Beyond SARI 2:

Severe Acute Respiratory Failure of Non-Infectious Etiologies

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Disclosure of AI Use

- Generative AI (ChatGPT & Claude) was used to assist in preparing parts of this presentation.
- The presenter reviewed and validated all content.

Contents

- Major **non-infectious causes** of severe acute respiratory failure
- **Differentiation** infectious from non-infectious pulmonary infiltrates in critically ill patients
- **Diagnostic tools and algorithm**
- Disease-specific **therapeutic** approaches

Case 1

57/M

Cough

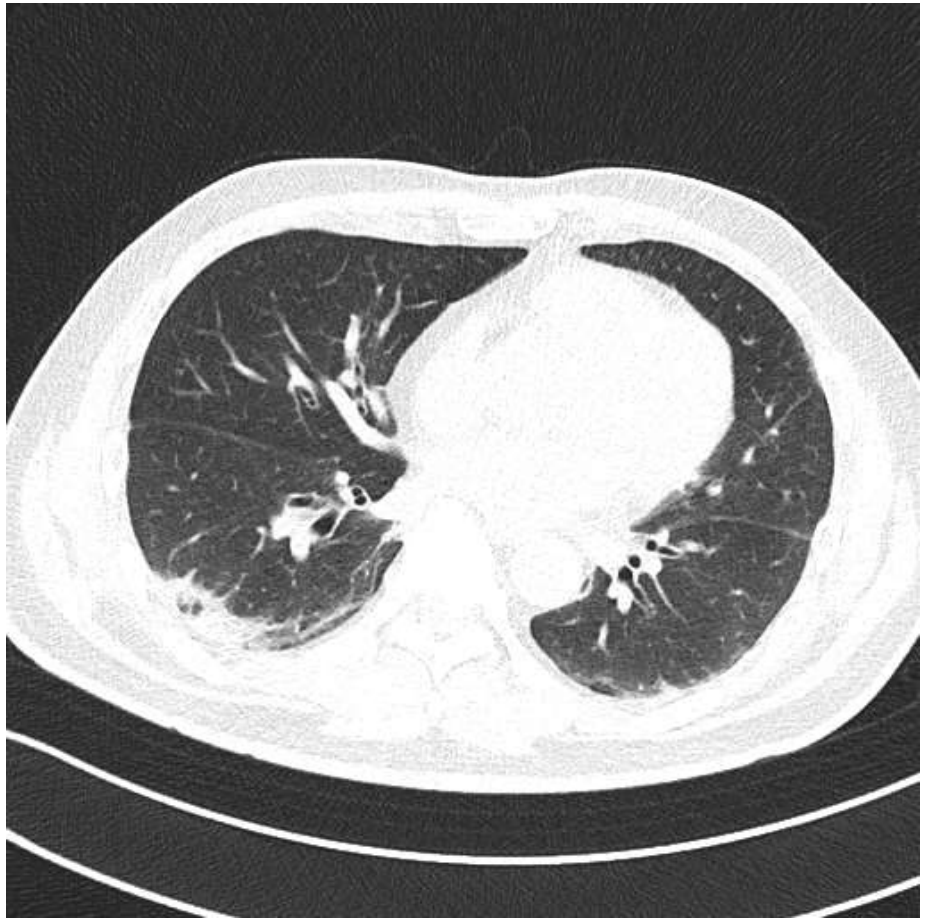
Fever, Myalgia

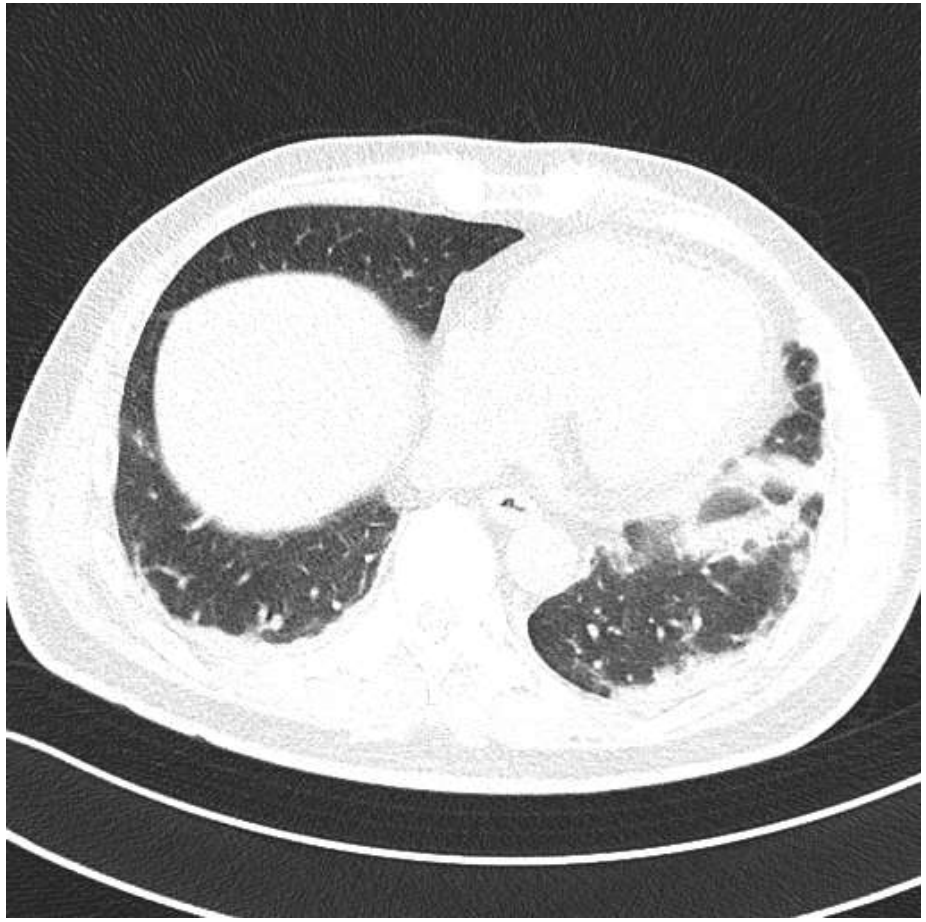
DM/HBV

Smoking: 30-PY, past

Job: 기계정비공

2024/11/30 (ER)





검사명	단위	2024-11-30 17:11
WBC	*10^3/㎣	4.9
RBC	*10^6/㎣	4.82
Hemoglobin(Hb)	g/dL	14.7
Hematocrit(Hct)	%	43.8
MCV	fl	90.9
MCH	pg	30.5
MCHC	g/dL	33.5
RDW	%	13.2
Platelet	*10^3/㎣	197
PCT	%	▼0.148
MPV	fl	7.5
Platelet Distribution Width	ratio/fL	16.8
Seg neutrophil	%	62.4
Band	%	0
Lymphocyte	%	25.6
Monocyte	%	▲10.5
Eosinophil	%	▼0.8
Basophil	%	0.7

검사명	단위	2024-11-30 17:11
Na(Sodium)	mmol/L	▼135.5
K(Potassium)	mmol/L	4.0
Cl(Chloride)	mmol/L	102.5
CO2, total	mmol/L	▲29
Protein, total	g/dL	7.3
Albumin	g/dL	▼3.9
Calcium	mg/dL	9.1
Phosphorus	mg/dL	3.9
Cholesterol	mg/dL	▼89
Glucose	mg/dL	▲111
Creatinine	mg/dL	▲1.01
eGFR Value	mL/min...	82.2
BUN(Urea nitrogen)	mg/dL	13.2
Bilirubin, total	mg/dL	0.6
Bilirubin, direct	mg/dL	0.2
ALP(Alkaline phosphatase)	U/L	73
AST(Aspartate aminotransferas...	U/L	▲61
ALT(Alanine aminotransferase)	U/L	▲65
GGT(Gamma-glutamyl transpe...	U/L	53
LDH(Lactate dehydrogenase)	U/L	▲512
CK(Creatine kinase)	U/L	110
Magnesium	mg/dL	1.9
Lipase	U/L	17
Osmolality	mOsm/...	282
Amylase	U/L	66
CK-MB(Creatine kinase-MB)	ng/mL	1.6
Troponin-I(hs)	ng/mL	▼0.003
BNP(Brain natriuretic peptide)	pg/mL	
Ammonia	umol/L	
Ketone body	umol/L	▲252.0
CRP(C-reactive protein)	mg/dL	0.3

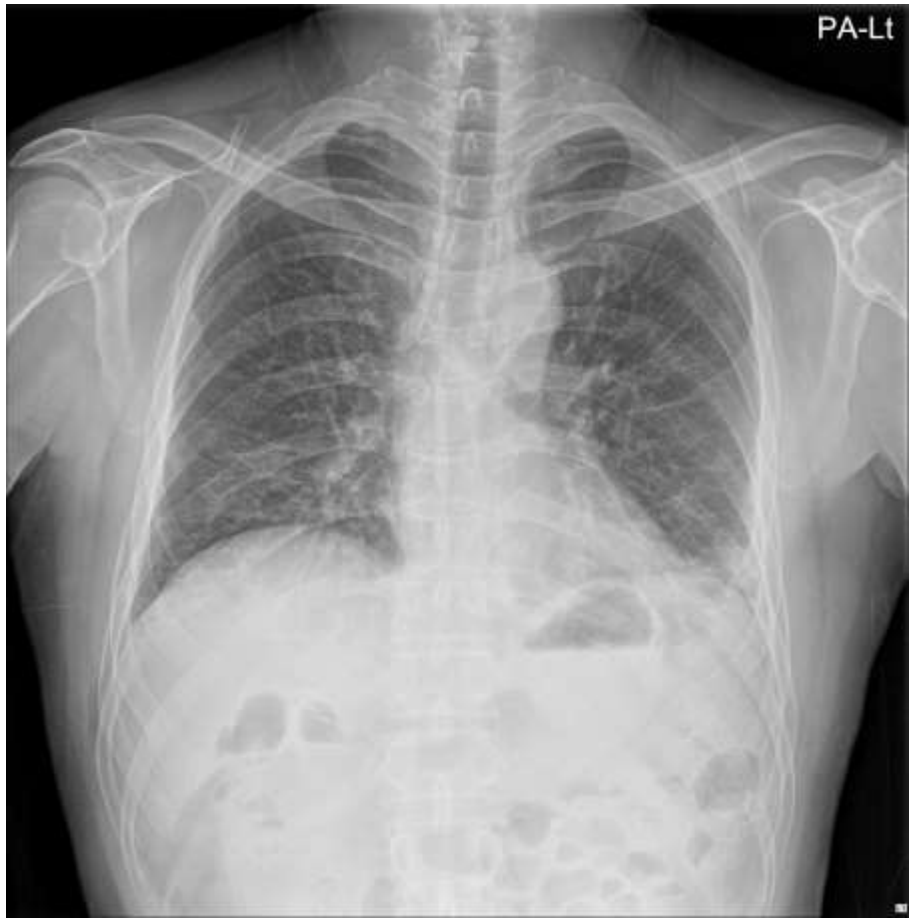
Course

11/30 ER: Levofloxacin po

12/03 OPD: Levofloxacin po

12/10 OPD, dyspnea

→ 입원 결정



History re-taking

* Symptom
C/S/R (+/+ whitish/+)
Dyspnea/orthopnea (-/-)
Arthralgia/Morning stiffness: 양쪽 어깨, 상완근육통 -> 물건을 들지 못하겠다, 양쪽 무릎 (일주일
)
Rash/Scleroderma/photosensitivity: 두피, 얼굴 중앙부 발진 (한달) -> 따뜻한 물이 닿으면 불편 //
손끝 피부 벗겨짐 + 오른쪽 네번째 손가락 관절에 피부병변 지금은 다소 호전 (한달)
Sicca Sx (-/-)
Raynaud phenomenon (-)
Oral ulcer (-)
GI Sx(-)
Neurology(-)
Weight loss: 5~6kg/mo

검사명	단위	2024-12-11 09:59
Myoglobin	ng/mL	▲216.8

Hostpital Course

12/11 BFS & BAL: WBC 170 (L11%, CD4:CD8 38:24),

virus/bacteria: all (-)

ANA, RF, anti-CCP, ANCA, alodolase: all (-)

Myositis Ab panel: pending

12/13 mPD 1 mg/kg start

12/14 discharge

2024/12/14 D/C

2024/12/26 OPD

Re-admission

2025/1/9 influenza

2025/1/22 VV ECMO

2025/2/4 LT 위해 AMC로 전원

Myositis Specific Ab Panel: MDA5 (+)

Myositis specific 11 antibodies panel 결과보고서

의뢰기관	한양대학교구리병원				
성 명	[redacted]	기관기호	31100538	접수번호	20241212-135-5241
등록번호		기관 전화번호	031-560-2587	채취일시	2024/12/12
생년월일	1967/11/15	진료과/병동	CM/M11	접수일시	2024/12/12 15:36
나이/성별	57/M	의뢰의사	L72-732	검사일시	2024/12/12 15:36
비 고	2420403452	검체종류	Serum	보고일시	2024/12/26 17:27

검사결과

Test Name	Result	Reference Range	Test Name	Result	Reference Range
JO-1 AB	< 11	< 11 SI	MI-2 ALPHA AB	< 11	< 11 SI
PL-7 AB	< 11	< 11 SI	MI-2 BETA AB	< 11	< 11 SI
PL-12 AB	< 11	< 11 SI	MDA5 AB	72	< 11 SI
EJ AB	< 11	< 11 SI	TIF1 GAMMA AB	< 11	< 11 SI
OJ AB	< 11	< 11 SI	NXP-2 AB	< 11	< 11 SI
SRP AB	< 11	< 11 SI			

Myositis-specific autoantibodies (MSAs) are highly selective, generally mutually exclusive, and are associated with a particular clinical phenotype within the myositis spectrum.

Anti-synthetase syndrome is associated with MSAs to cytoplasmic enzymes and tRNAs involved with the synthesis of proteins. Target antigens include Jo-1, PL-7, PL-12, EJ, and OJ. Clinically, anti-synthetase syndrome is primarily characterized by myositis and lung inflammation.

Dermatomyositis is associated with MSAs to SRP, Mi-2A, Mi-2B, and clinically this disease is characterized by myositis in association with a rash. Additionally, MSAs to MDA5 (CADM140) have been identified in patients with clinically amyopathic dermatomyositis and rapidly progressive lung disease. MSAs to TIF1-γ and NXP-2, collectively, are seen in >40% of children with dermatomyositis and appear to identify those with more severe disease. Finally, TIF1-γ Ab has been reported in adults with dermatomyositis and is associated with malignancy, but not in children.

SRP Ab has also been associated with necrotizing myopathy, a disease with unique histological features and an aggressive clinical course.

This test was developed and its analytical performance characteristics have been determined by Quest Diagnostics. It has not been cleared or approved by the FDA. This assay has been validated pursuant to the CLIA regulations and is used for clinical purposes.

Severe Acute Respiratoy Infection: SARI

- Fever (≥38℃), cough within 10 days, hostpitalization
- SARI 감시체계: 감염병 유행을 파악하기 위한 기초 역학 데이터
  - Influenza: 유행 추이 파악
  - SARS-CoV-2: 변이 바이러스 감시
  - 바이러스 및 세균성 병원체의 조기 감기, 지역사회 대유행 선제 대응
- **Fever → "감염 중심 판정 가능성"**
- 호흡부전: **감염성** vs. **비감염성**

ARDS: A syndrome, not a diagnosis

- ARDS is a final common pathway
  - Many insults → diffuse alveolar damage and non-cardiogenic edema.

    (Infectious) Pneumonia is only one.
  - Meeting ARDS criteria?
    - Says nothing about whether the trigger was an infection.

Table 1—*Acute Noninfectious Diffuse Parenchymal Lung Diseases and Their Underlying Histology, Etiology, and BAL Cellular Content*

AIP	
	Organizing diffuse alveolar damage
	Idiopathic (Hamman-Rich syndrome), CVD, cytotoxic drugs, infections
	Neutrophilia (> 10%)
AEP	
	Eosinophilic infiltration and diffuse alveolar damage
	Idiopathic, drugs
	Eosinophilia (> 25%)
Acute BOOP	
	Organizing pneumonia,
	Idiopathic, CVD, drugs, radiation, infections
	Neutrophilia, and sometimes lymphocytosis (< 25%), eosinophilia (< 25%)
DAH	
	Pulmonary capillaritis, bland hemorrhage, diffuse alveolar damage
	Vasculitides, CVD, ABMA disease, coagulopathies, diffuse infections (partial list)
	RBCs, hemosiderin-laden macrophages
Acute HP	
	Granulomatous and cellular pneumonitis with diffuse alveolar damage
	Environmental and workplace antigens
	Lymphocytosis (> 25%) and sometimes neutrophilia (< 10%)

"Imitators" of the ARDS*

Implications for Diagnosis and Treatment

Marvin I. Schwarz, MD, FCCP; and Richard K. Albert, MD, FCCP

(CHEST 2004; 125:1530–1535)

ICU Case Challenge

- Fever, bilateral infiltrates, acute hypoxemic respiratory failure.
- Admitted as severe pneumonia (SARI).
- Full microbiological work-up & broad-spectrum antibiotics
- Day 3–5: cultures negative.

  No clinical improvement.

  Oxygen requirement rising. → ***"What now?"***

인플루엔자 및 원인불명폐렴 검체 채취 및 운송 매뉴얼

1. 목적

◦지역사회 중증 급성 호흡기 감염병 유행 양상 및 중증도 파악, 신•변종 호흡기 감염병 조기 인지

◦중증 급성 호흡기 감염병 임상감시체계 운영

:중증 급성 호흡기 감염병 발생양상 파악, 신•변종 호흡기 감염병 및 조류 인플루엔자 조기 인지

:성과 지표-입원환자 중 SARI 환자 비율, SARI 환자 중 인플루엔자 및 폐렴 환자 비율, SARI 환자에서 사망한 환자 비율 및 중환자 비율, SARI 환자의 연령별, 원인병원체별 현황, 호흡기바이러스 양성률 등

◦중증 급성 호흡기 감염병 병원체감시체계 운영

치료제 내성, 조류인플루엔자 및 신•변종 인플루엔자 의심 시 검체 채취 및 분석

질병관리청 "원인불명 호흡기 감염병 병원체 감시" 연구 용역사업과 연계한 병원체 심층 분석

2. 검체 채취 항목

◦ 인플루엔자

- 치료에 반응하지 않는 인플루엔자 검체 : 인플루엔자 (+)으로 타미플루 치료를 함에도 불구하고 나빠지는 경우

◦ 원인불명폐렴

- 원인불명 질환의 정의는 입원 후 72시간 이내에 시행한 바이러스 검사와 세균 검사에서 모두 음성인 경우

Refractory pneumonia? Non-infectious etiologies!

- Delayed life-saving therapy
  - Steroid-responsive, time-critical
- Antimicrobial overuse
- Prognostic mislabelling
- Confusion in SARI surveillance

Non-infectious Acute Respiratory Railure: Mimickers of SARI

- **Cardiovascular**
  - Cardiogenic pulmonary edema
- **ILD**
  - AIP (Hamman–Rich) · acute exacerbation of ILD/IPF · organising pneumonia / AFOP
- **(Auto)Immune/CTD**
  - Anti-MDA5 RP-ILD · other CTD-ILD · ANCA & anti-GBM vasculitis
  - Diffuse alveloar hemorrhage · acute eosinophilic pneumonia
- **Drug/toxic/environmental**
  - Checkpoint-inhibitor & cytotoxic pneumonitis · amiodarone · EVALI · HP
- **Others**
  - Aspiration pneumonitis · malignancy, TRALI · post-HSCT IPS

Intersitial Lung Disease; Acute Interstitial Pneumonia; Idiopathic Pulmonary Fibrosis; Acute Fibrinous Organizing Pneumonia; Connective Tissue Disease; Anti-Melanoma Differentiation-Associated Protein 5 Rapidly Progressive Interstitial Lung Disease; Antineutrophil Cytoplasmic Antibody; Glomerular Basement Membrane; E-cigarette or Vaping Use-Associated Lung Injury; Transfusion-Related Acute Lung Injury; Hypersensitivity pneumonitis; Idiopathic Pneumonia Syndrome

Clues Distiguishing from Infectious Causes – 1

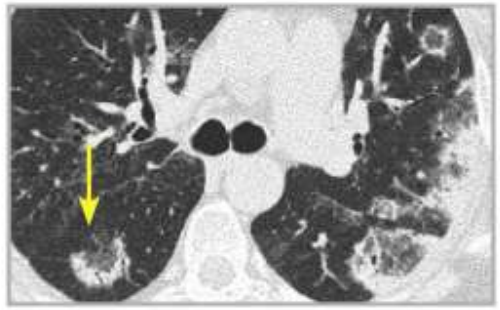
- **History**
  - Drug, chemotherapy, taboacco smoking, vaping, occupational exposure
- **Course**
  - Fulminant onset over hours~days: AEP, DAH, TRALI
  - Days–weeks of “non-resolving pneumonia”: OP, BAC
- **Imaging**
  - Acute-on-chronic on a fibrotic background: AE-ILD

Clues Distiguishing from Infectious Causes – 2

- **Imaging (CT)**

Atoll sign (reverse-halo sign)

- Central GGO surrounded by a crescentic or circumferential denser consolidation
- DDx: COP, IFI, PJP, LG, GPA, lipoid pna, sarcoidosis, paracoccidioidomycosis

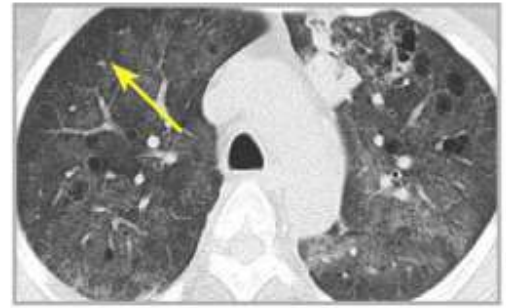


Crazy paving sign

- Thickened interlobular septa in a background of diffuse GGO's.
- DDx: PAP, pulm edema, lymphangitic spread of malignancy, pulm mucinous adeno Ca, sarcoidosis, lipoid pna, pulm hge, ARDS, PJP

Mosaic attenuation

- Variable attenuation seen on a chest CT in a lobular or multilobular distribution.
- DDx: BO, CTEPH, PJP, CEP, HP, COP



Clues Distiguishing from Infectious Causes – 3

- **Extrapulmonary**
  - Skin: Gottron papule, mechanic's hands, ulcers: anti-MDA5
  - Rash, arthralgia · arthritis/myalgia: CTD, vasculitis, myositis
  - Hemoptysis, hematuria: pulmonary-renal syndrome, DAH, vasculitis
- **Lab**
  - Low procalcitonin
  - Rapid Hb drop: DAH
  - LDH, CK, myoglobin: myositis

Diffuse Alveolar Hemorrhage

- Disruption of the alveolar-capillary basement membrane
- Hemoptysis (not always, 1/3 - absent)
- Cough, fever, dyspnea
- Hypoxemia, anemia
- Sequentially bloodier return on serial BAL

- Pulmonary capillaritis
  - ANCA-associated granulomatous vasculitis
  - Microscopic polyangiitis
  - Isolated pulmonary capillaritis (ANCA positive and negative)
  - SLE
  - Rheumatoid arthritis
  - Mixed connective tissue disorder
  - Scleroderma
  - Polymyositis
  - Primary antiphospholipid antibody syndrome
  - Henoch-Schönlein purpura
  - Behçet Syndrome
  - IgA nephropathy
  - Goodpasture syndrome
  - Idiopathic glomerulonephritis (pauciimmune or immune complex-related)
  - Acute lung transplant rejection
  - Idiopathic pulmonary fibrosis
  - Diphenylhydantoin
  - Retinoic acid toxicity
  - Autologous bone marrow transplantation
  - Myasthenia gravis
  - Cryoglobulinemia
  - Ulcerative colitis
  - Propylthiouracil
- Bland pulmonary hemorrhage
  - IPH
  - Goodpasture syndrome
  - SLE
  - Coagulation disorders
  - Trimellitic anhydride
  - Isocyanate exposure
  - Penicillamine
  - Amiodarone
  - Nitrofurantoin
  - Mitral stenosis
  - Subacute bacterial endocarditis
  - Polyglandular autoimmune syndrome
  - Multiple myeloma
- Diffuse alveolar damage
  - Bone marrow transplantation
  - Crack cocaine inhalation
  - Cytotoxic drug therapy
  - SLE
  - Radiation therapy
  - ARDS

Pulmonary-Renal Syndrome

- DAH + rapidly progressive GN

Case 2

M/67

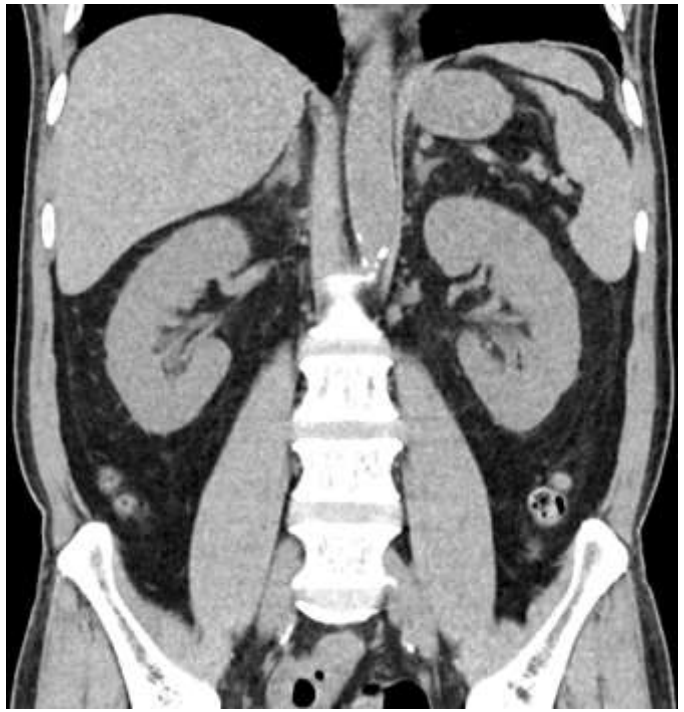
Asymptomatic

Nephrology OPD (2026/2/23)

BUN/Cr elevation

HTN/DM, dyslipidemia

검사명	단위	2026-02-23 13:21
Na(Sodium)	mmol/L	▼132.2
K(Potassium)	mmol/L	4.0
Cl(Chloride)	mmol/L	▼91.8
CO2, total	mmol/L	24
Protein, total	g/dL	▲8.5
Albumin	g/dL	▼3.7
Calcium	mg/dL	▼8.7
Phosphorus	mg/dL	▲4.9
Cholesterol	mg/dL	▼106
Glucose	mg/dL	▲115
Creatinine	mg/dL	▲6.42
eGFR Value	mL/min...	▼8.2
BUN(Urea nitrogen)	mg/dL	▲86.4



Kidney biopsy

검사명	단위	2026-03-04 11:56	2026-03-04 12:03
Cryoglobulin		Negative	
ANA정량			Negative ...
Anti PR3	IU/mL		Negative ...
Anti MPO	IU/mL		Positive 369
Anti GBM	U/mL		Negative ...

2026/3/9 ER visit d/t dyspnea

Hospital Course

3/10 BFS & BAL

Steroid pulse therapy

Plasmapheresis q48hr

Rituximab weekly

CRRT

3/20 VV ECMO

4/5 Expired (MODS)

Treatment of DAH – Fatal if Delayed

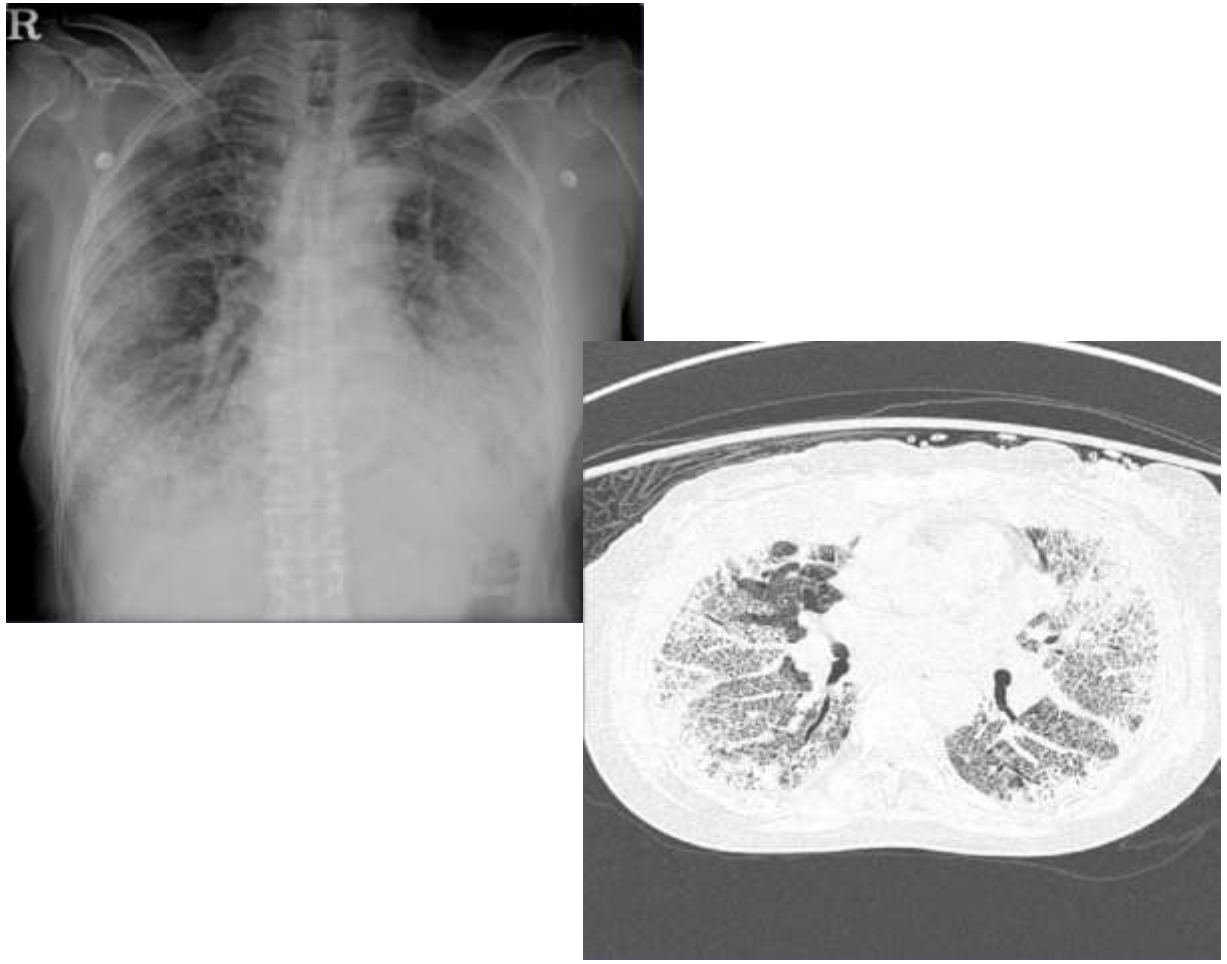
- **Methylprednisolone pulse** (500 ~ 1000 mg/day for upto 5 days)
  → 1 mg/kg, tapering
- **Cyclophosphamide** or **Rituximab**
- **Plasmapheresis** (selected cases)
  - severe DAH (life-threatening)
  - Cr > 5.7 mg/dL or need dialysis
  - anti-GBM overlap

Acute Interstitial Pneumonia (AIP)

- **Hamman-Rich syndrome**
  - Rare and fulminant form of diffuse lung injury originally described by Hamman and Rich in 1935
  - Previously healthy individuals
  - Rapid, with a prodromal illness of 7 to 14 days.
  - Fever, cough, and progressive severe shortness of breath

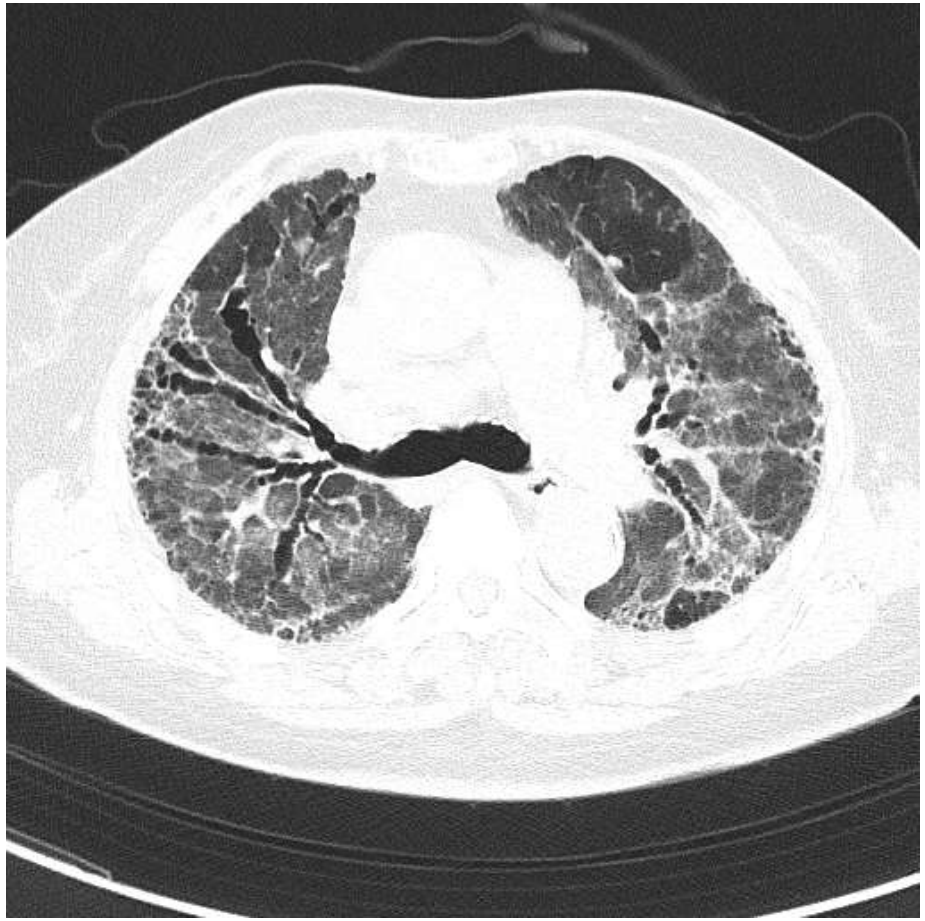
Acute Interstitial Pneumonia (AIP)

- **Diagnosis (exclusion)**
  - Idiopathic ARDS
  - Pathologic confirmation (DAD)
- **Treatment**
  - Supportive care, steroids, immunosuppressive therapies
  - Lung TP



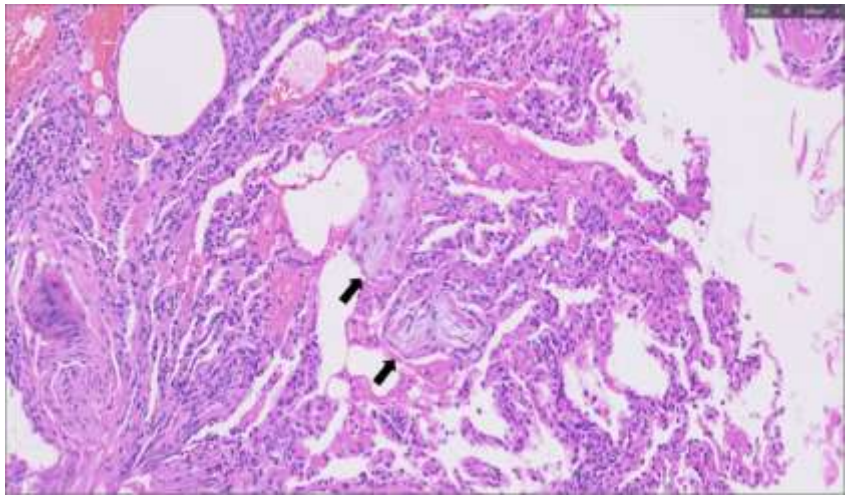
Acute Exacerbation of ILD

- Common ICU non-infectious respiratory failure
- Acute worsening over fibrotic ILD
- HRCT: fibrosis + new GGO
- Mx: supprotive care + steroid
- **Poor prognosis**
  - In-hospital mortality >50%
    (80% if invasive MV)
  - Median surivival 3~4 mo



Cryptogenic Organizing Pneumonia (COP)

- Acute ~ subacute
- Dry cough, fever, wt loss
- HRCT: patch consolidation, subpleural/peribronchial, migrating pattern
- Good response to steroid, but often relapsed.



Intra-alveolar fibroblastic plugs (Masson's body)

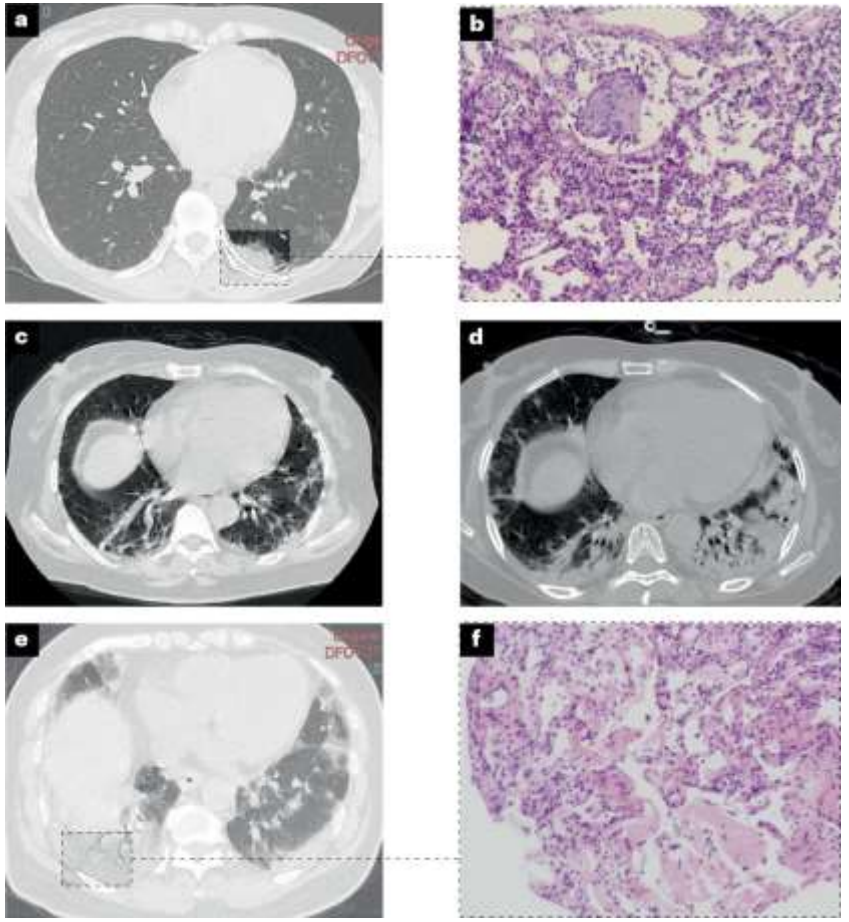
Anti-MDA5 Dermatomyositis with RP-ILD

- **Anti-melanoma differentiation-associated protein 5**: subtype of DM
- **Rapidly progressive ILD** with refractory hypoxemia
  - ILD occurs in up to 95% of anti-MDA5 patients
  - Often clinically amyopathic — little or no muscle weakness
- **Gottron papules, mechanic's hands, cutaneous ulcers**
- Markedly elevated **ferritin**; **myositis-specific antibody** panel
- **6-month mortality (RP-ILD) ~60%**
  - Anti-Ro52 co-positivity marks a worse prognosis


a
b
c
d
e
f

Anti-MDA5 Dermatomyositis with RP-ILD: HRCT

- Lower lobe predominance
- Bilateral basal subpleural consolidation
- Bilateral ground glass opacities



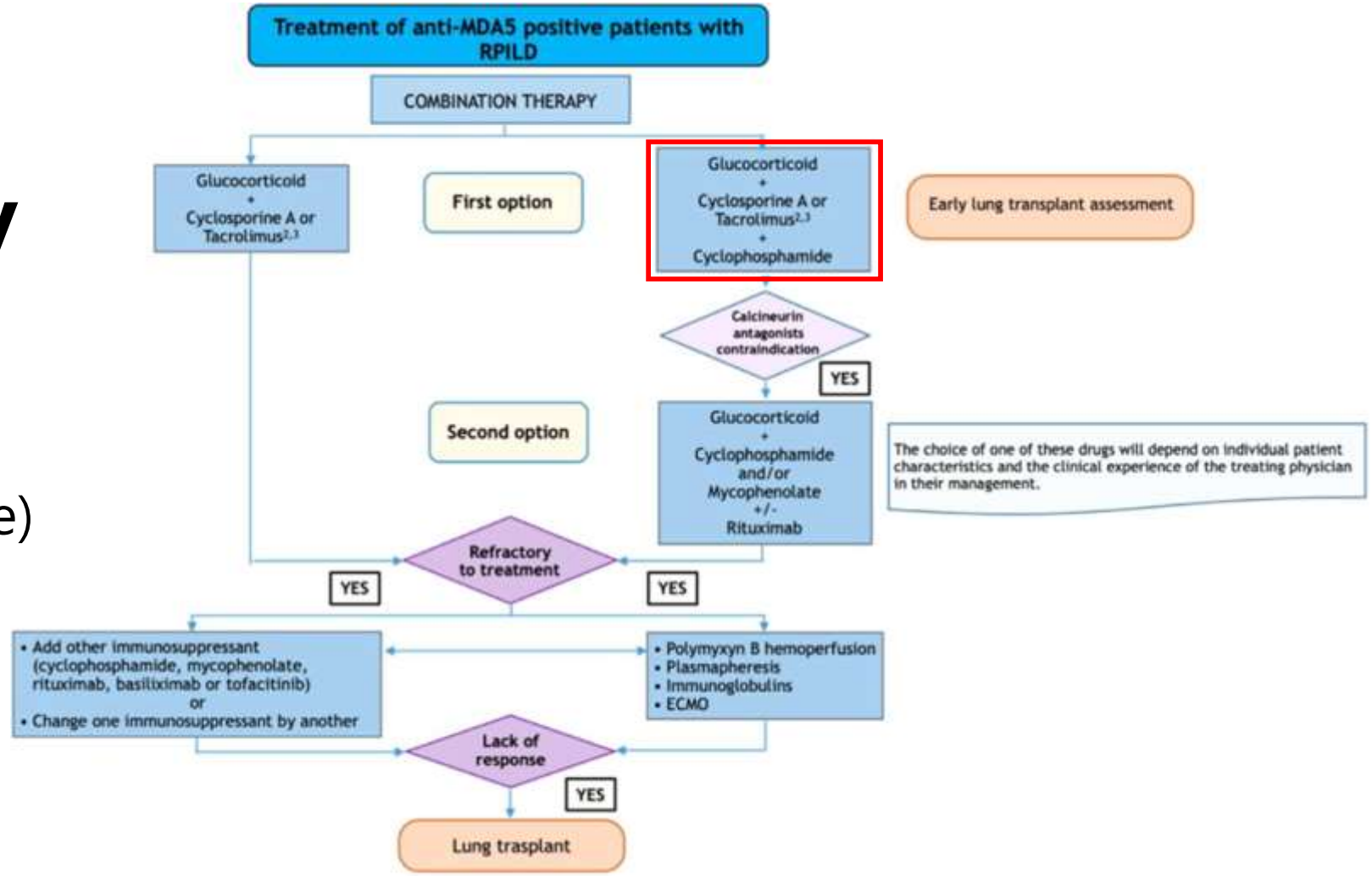
Tx: Early, aggressive combination immunosuppression — do not wait for muscle signs.

Triple Therapy

Steroid

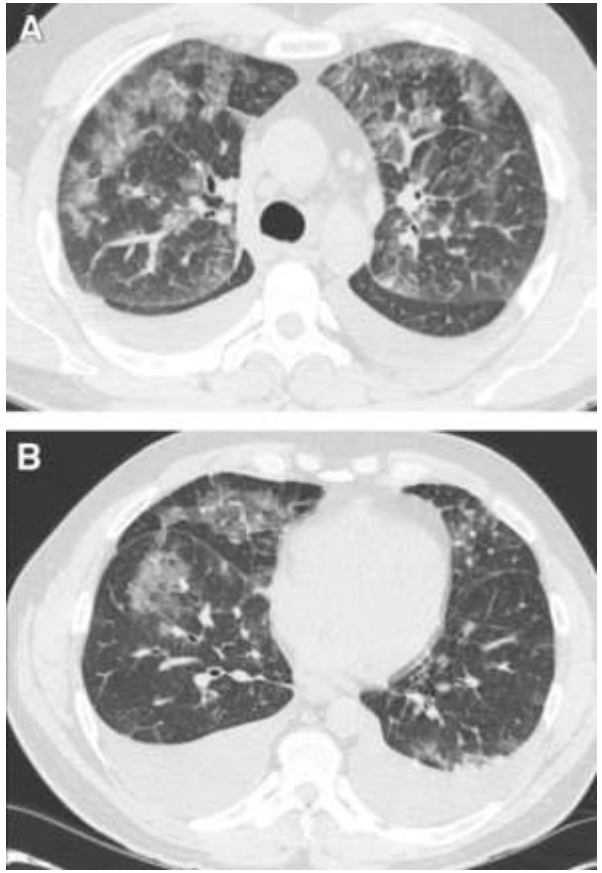
Tacrolimus (or Cyclosporine)

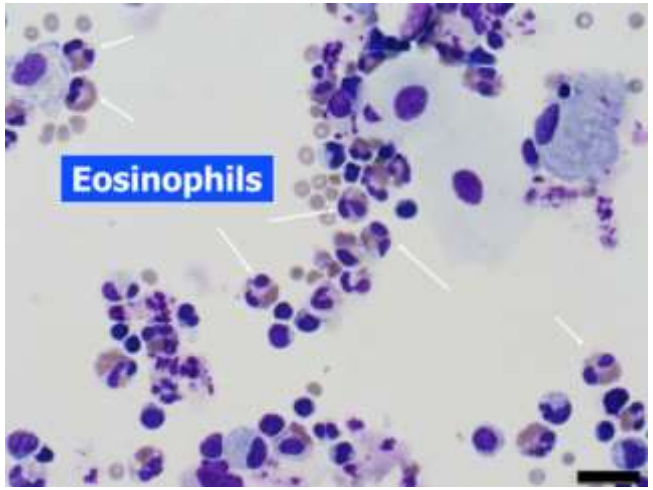
Cyclophophamide



Acute Eosinophilic Pneumonia

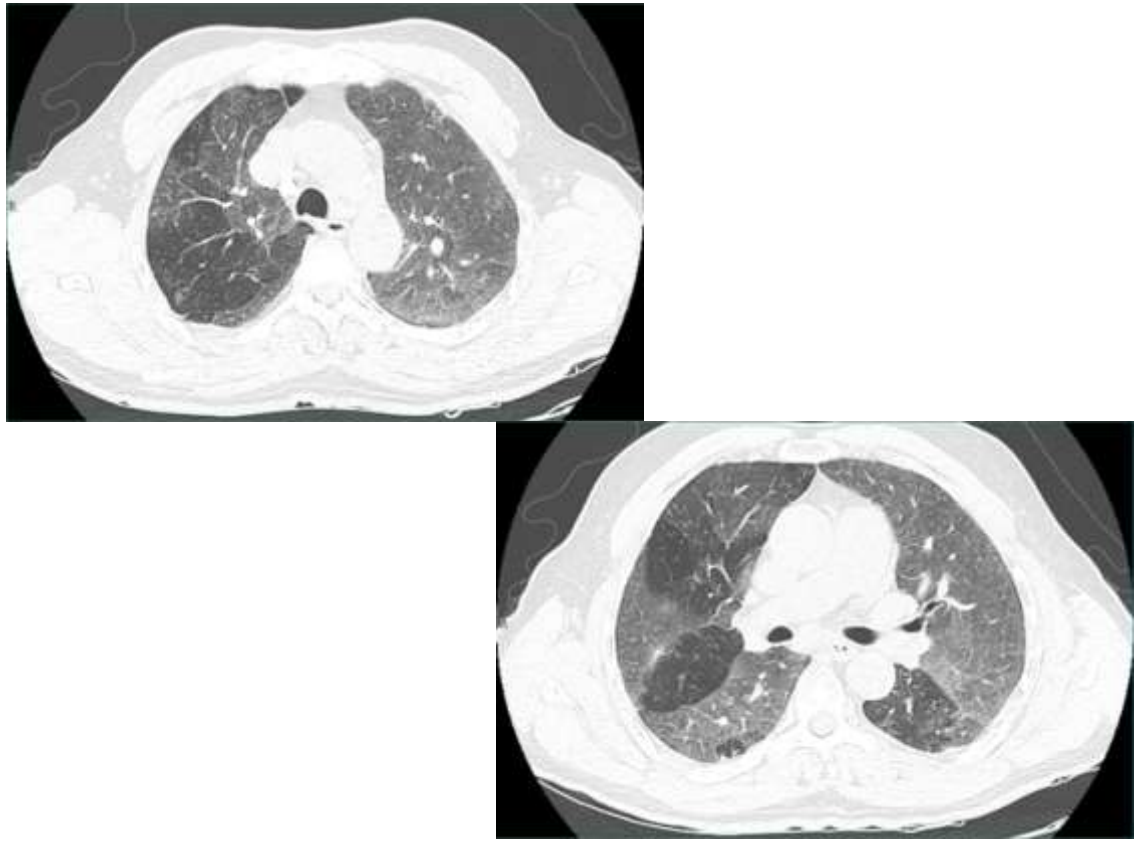
- Fever, hypoxemia, diffuse bilateral infiltration in young adults
- Trigger
  - (New or resumed) tobacco smoking, vaping, inhaled dusts, or a culprit drug.
- Diagnosis
  - **BAL: Eosinophils ≥25%**
  - Peripheral blood eosinophilia is often absent
- Dramatic steroid response





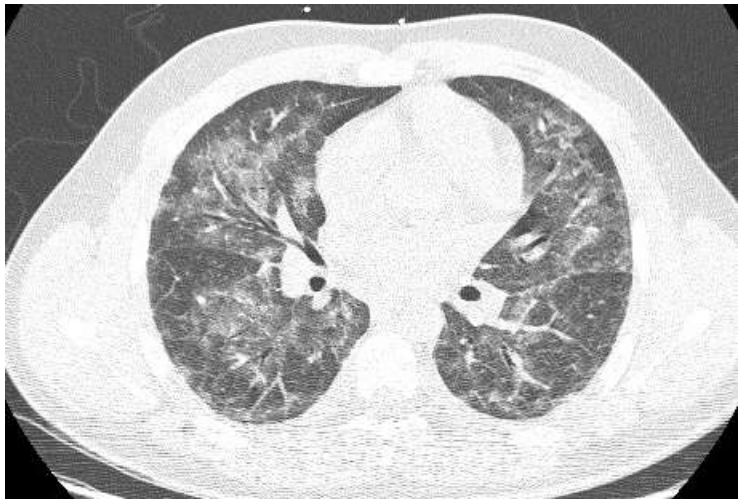
Hypersensitivity Pneumonitis

- Extrinsic allergic alveolitis
  - Hypersensitivity to an inhaled agent
- Nonfibrotic or fibrotic
- Dx: multidisciplinary
  - Provocative antigen
  - HRCT, BAL, pathology



E-cigarette / vaping-associated lung injury (EVALI)

- Tetrahydrocannabinol (THC) and/or vitamin E acetate
- Male, ≤35 yr
- Dyspnea, cough, chest pain
- GI Sx: N/V/D, abdominal pain
- Invasive MV 1/3
- Tx: supportive, selective use of steroid



Proposed criteria for EVALI

Confirmed case
▪ Use of an e-cigarette ("vaping") or "dabbing" in the previous 90 days*
▪ Lung opacities on chest radiograph or computed tomography
▪ Exclusion of lung infection based on: • Negative influenza PCR or rapid test (unless out of season) • Negative respiratory viral panel • Negative testing for clinically-indicated respiratory infections (eg, urine antigen test for *Legionella* and *Streptococcus pneumoniae*, blood cultures, sputum cultures if producing sputum, and bronchoalveolar lavage if performed) • Negative testing for HIV-related opportunistic respiratory infections (if appropriate)
▪ Absence of a plausible alternative diagnosis (eg, cardiac, neoplastic, rheumatologic)

Drug-induced Lung Injury

- Amiodarone
- MTX, bleomycin, gemcitabine…
- EGFR-TKI
- **Immune Checkpoint-Inhibitor: PD-1, PD-L1**
- Radiologic pattern
  - OP
  - NSIP
  - DAD

Immune Checkpoint-inhibitor (ICPi) Pneumonitis

- Onset weeks to months after starting therapy; **pre-existing ILD** raises risk
- ~3% (all-grade in trials), 0.8% grade ≥3
- 13-30% in real world cohorts

TABLE 3. Lung Toxicities

3.1. Pneumonitis

Workup and evaluation Should include the following: Pulse oximetry and CT chest[123] preferably with contrast if concerned for other etiologies such as pulmonary embolus. For G2 or higher, may include the following infectious workup: nasal swab, sputum culture, and sensitivity, blood culture and sensitivity, urine culture, and sensitivity. COVID-19 evaluation—per institutional guidelines where relevant.	
Grading	**Management**
G1: Asymptomatic; confined to one lobe of the lung or < 25% of lung parenchyma; clinical or diagnostic observations only	Hold ICPi or proceed with close monitoring. Monitor patients weekly with history and physical examination, pulse oximetry; may also offer chest imaging (CXR, CT) if uncertain diagnosis and/or to follow progress. Repeat chest imaging in 3-4 weeks or sooner if patient becomes symptomatic. In patients who have had baseline testing, may offer a repeat spirometry or DLCO in 3-4 weeks. May resume ICPi with radiographic evidence of improvement or resolution if held. If no improvement, should treat as G2.
G2: Symptomatic; Involves more than one lobe of the lung or 25%-50% of lung parenchyma; medical intervention indicated; limiting instrumental ADL	Hold ICPi until clinical improvement to ≤ G1. Prednisone 1-2 mg/kg/d and taper over 4-6 weeks. Consider bronchoscopy with BAL ± transbronchial biopsy. Consider empiric antibiotics if infection remains in the differential diagnosis after workup. Monitor at least once per week with history and physical examination, pulse oximetry, consider radiologic imaging; if no clinical improvement after 48-72 hours of prednisone, treat as grade 3. Pulmonary and infectious disease consults if necessary.
G3: Severe symptoms; Hospitalization required: Involves all lung lobes or > 50% of lung parenchyma; limiting self-care ADL; oxygen indicated. G4: Life-threatening respiratory compromise; urgent intervention indicated (intubation)	Permanently discontinue ICPi. Empiric antibiotics may be considered. Methylprednisolone IV 1-2 mg/kg/d. If no improvement after 48 hours, may add immunosuppressive agent. Options include infliximab or mycophenolate mofetil IV or IVIG or cyclophosphamide (See Table A2 for dosing). Taper corticosteroids over 4-6 weeks[a] Pulmonary and infectious disease consults if necessary. May consider bronchoscopy with BAL ± transbronchial biopsy if patient can tolerate.

Diagnostic tools – 1

- **History & exposures**
  - Drugs (including ICPi)
  - Smoking/vaping
  - Occupation
  - Transfusion, transplant, prior ILD
- **PCT, CK, LDH, myglobin**
- **BNP/echocardiography**
- **HRCT**
- **Serology**
  - ANA · RF/anti-CCP
  - ANCA · anti-GBM
  - Myositis panel (anti-MDA5, anti-Ro52)

Diagnostic tools – 2

- **Thoracic ultrasound**
  - Bedside pleural & B-line patterns
- **Bronchoscopy & BAL**
  - Excludes infection and patterns of the non-infectious cause

Practical Bedside Algorithm

- **Step 1**: Severe respiratory failure
  - Fever, bilateral infiltrates, hypoxaemia — treated as SARI
- **Step 2**: Standard SARI work-up & Tx
  - Cultures, pathogen panels, appropriate empiric antimicrobials
- **Step 3**: **Re-assess at 48–72 h**
  - Culture-negative AND not improving → broaden the differential
- **Step 4**: Structured non-infectious work-up
  - Exposure history · serology · echo · ultrasound · BAL differential
- **Step 5**: Pattern-targeted therapy
  - Often time-critical corticosteroids ± disease-specific immunosuppression

Multidisciplinary Approaches

- ILD – multidisciplinary discussion (MDD)

- Pulmonologist
- Intensivist
- Infectious disease specialist
- Rheumatologist
- Radiologist

Summary

- Not all that looks like SARI is infection

  — keep non-infectious mimics.

- Culture-negative AND no improvement on appropriate therapy by 48–72 h

  — need to consider whether the cause is infectious or non-infectious.

- BAL is the pivot.

  — excludes infection and patterns the non-infectious cause via its cell differential.

- AEP, DAH, checkpoint pneumonitis and anti-MDA5 RP-ILD

  — time-critical and steroid-responsive; recognition changes survival.

Whent to Suspect Non-Infectious Respiratory Failure

1. Microbiologic evaluation is repeatedly negative (BAL)
2. Extrapulmonary manifestations
   - Rash, digital ulcer, purpura
   - Arthritis, myositis
3. Unexpected laboratory abnormalities
   - ↓Hb, ↑CK, ↑ferritin, eosinophilia
   - AKI, urinary RBC casts
4. HRCT pattern inconsistent with typical pneumonia
5. Rapid progression despite appropriate antibiotics

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경청해주셔서 감사합니다.