6.3)	7 (8.6)	23 (9.2)	ND	ND
C. pneumoniae	9 (7.1)	10 (12.3)	33 (13.2)	ND	ND
Legionella spp.	3 (2.4)	0 (0)	ND	10 (2.3)	2 (5.3)

J Korean Med Assoc 2010;53:20

Empirical Coverage against Atypical Pathogen Meta-analysis, 2005

Meta-analysis with 18 clinical trials (~2004)

Total number of cases : 6,749 patients with mild-moderate CAP

Compare regimen active against atypical pathogens
(FQ, macrolide, ketolide) vs β -lactams (penicillin or cephalosporins)

	Relative risk for treatment failure	
	Relative risk	95 % CI
Macrolide or ketolide	0.81	0.58 - 1.14
Quinolone	0.99	0.88 - 1.11
Overall	0.97	0.87 - 1.07

BMJ 2005;330:456

외래에서의 경험적 항생제 치료지침 권고안, 2009

ß-lactam ± macrolide 경구 level I - 3등급

- amoxicillin 또는 amoxicillin-clavulanate
- cefpodoxime, cefditoren level II-3등급

±

- azithromycin, clarithromycin, erythromycin, roxithromycin 3등급

Respiratory fluoroquinolone 경구 level I - 3등급

- gemifloxacin, levofloxacin, moxifloxacin

➡ Macrolide 나 tetracycline 단독요법은 *S. pneumoniae*의 높은 내성률 때문에 권장되지 않음
➡ 고령이거나 기저질환을 가진 환자에서는 macrolide를 병용
➡ Cefuroxime은 S. pneumoniae의 높은 내성률 때문에 권장되지 않음

J Korean Med Assoc 2010;53:20

경구용 항생제의 적절한 용량 및 용법 치료지침 권고안, 2009

Antimicrobial agents	Dosage
Ampicillin	500mg 4–6 times
Amoxicillin	500mg tid (고용량, 1g tid)
Amoxicillin/clavulanate	(2:1) 750mg tid
	(4:1) 625mg tid
	(7:1) 1g bid
Cefpodoxime proxetil	100-200mg bid
Cefditoren pivoxil	100mg tid
Levofloxacin	500–750mg qd
Gemifloxacin	320mg qd
Moxifloxacin	400mg qd

J Korean Med Assoc 2010;53:20

증례 4. 고열, 기침 및 호흡곤란

M/50

1주전부터 고열, 기침이 나고 목이 잠김

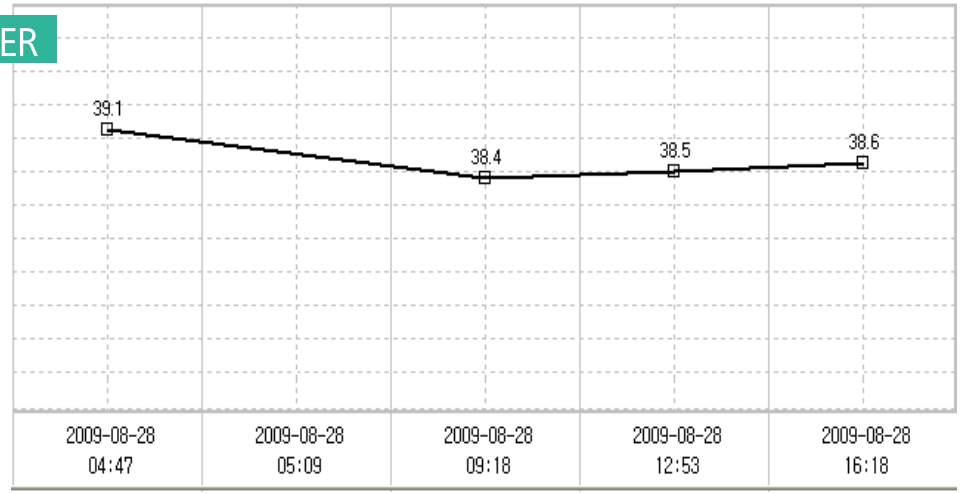
호흡곤란(+)

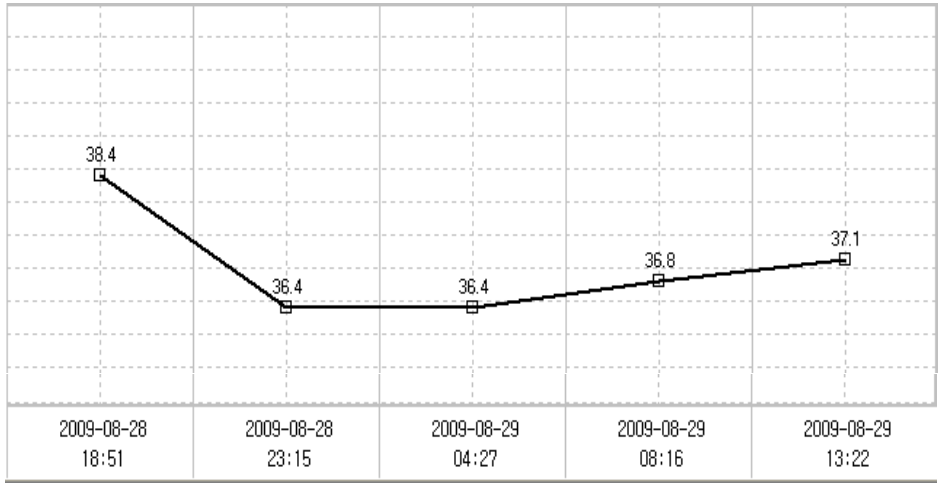
- RR 32회/min
- SpO_2 90% (room air)

과거력: DM, HTN

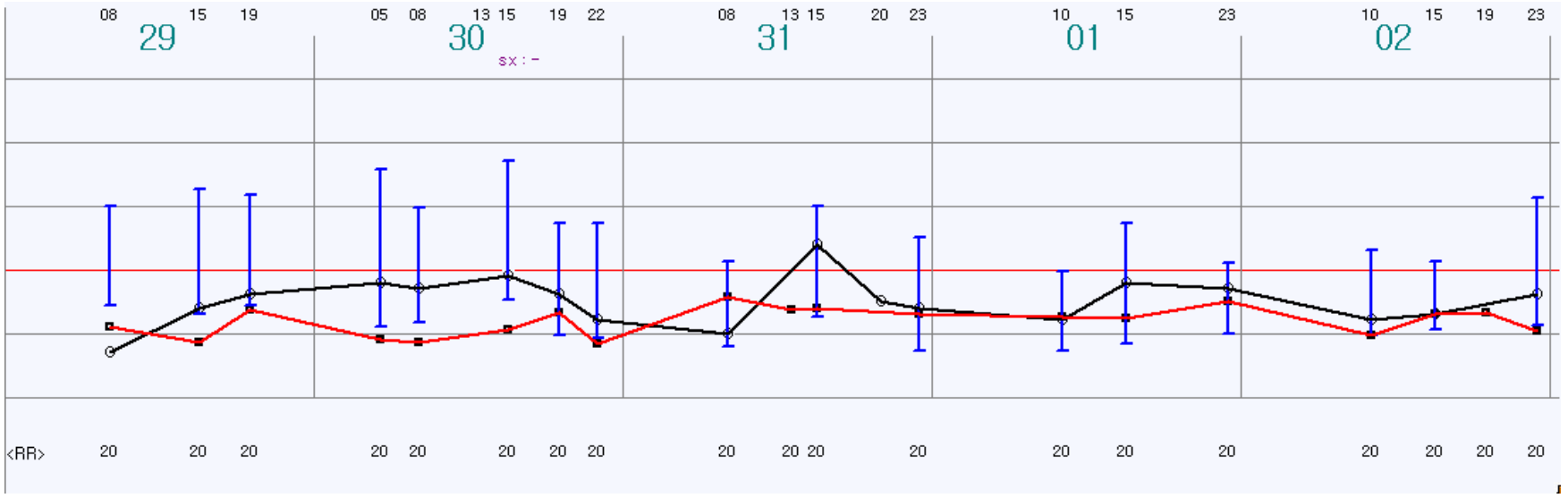
Moxifloxacin 투여

At ER

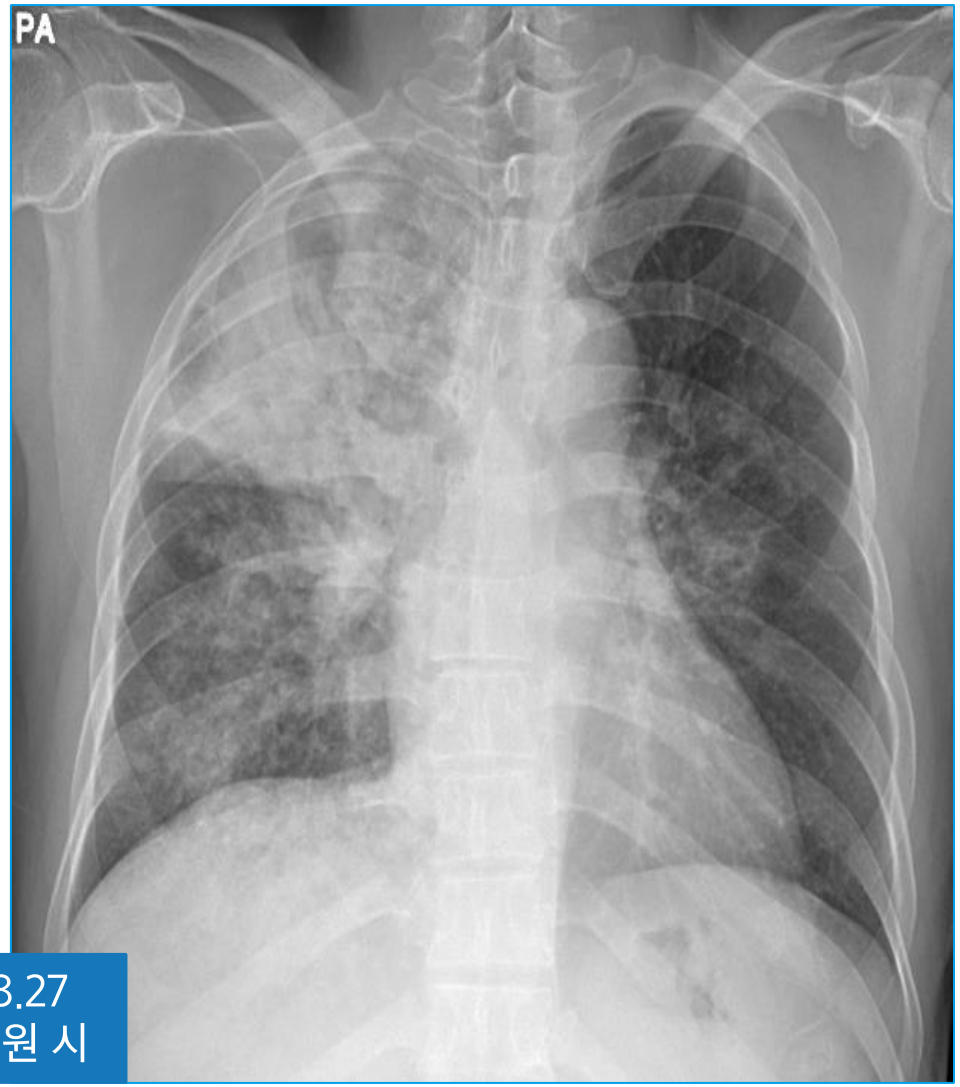




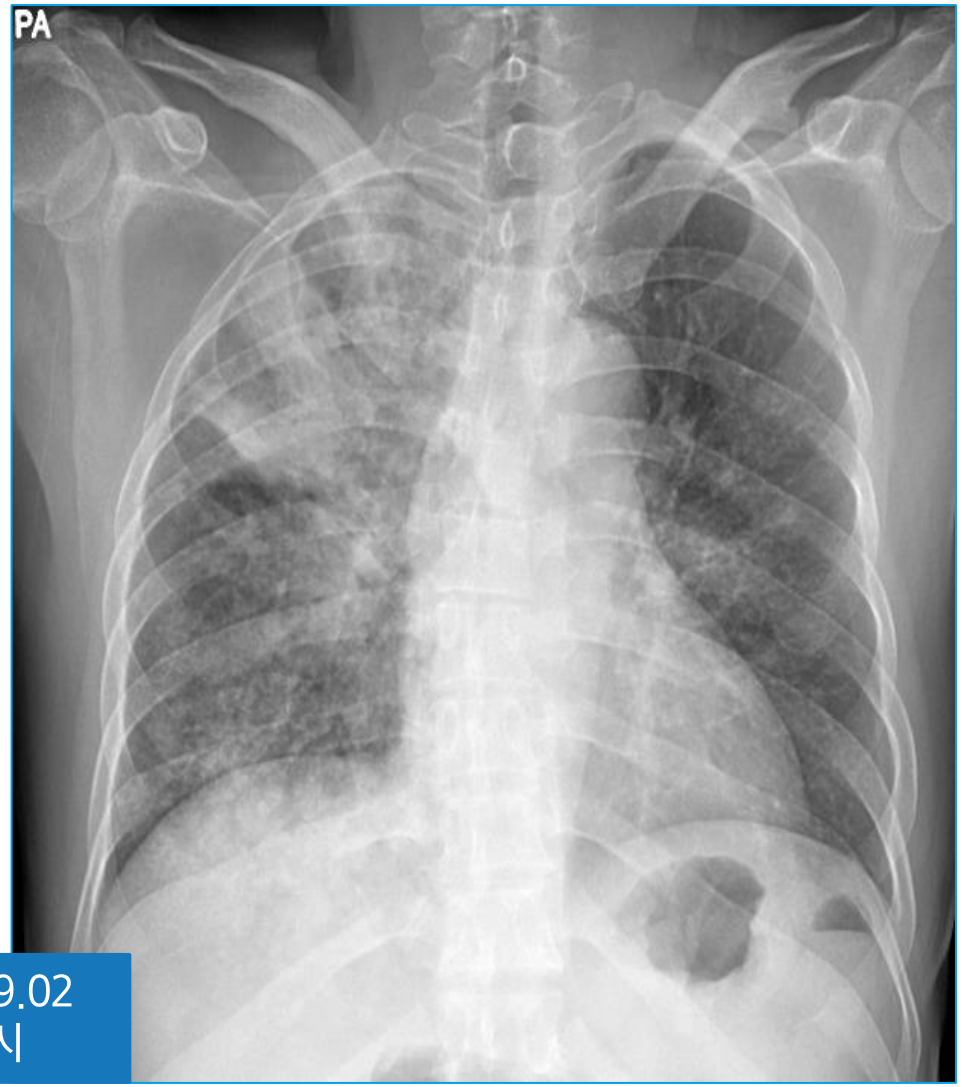
At Ward



방사선학적 호전



2009.08.27
응급실 내원 시



2009.09.02
퇴원시

최종 진단 ??

검사명 AFB Stain and Culture, 1st [BL4112] 구분 응급

처방일 2009-08-27 접수일 2009-08-27 23:37 보고일 2009-09-28 08:14

**** [최종보고] ****

[판독의1] 이남용 [판독의3] 이남용

[검체] Sputum

No AFB seen.

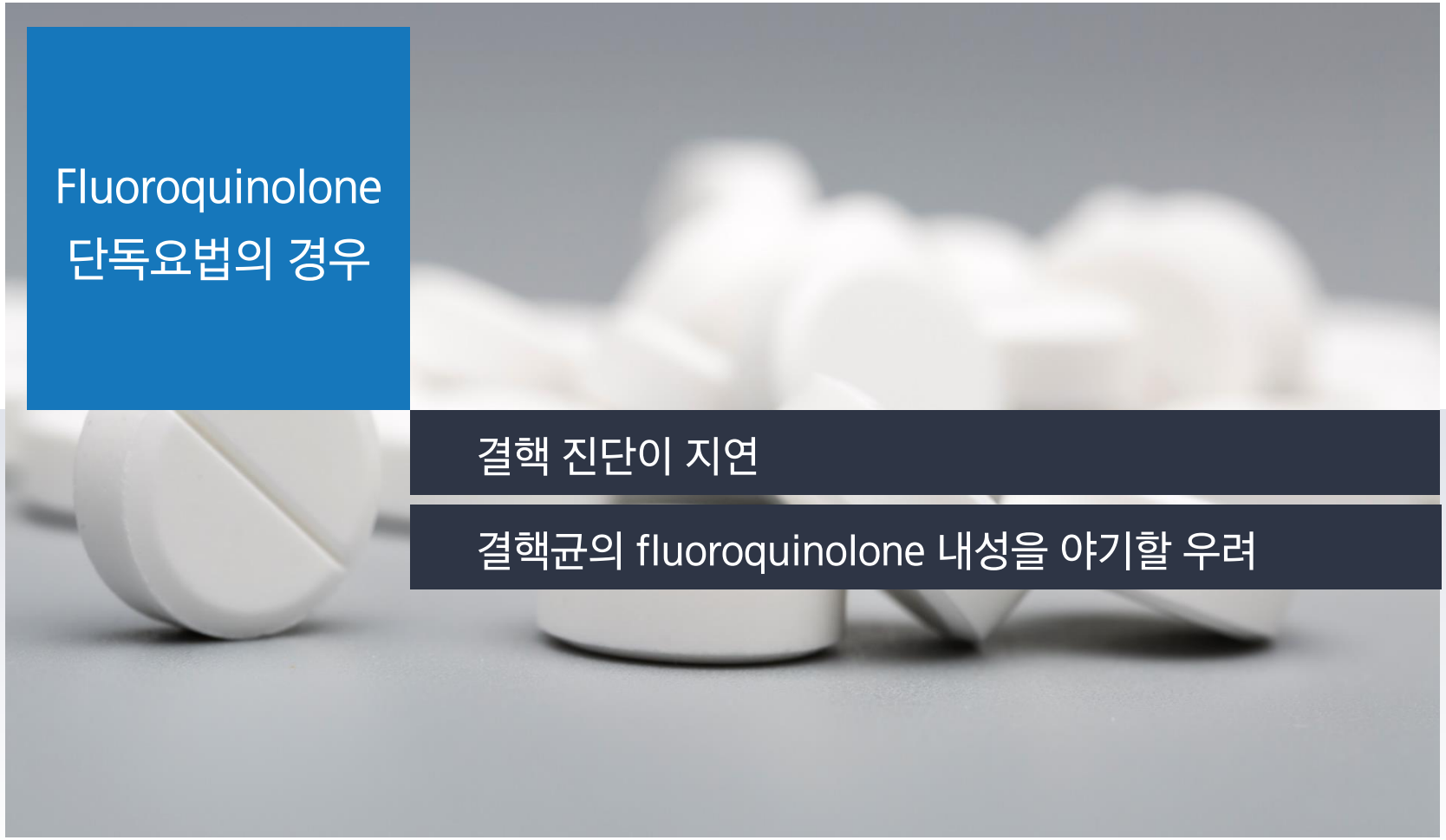
2009-05-19 16:06:31

Mycobacterium tuberculosis isolated (액체배양)

BL4118 AFB, 약제감수성(1차약제) 검사가 시행됩니다.

2009-03-14 16:04:32

Empirical Fluoroquinolone Thearpy for CAP 치료지침 권고안, 2009



Fluoroquinolone 단독요법의 경우

결핵 진단이 지연

결핵균의 fluoroquinolone 내성을 야기할 우려

➡

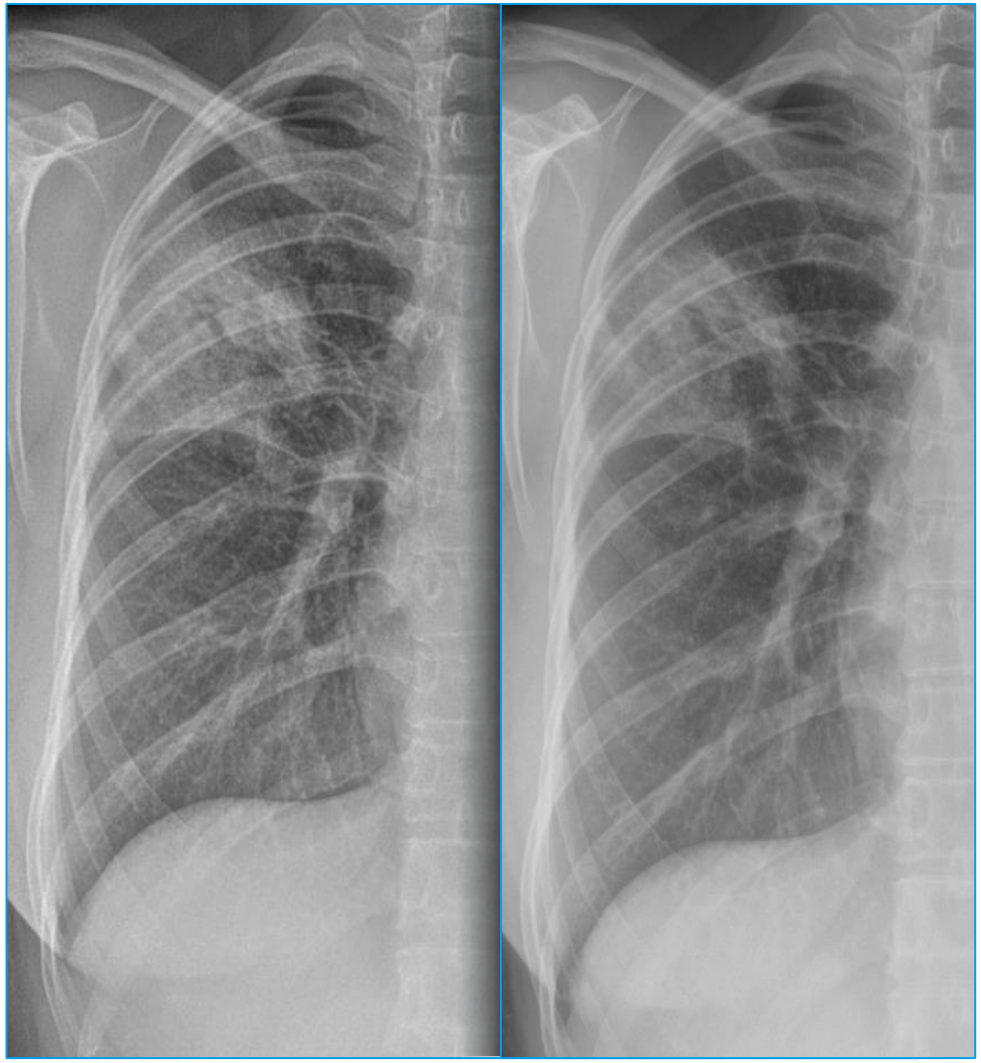
결핵을 배제할 수 없는 경우에는 fluoroquinolone의 경험적 사용을 피할 것을 권장

J Korean Med Assoc 2010;53:20

치료 반응이 있는 것인가?

Cefditoren 100 mg tid 복용 후 3일 후 부터
발열, 오한, 근육통 호전

하지만, 기침, 화농성 객담 지속



Time to Stability in Hospitalized CAP Objective Clinical Status

Criterion for Stability	Unstable on Day 1, No. (%)	Time to Stability	
		Median, d	Interquartile Range, d
Systolic blood pressure ≥90 mm Hg†	50 (7)	2	2-3
Heart rate ≤100 beats/min†	385 (56)	2	2-3
Respiratory rate, breaths/min†			
≤24	337 (49)	3	2-4
≤22	489 (71)	3	2-6
≤20	537 (78)	4	3-7
Temperature, °C (°F)‡			
≤38.3 (101)	314 (46)	2	2-3
≤37.8 (100)	432 (63)	3	2-4
≤37.2 (99)	550 (80)	3	2-6
Oxygen saturation, %§			
≥90	142 (23)	3	2-6
≥92	188 (31)	3	2-6
≥94	237 (39)	4	2-8
Ability to eat†‖	73 (11)	2	2-8
Mental status¶	56 (8)	3	2-4

*The time to stability indicates the first day each clinical variable was stable according to the specified criterion. A variable was considered stable if all measurements over the 24-hour period met stability criteria. The Kaplain-Meier estimates of time to stability are for the subgroup of patients with a specified abnormality on admission. The day of admission is day 1. The stable oxygenation is oxygen saturation at least equal to the specified value or Pao_2 ≥60 mm Hg.

JAMA 1998;279:1452

Difference of Stability by Severity, Complications

Definition of Stability				Pneumonia Severity Index Risk Class, d							
				Class I-III		Class IV		Class V		All Patients	
Definition	Temperature, °C (°F)	0_2 Saturation, %	Respiratory Rate Breaths/min	Median	Interquartile Range	Median	Interquartile Range	Median	Interquartile Range	Median	Interquartile Range
A	≤38.3 (101)	≥90	≤24	3	2-4	3	2-7	5	3-9	3	2-5
B	≤37.8 (100)	≥90	≤24	3	2-5	4	2-7	6	3-9	3	2-6
C	≤37.2 (99)	≥92	≤24	4	3-7	6	3-9	7	4-11	5	3-8
D	≤37.2 (99)	≥92	≤20	6	3-12	7	3-16	10	6-17	6	4-13
E	≤37.2 (99)	≥94	≤20	6	4-15	9	4-17	13	7-17	7	4-17

JAMA 1998;279:1452

Characteristic	Time to clinical stability, median days (IQR)		
	Characteristic present	Characteristic absent	*P*
Comorbid condition			
Chronic bronchitis	4 (3–7)	3 (2–6)	.003
Neoplasm	4 (3–8)	3 (2–6)	.009
Symptoms			
Dyspnea	4 (2–7)	3 (2–4)	<.001
Confusion	6 (3–10)	3 (2–6)	<.001
Risk class[a]			<.001
I	3 (2–4)	…	
II	3 (2–4)	…	
III	3 (2–5)	…	<.01
IV	4 (2–7)	…	<.05
V	5 (3–8)	…	<.05
Radiographic findings			
Pleural effusion	4 (3–9)	3 (2–6)	.02
Multilobed CAP[b]	4 (3–7)	3 (2–5)	<.001
Antimicrobial treatment			
Prior treatment	3 (2–5)	4 (2–6)	.02
Adherence to guidelines	3 (2–6)	4 (2–7)	.007

Characteristic	Time to clinical stability, median days (IQR)		
	Characteristic present	Characteristic absent	*P*
Response to empirical treatment: treatment failure	9 (6–17)	3 (2–5)	<.001
Complications			
Renal failure	5 (3–9)	3 (2–6)	<.001
Heart failure	7 (4–10)	3 (2–6)	<.001
Shock	9 (7–19)	3 (2–6)	<.001
Empyema	11 (7–14)	3 (2–6)	<.001
ICU admission	10 (7–13)	3 (2–5)	<.001

Clin Infect Dis 2004;39:1783

항생제 치료 반응 주관적 증상 호전

Subjective improvement within 3 ~ 5 days of treatment

Symptom	Time to resolution (days)	Inter-quartile range (days)	% With unresolved symptom at day 28
Fever	3	2-4	3·5
Myalgia	5	4-6	13·5
Dyspnea	6	5-14	16·8
Cough	14	7-21	19·9
Fatigue	14	6-21	25·7
All symptoms	21	21-28	35·0

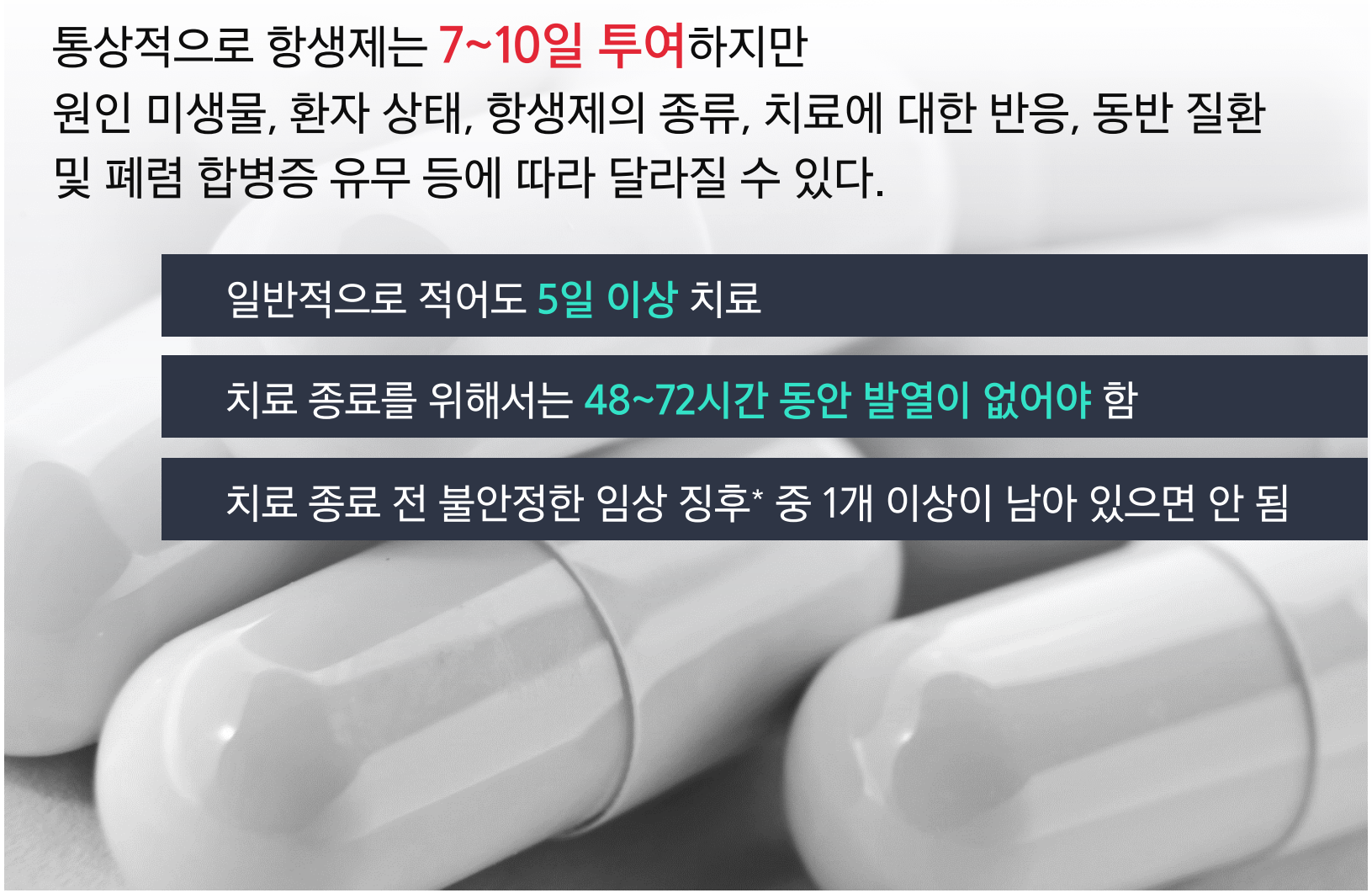
Respir Med 1998;92:1137

Risk factors for delayed resolution

- 동반질환
- 고령 (≥ 50세)
- 중증도
- 원인 균주

항생제 치료 기간 치료지침 권고안, 2009

통상적으로 항생제는 **7~10일 투여**하지만
원인 미생물, 환자 상태, 항생제의 종류, 치료에 대한 반응, 동반 질환 및 폐렴 합병증 유무 등에 따라 달라질 수 있다.



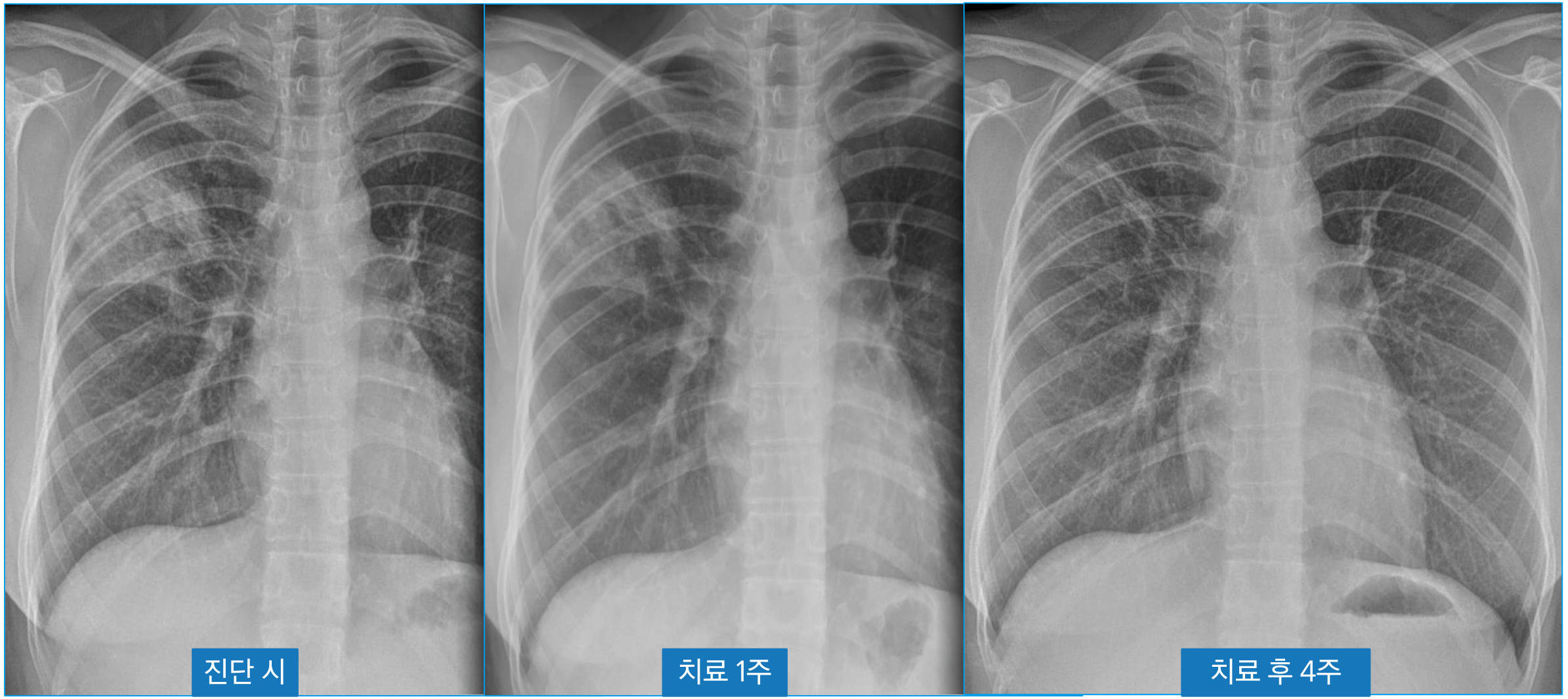
- 일반적으로 적어도 **5일 이상** 치료
- 치료 종료를 위해서는 **48~72시간 동안 발열이 없어야** 함
- 치료 종료 전 불안정한 임상 징후* 중 1개 이상이 남아 있으면 안 됨

* 불안정한 임상 징후

- 발열
- 심박수 증가
- 호흡수 증가
- 저혈압
- 저산소증
- 식이 불능
- 의식저하

J Korean Med Assoc 2010;53:20

방사전학적 호전 ?



Radiologic Resolution of CAP

Radiologic resolution in Pneumococcal pneumonia

- 69% within 2 weeks and 83% within 30 days
- Complete resolution in all within 8 ~10 weeks

N Engl J Med 1954;251:1048
N Engl J Med 1975;293:798

Radiologic resolution in heterogeneous population

- complete clearance after 2 wk: 50.6%
- complete clearance after 4 wk: 66.7%

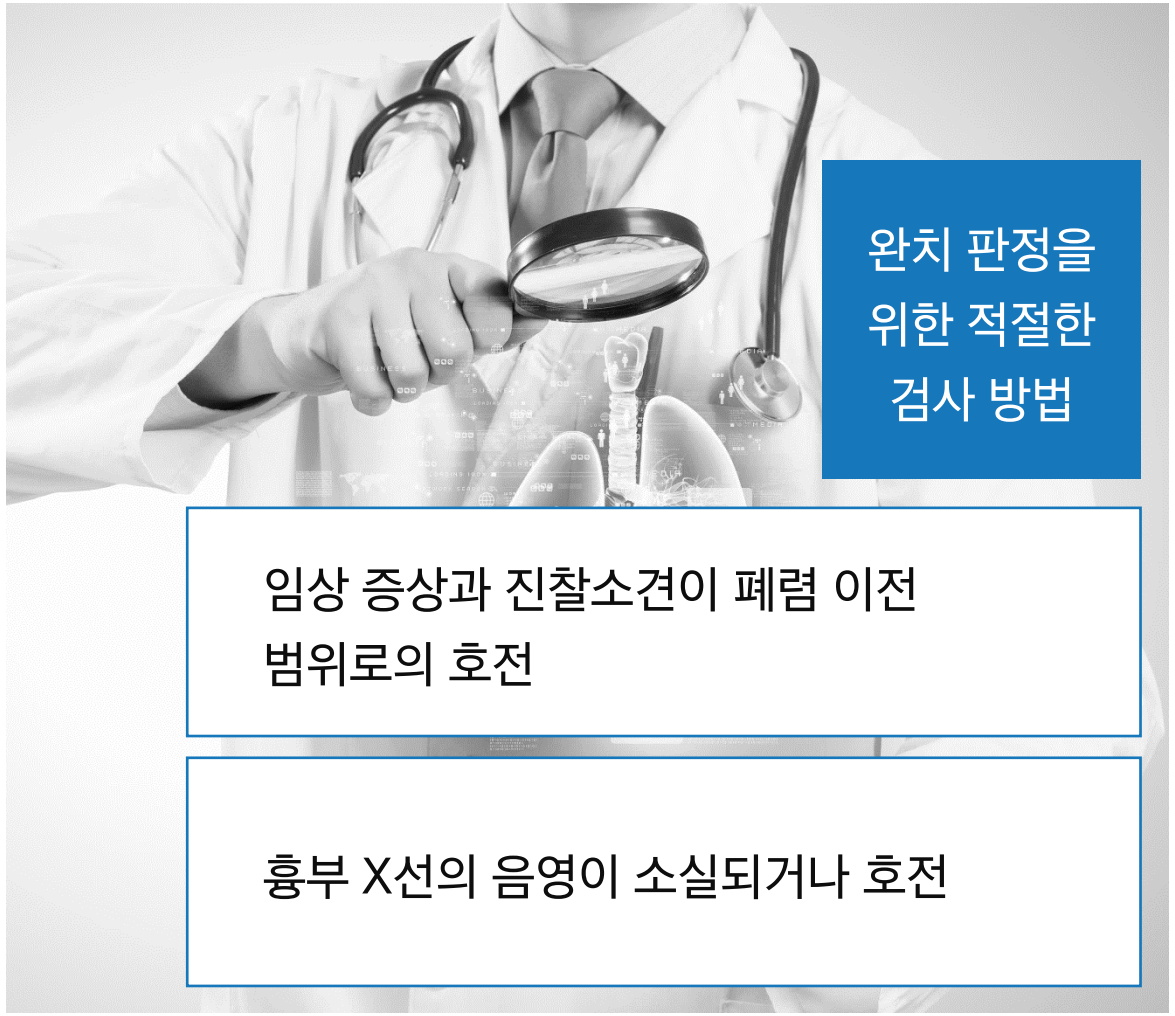
Am J Respir Crit Care Med. 1994;149:630

Radiographic clearance in old age patients (≥ 70 years)

- 35.1% within 3 weeks, 60.2% within 6 weeks
- 84.2% within 12 weeks

J Am Geriatr Soc. 2004;52:224

완치판정 및 추적검사 기간 치료지침 권고안, 2009



완치 판정을 위한 적절한 검사 방법

- 임상 증상과 진찰소견이 폐렴 이전 범위로의 호전
- 흉부 X선의 음영이 소실되거나 호전

재방문 시점

- 외래환자의 경우는 임상적인 소견에 따라 재방문시점을 정함
- 만성 기도 질환이나 고령의 환자에서는 장기간 재방문 및 추적관찰이 필요

지역사회폐렴의 외래진료 요약

지역사회폐렴의 진단	지역사회폐렴의 중증도 평가	지역사회폐렴의 치료	지역사회폐렴의 치료반응 평가: 완치판정
• 임상적 진단의 어려움: 흉부방사선 사진의 중요성 • 원인균 진단이 필수적이지 않지만 상황에 따라 필요: 폐결핵	• 의료진의 임상적 판단이 중요하지만 객관적 기준을 참고: CRB-65	• β-lactam ± macrolide (경구) 또는 respiratory fluoroquinolone (경구) • 치료기간: 7~10일 (최소 5일, 상황에 따라 판단)	• 임상적 치료 반응: 치료 후 3~5일 이내 주관적 증상 호전 • 방사선학적 평가: 최소 4~6주 추적, 고령의 경우 12주 이상 추적