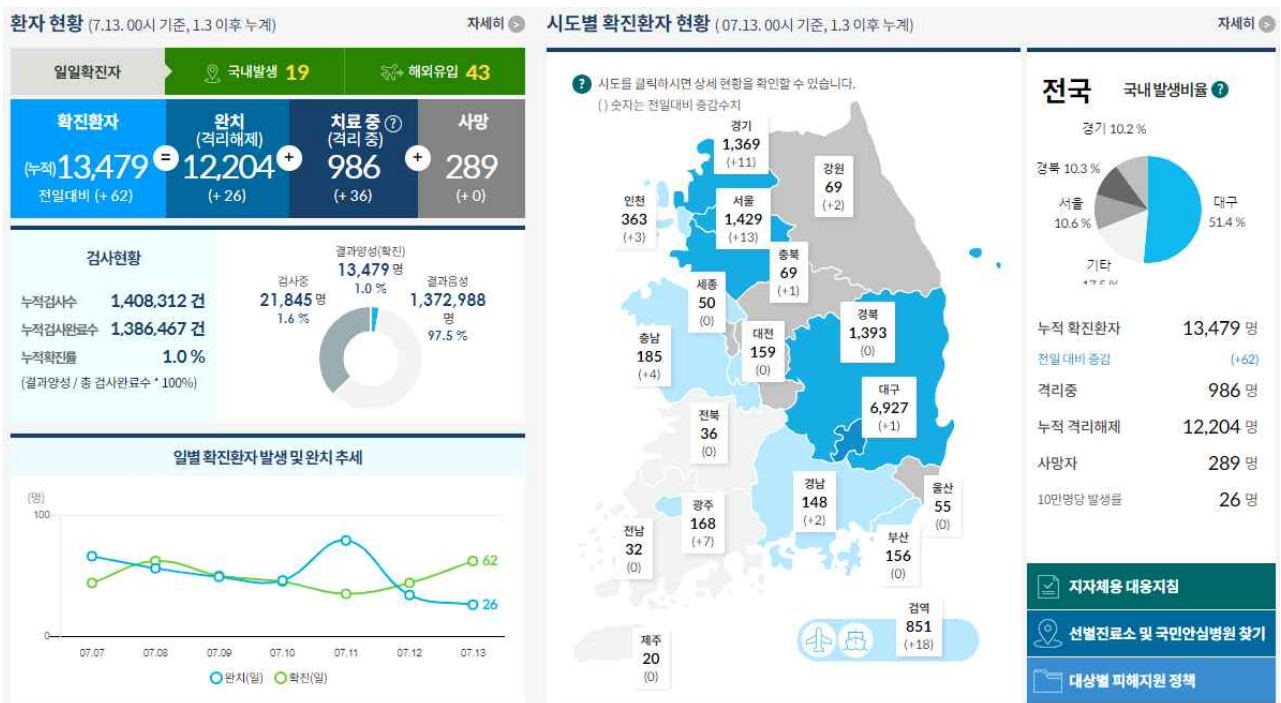


NEWSLETTER

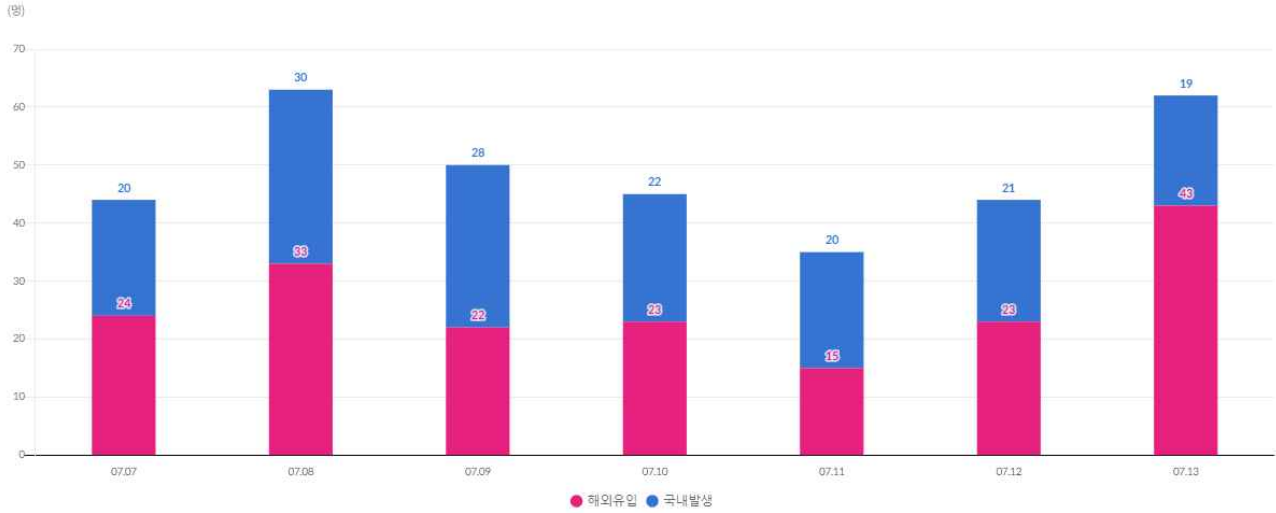
대한결핵 및 호흡기학회, 학술위원회

1. COVID-19 현황

- [2020년 7월 13일 00시 기준, 2020년 1월 3일 이후 누계]
- 출처: <http://ncov.mohw.go.kr/>



□ 감염경로구분에 따른 신규확진자 현황



□ 해외유입 환자현황 (7.12.00시 기준)

구분		신규	누계	(비율)
합계		23	1,829	
유입국가	중국	0	19	(1.0%)
	중국외아시아	10	629	(34.4%)
	유럽	1	504	(27.6%)
	미주	12	655	(35.8%)
	아프리카	0	21	(1.1%)
	호주	0	1	(0.1%)
확인단계	검역단계	12	833	(45.5%)
	지역사회	11	996	(54.5%)
국적	내국인	9	1,311	(71.7%)
	외국인	14	518	(28.3%)

□ 확진자 성별 현황 (7.13.00시 기준)

구분	확진자(%)	사망자(%)	치명률(%)
남성	5,895 (43.73)	153 (52.94)	2.6
여성	7,584 (56.27)	136 (47.06)	1.79

* 치명률 = 사망자수 / 확진자수 × 100

□ 확진자 연령별 현황 (7.13.00시 기준)

구분	확진자(%)	사망자(%)	치명률(%)
80 이상	576 (4.27)	144 (49.83)	25
70-79	898 (6.66)	84 (29.07)	9.35
60-69	1,758 (13.04)	41 (14.19)	2.33
50-59	2,396 (17.78)	15 (5.19)	0.63
40-49	1,770 (13.13)	3 (1.04)	0.17
30-39	1,627 (12.07)	2 (0.69)	0.12
20-29	3,485 (25.86)	0 (0.00)	-
10-19	750 (5.56)	0 (0.00)	-
0-9	219 (1.62)	0 (0.00)	-

* 치명률 = 사망자수 / 확진자수 × 100

2. [Review article] Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-10); A Review. (JAMA. doi:10.1001/jama.2020.12839, Published online July 10, 2020.)

1) Methods

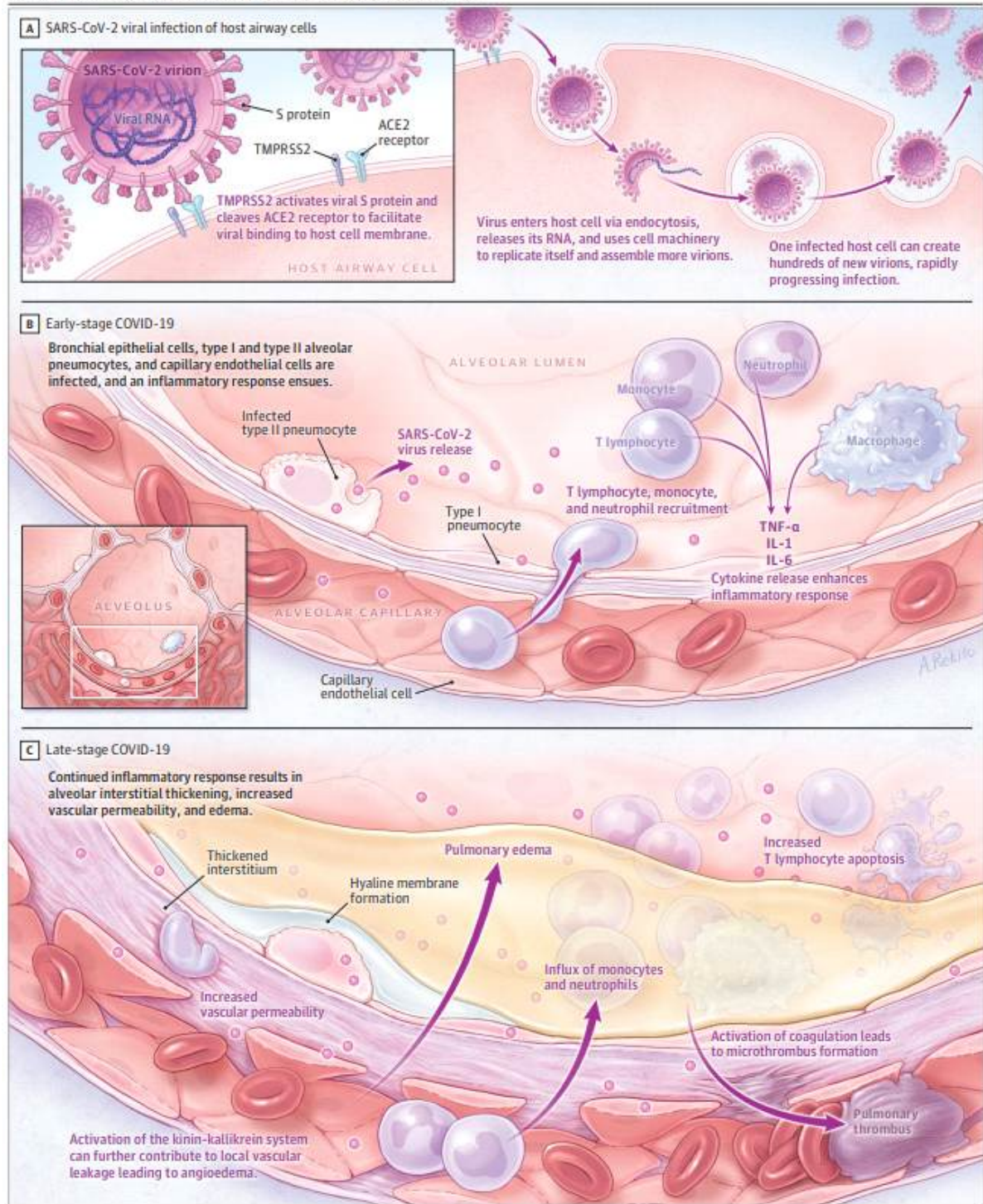
- PubMed, LitCovid, and MedRxiv using the search terms *coronavirus, severe acute respiratory syndrome coronavirus 2, 2019-nCoV, SARS-CoV-2, SARS-CoV, MERS-CoV, and COVID-19* for studies published from January 1, 2002, to June 15, 2020 and manually searched the references of select articles for additional relevant articles.
- Ongoing or completed clinical trials were identified using the disease search term *coronavirus infection* on ClinicalTrials.gov, the Chinese Clinical Trial Registry, and the International Clinical Trials Registry Platform.

2) Pathophysiology

- Figure 2. Immunopathogenesis of Coronavirus Disease 2019 (COVID-19)
 - SARS-CoV-2 targets cells through the viral structural spike (S) protein that binds to the angiotensin converting enzyme 2 (ACE2) receptor. The serine protease type 2 transmembrane serine protease (TMPRSS2) in the host cell further promotes viral uptake by cleaving ACE2 and activating the SARS-CoV-2 S protein.
 - In the early stage, viral copy numbers can be high in the lower respiratory tract. Inflammatory signaling molecules are released by infected cells and alveolar

- macrophages in addition to recruited T lymphocytes, monocytes, and neutrophils.
- In the late stage, pulmonary edema can fill the alveolar spaces with hyaline membrane formation, compatible with early-phase acute respiratory distress syndrome.

Figure 2. Immunopathogenesis of Coronavirus Disease 2019 (COVID-19)



3) Clinical Presentation

- Transmission
 - Transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) occurs primarily via respiratory droplets from face-to-face contact and, to a lesser degree, via contaminated surfaces.
 - Aerosol spread may occur, but the role of aerosol spread in humans remains unclear.
 - An estimated 48% to 62% of transmission may occur via presymptomatic carriers.
- Symptoms
 - Common symptoms in hospitalized patients include fever (70%-90%), dry cough (60%-86%), shortness of breath (53%-80%), fatigue (38%), myalgias (15%-44%), nausea/vomiting or diarrhea (15%-39%), headache, weakness (25%), and rhinorrhea (7%).
 - Anosmia or ageusia may be the sole presenting symptom in approximately 3% of individuals with COVID-19.
- Laboratory findings
 - Common laboratory abnormalities among hospitalized patients include lymphopenia (83%), elevated inflammatory markers (eg, erythrocyte sedimentation rate, C-reactive protein, ferritin, tumor necrosis factor- α , IL-1, IL-6), and abnormal coagulation parameters (eg, prolonged prothrombin time, thrombocytopenia, elevated D-dimer [46% of patients], low fibrinogen).
- Imagings
 - Common radiographic findings of individuals with COVID-19 include bilateral, lower-lobe predominate infiltrates on chest radiographic imaging and bilateral, peripheral, lower-lobe ground-glass opacities and/or consolidation on chest computed tomographic imaging.
- Complications
 - Common complications among hospitalized patients with COVID-19 include pneumonia (75%); acute respiratory distress syndrome (15%); acute liver injury, characterized by elevations in aspartate transaminase, alanine transaminase, and bilirubin (19%); cardiac injury, including troponin elevation (7%-17%), acute heart failure, dysrhythmias, and myocarditis; prothrombotic coagulopathy resulting in venous and arterial thromboembolic events (10%-25%); acute kidney injury (9%); neurologic manifestations, including impaired consciousness (8%) and acute

cerebrovascular disease (3%); and shock (6%).

- Rare complications among critically ill patients with COVID-19 include cytokine storm and macrophage activation syndrome (ie, secondary hemophagocytic lymphohistiocytosis).

4) Treatment

- Supportive care and respiratory support

- Approximately 5% of patients with COVID-19, and 20% of those hospitalized, experience severe symptoms necessitating intensive care.
- More than 75% of patients hospitalized with COVID-19 require supplemental oxygen.
- Currently, best practices for supportive management of acute hypoxic respiratory failure and ARDS should be followed.
 - : For patients who are unresponsive to conventional oxygen therapy, heated high-flow nasal cannula oxygen may be administered.
 - : For patients requiring invasive mechanical ventilation, lung-protective ventilation with low tidal volumes (4-8 mL/kg, predicted body weight) and plateau pressure less than 30 mm Hg is recommended.
 - : Additionally, prone positioning, a higher positive end-expiratory pressure strategy, and short-term neuromuscular blockade with cisatracurium or other muscle relaxants may facilitate oxygenation.
 - : Currently, insufficient evidence exists to make recommendations regarding earlier vs later intubation.
- In observational studies, approximately 8% of hospitalized patients with COVID-19 experience a bacterial or fungal co-infection, but up to 72% are treated with broad-spectrum antibiotics.

- Targeting the virus and the host response

- The following classes of drugs are being evaluated or developed for the management of COVID-19: antivirals (eg, remdesivir, favipiravir), antibodies (eg, convalescent plasma, hyperimmune immunoglobulins), anti-inflammatory agents (dexamethasone, statins), targeted immunomodulatory therapies (eg, tocilizumab, sarilumab, anakinra, ruxolitinib), anticoagulants (eg, heparin), and antifibrotics (eg, tyrosine kinase inhibitors).
- Viral inhibition would be expected to be most effective early in infection, while, in hospitalized patients, immunomodulatory agents may be useful to prevent

disease progression and anticoagulants maybe useful to prevent thromboembolic complications.

- Emerging data indicate that dexamethasone therapy reduces 28-day mortality in patients requiring supplemental oxygen compared with usual care (21.6%vs 24.6%; age-adjusted rate ratio, 0.83 [95%CI, 0.74-0.92]) and that remdesivir improves time to recovery (hospital discharge or no supplemental oxygen requirement) from 15 to 11 days.
- In a randomized trial of 103 patients with COVID-19, convalescent plasma did not shorten time to recovery.
- Ongoing trials are testing antiviral therapies, immune modulators, and anticoagulants.

5) Prognosis

- Overall hospital mortality from COVID-19 is approximately 15% to 20%, but up to 40% among patients requiring ICU admission.
- Hospital mortality ranges from less than 5% among patients younger than 40 years to 35% for patients aged 70 to 79 years and greater than 60% for patients aged 80 to 89 years.

6) Prevention and Vaccine Development

- A human vaccine is currently not available for SARS-CoV-2, but approximately 120 candidates are under development.
- Approaches include the use of nucleic acids (DNA or RNA), inactivated or live attenuated virus, viral vectors, and recombinant proteins or virus particles.
- Until an effective vaccine is available, the primary methods to reduce spread are face masks, social distancing, and contact tracing.
- Monoclonal antibodies and hyperimmune globulin may provide additional preventive strategies.

7) Commonly Asked Questions About Coronavirus Disease 2019 (COVID-19)

- How is severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) most commonly transmitted?
 - SARS-CoV-2 is most commonly spread via respiratory droplets (eg, from coughing, sneezing, shouting) during face-to-face exposure or by surface

contamination.

- What are the most common symptoms of COVID-19?
 - The 3 most common symptoms are fever, cough, and shortness of breath.
 - Additional symptoms include weakness, fatigue, nausea, vomiting, diarrhea, changes to taste and smell.
- How is the diagnosis made?
 - Diagnosis of COVID-19 is typically made by polymerase chain reaction testing of a nasopharyngeal swab.
 - However, given the possibility of false-negative test results, clinical, laboratory, and imaging findings may also be used to make a presumptive diagnosis for individuals for whom there is a high index of clinical suspicion of infection.
- What are current evidence-based treatments for individuals with COVID-19?
 - Supportive care, including supplemental oxygen, is the main treatment for most patients.
 - Recent trials indicate that dexamethasone decreases mortality (subgroup analysis suggests benefit is limited to patients who require supplemental oxygen and who have symptoms for >7 d) and remdesivir improves time to recovery (subgroup analysis suggests benefit is limited to patients not receiving mechanical ventilation).
- What percentage of people are asymptomatic carriers, and how important are they in transmitting the disease?
 - True asymptomatic infection is believed to be uncommon.
 - The average time from exposure to symptoms onset is 5 days, and up to 62% of transmission may occur prior to the onset of symptoms.
- Are masks effective at preventing spread?
 - Yes.
 - Face masks reduce the spread of viral respiratory infection.
 - N95 respirators and surgical masks both provide substantial protection (compared with no mask), and surgical masks provide greater protection than cloth masks.
 - However, physical distancing is also associated with substantial reduction of viral transmission, with greater distances providing greater protection.
 - Additional measures such as hand and environmental disinfection are also important

8) Limitations

- First, information regarding SARS CoV-2 is limited.
- Second, information provided here is based on current evidence, but may be modified as more information becomes available.
- Third, few randomized trials have been published to guide management of COVID-19.

정리작성: 고려대학교 구로병원 호흡기내과 민경훈