

중증 COVID-19 환자 진료 경험



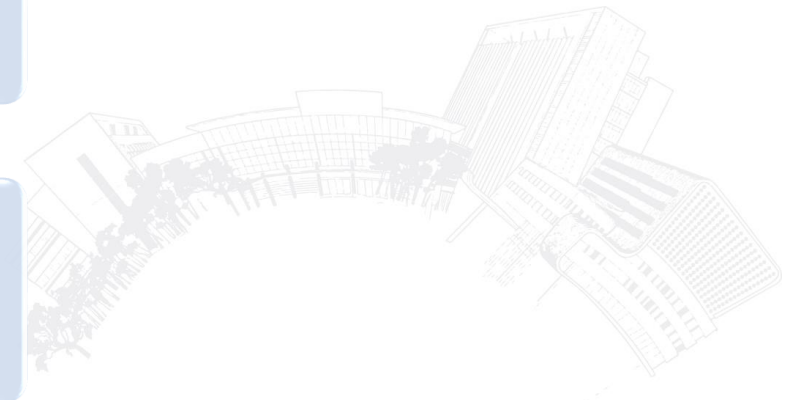
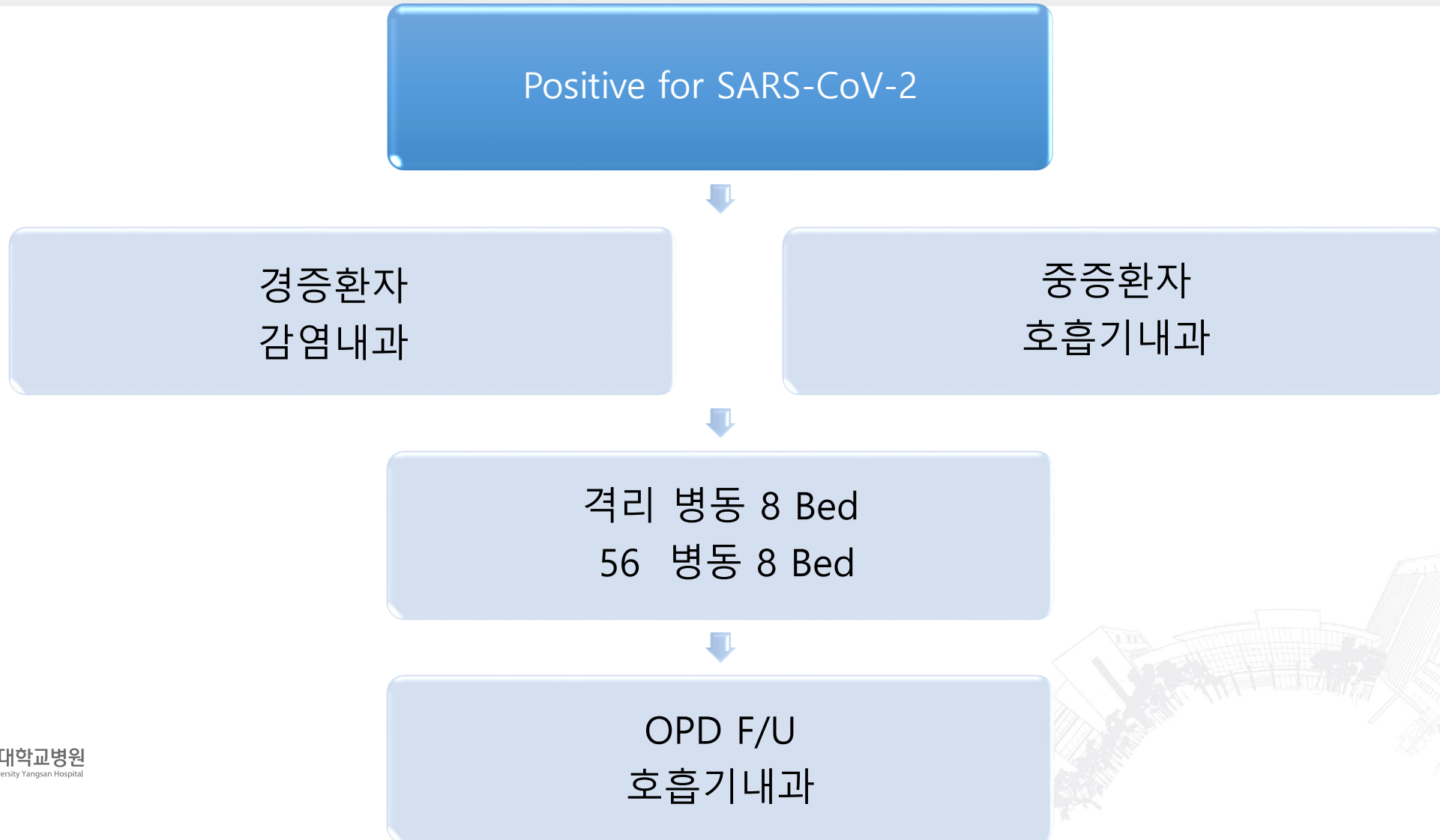
Pusan National University
Yangsan Hospital



 양산부산대학교병원
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Kim Taehwa
Division of Pulmonology
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Department of Internal Medicine
Pusan National University Yangsan Hospital

SARS-CoV-2 Flow Processing

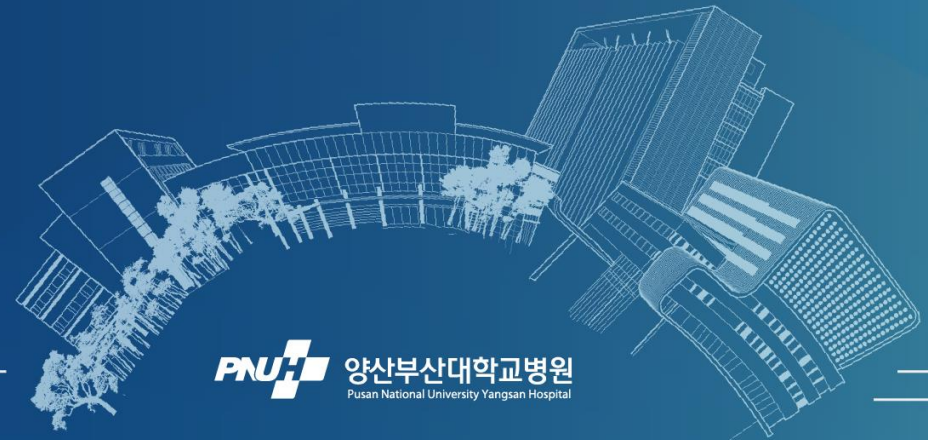


Case 1

ECMO & Ventilation case



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PNU 양산부산대학교병원
Pusan National University Yangsan Hospital

Patient Information



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Yangsan Hospital

- 63 F h/o DM, HTN on medication
- 165cm 75kg BMI 27.55



Present Illness

- C.C.> Dyspnea
- P.I.>
 - 2/29 2019-nCoV 확진자로 마산의료원 재원 중 산소 포화도 저하로 전원
 - 3/4 내원 당시 Reserve bag(15L/min) oxygen mask 적용 중 pSat 70-80%



Family, social History and ROS

- Family History –
- Social History : **Never smoker**

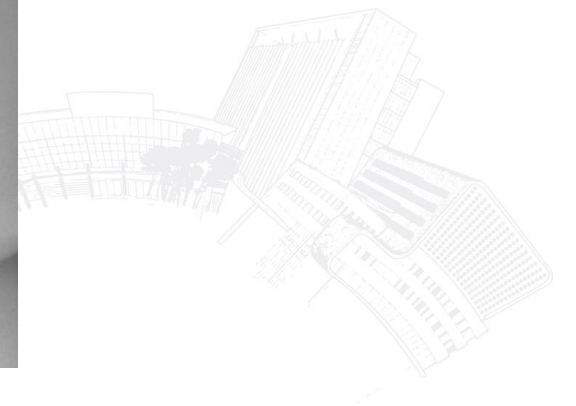
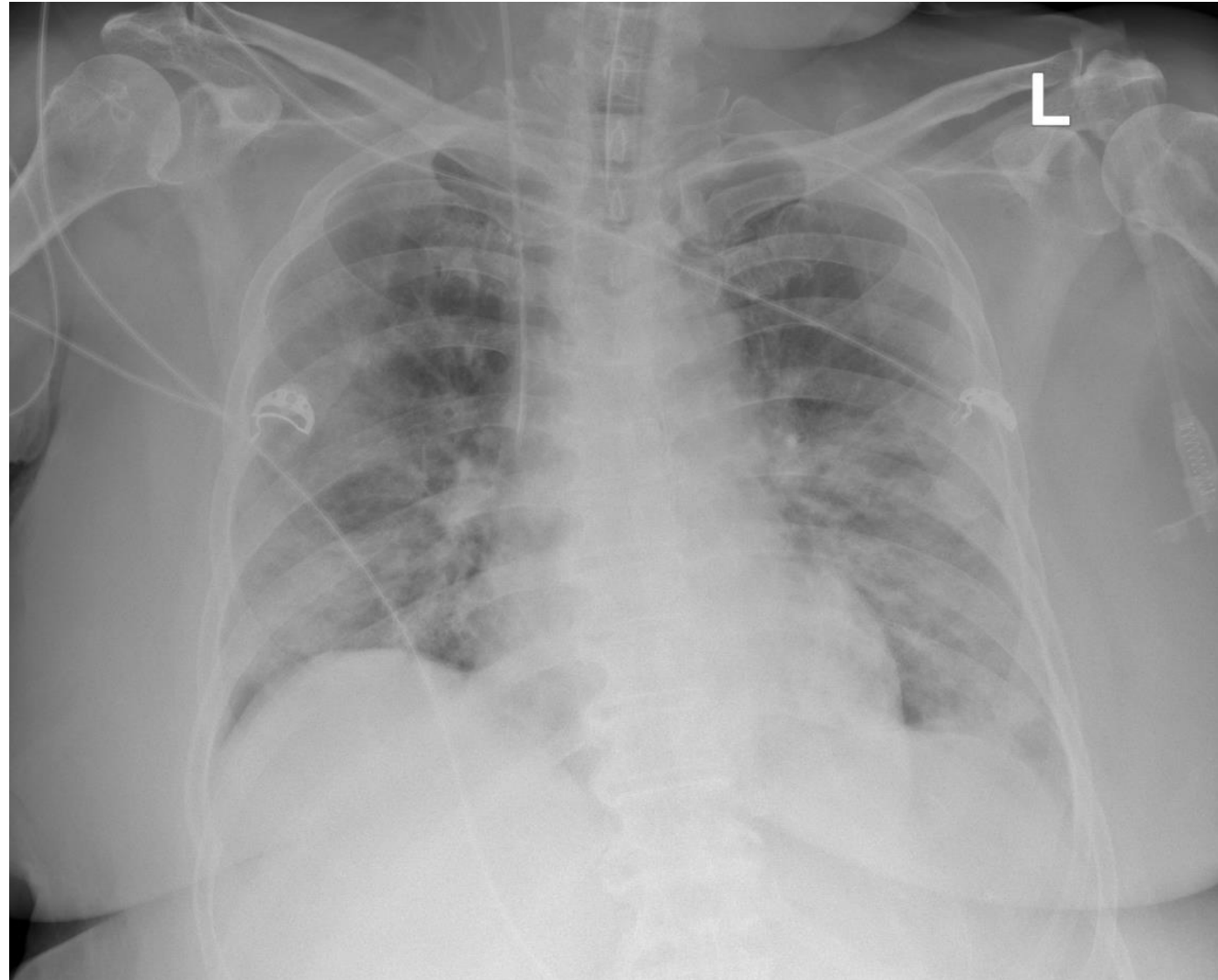
- ROS
- General conditions : General weakness
- Head and neck : Normal
- Cardiovascular : Normal
- Respiratory : **Dyspnea**
- Gastrointestinal : Normal
- Urinary : Normal
- Musculoskeletal : Normal
- Neurologic : Normal



Initial Lab

ABGA		AST	53 IU/L
pH	7.428	ALT	40 IU/L
pCO2	35.4 mmHg	ALP	70 IU/L
pO2	79.4 mmHg	LDH	552 U/L
O2 Saturation	96.3 %	T. Bilirubin	0.7 mg/dL
Base Excess (Blood)	0.2	T. Protein	6.2 gm/dL
Base Excess (ECF)	-0.9	Albumin	3.1 g/dL
TCO2	24.7 mM	BUN	24.3 mg/dL
HCO3	23.6 mM	Creatinine	0.91 mg/dL
		eGFRcrea (CKD-EPI)	67 mL/min/1.73m ²
		hsCRP (Blood)	16.18 mg/dL
Lactic acid	2.2	BNP	171
WBC	2.22 10E3/uL	Procalcitonin (Blood)	0.190 ng/mL
Hb	13.0 g/dL		
Platelet	225 10E3/uL		
Neutrophil #	10.35 10E3/uL		

Initial CXR



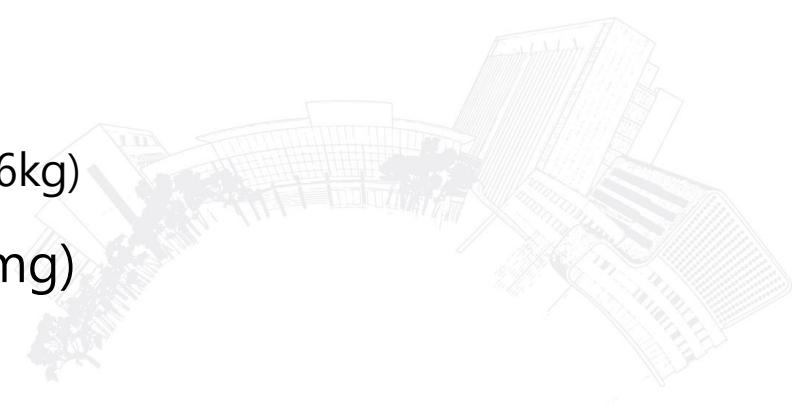
Initial Assessment

- CAP d/t viral and COVID-19
- ARDS



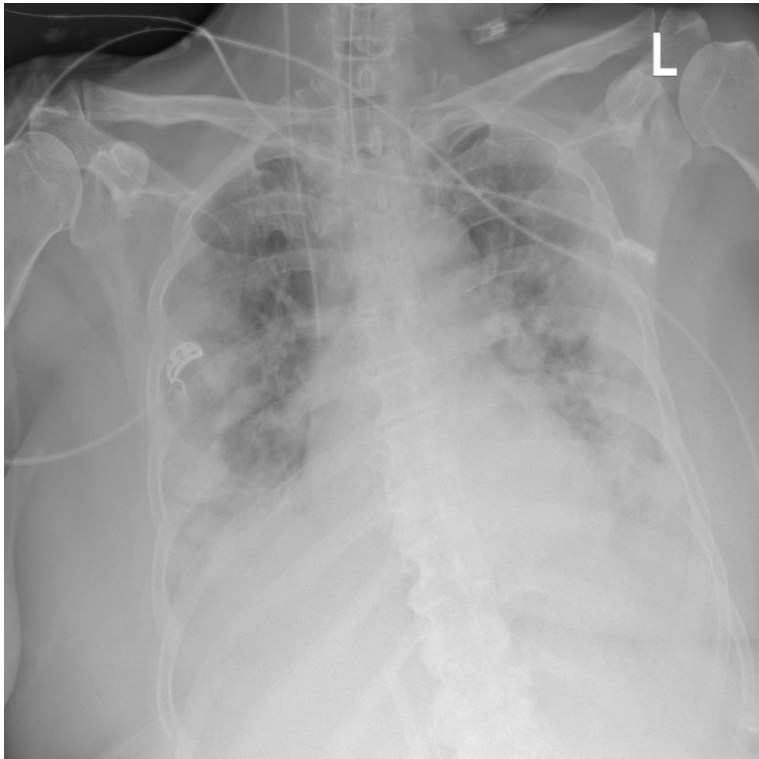
Plan and Treatment

- 3/4
 - Intubation
 - Ventilation care /c full sedation
(remifentanil + propofol + cisatracurium)
 - Empiric antibiotics (Piperacillin (4 g)/tazobactam (0.5g), Levofloxacin 750mg)
- 3/5
 - ECMO d/t P/F ratio < 100
 - low BP – Norepinephrine 0.4r
 - Protective ventilation
(PC 10-12, RR 12 PEEP 10, FiO2 60, MV 4, TV 280-300 PBW 56.96kg)
 - Kaletra (lopinavir (200 mg)/ritonavir (50 mg)) + Losartan(100mg)

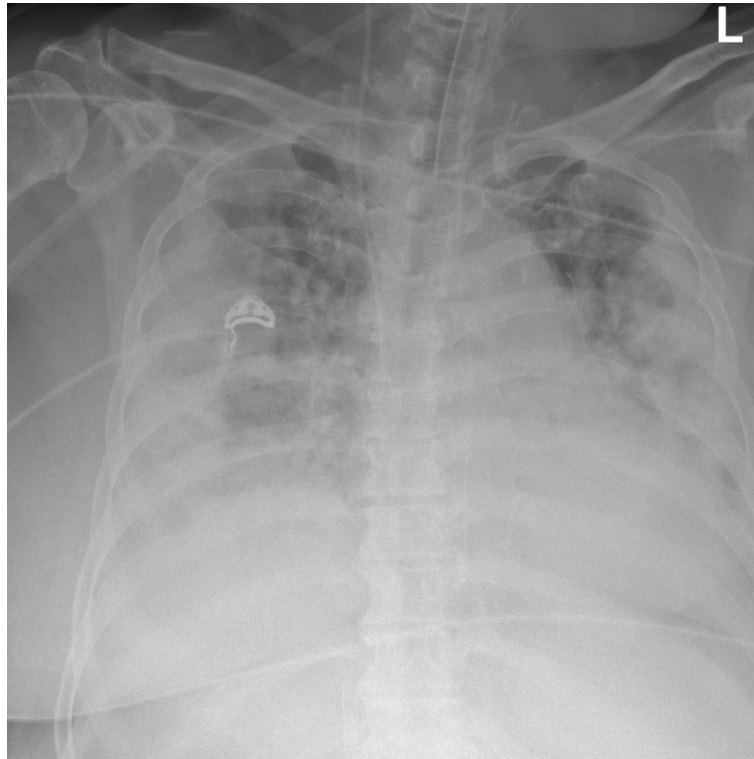


CXR series

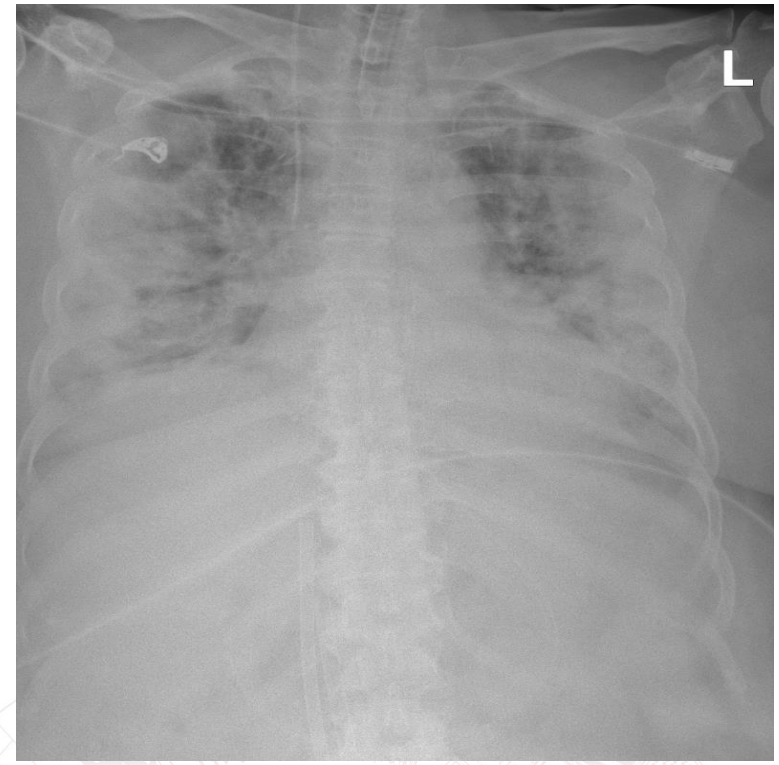
3/6



3/9



3/14



CXR series

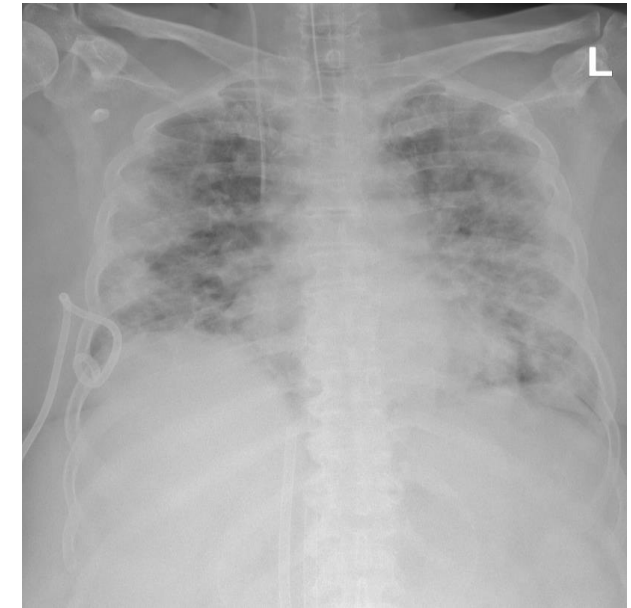
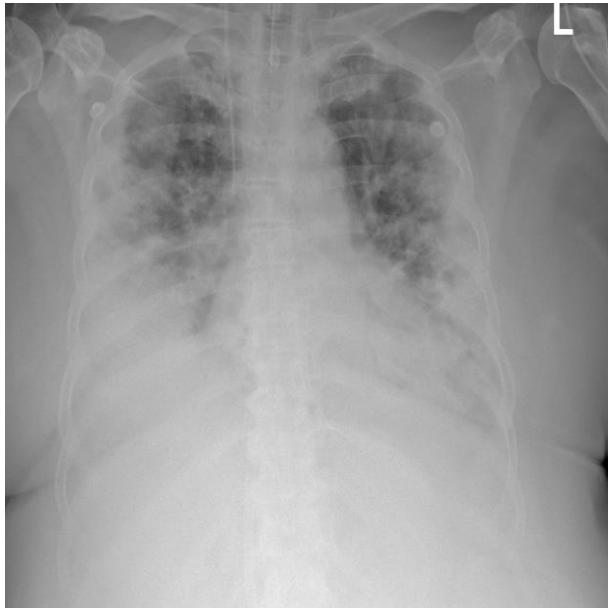
3/11

3/17

3/18

3/20

ECMO
MO change



Rt. PCD insertion
d/t pleural effusion
PICC insertion

3/20 Hydroxychloroquine
3/23 Tracheostomy

Plan and Treatment

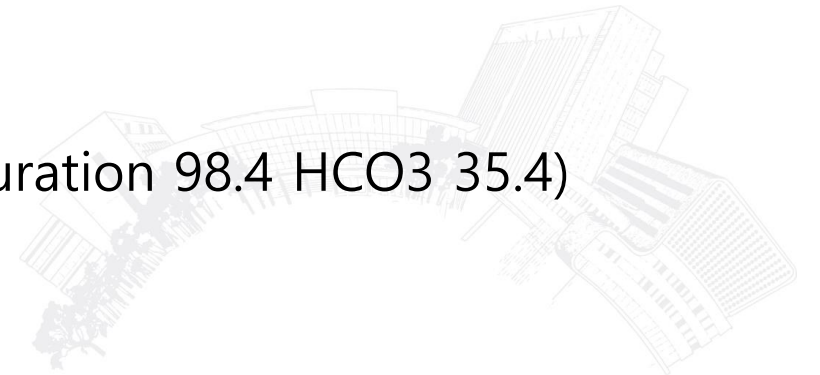
- 3/24 ECMO removed
- 3/25 Tracheostomy bleeding
- 3/31 mental check -> vent mode : PS



Plan and Treatment

- 4/1 occipital sore
- 4/2 fever – mero + vanco
- 4/6 vent. Weaning/optiflow mero 단독, mental alert
- 4/8 mood change
- 4/14 tazo + levo
- 4/16 weaning nasal O2 6L apply

(pH 7.479 pCO2 47.7 pO2 106.1 Hemoglobin 10.9 O2 Saturation 98.4 HCO3 35.4)



Result of RT-PCR tests for 2019-nCoV according to treatment progress



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Specimen	Illness Day 10 3/9	Illness Day 19 3/19	Illness Day 31 3/30	Illness Day 34 4/2	Illness Day 38 4/6	Illness Day 40 4/8	Illness Day 43 4/11
Nasopharyngeal swab	Positive E gene Ct: 24.37 RdRp gene CT: 24.67	Positive E gene Ct: 29.01 RdRp gene Ct: 29.24	Negative	Indeterminate E gene Ct: 39.82 RdRp gene Ct: 38.90	Positive E gene Ct: 33.05 RdRp gene Ct: 33.18	Indeterminate E gene Ct: 38.38 RdRp gene Ct: 39.66	Negative
Oropharyngeal swab	Negative	Positive E gene Ct: 34.77 RdRp gene Ct: 34.96	Indeterminate E gene Ct: 37.70 RdRp gene Ct: 39.84	Negative	Negative	Negative	Negative

Ct: cycle threshold, RdRp: RNA-dependent RNA polymerase

Plan and Treatment

Post ICU care

- 4/17 nasal 4L, Try sitting position
- 4/20 tazo 단독, swallowing test
- 4/21 Try self voiding, 화장실 가는 것 연습- 실패
- 4/24 화장실 걸어서 감
- 4/29 nasal 3L, 호흡 재활, 근력 재활 지속



CXR series

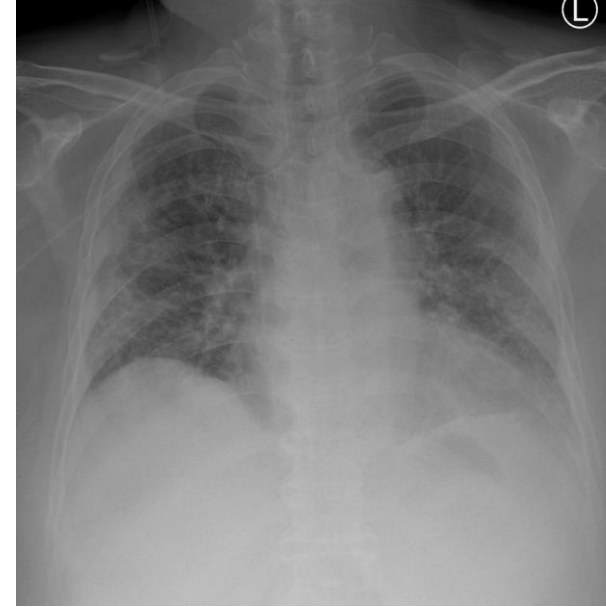
4/5



4/19



4/23



5/4

Discharge



Final Outcome

- 5/15 안심외래
- 산소 유지 O2 2L, tra site 경과 관찰
- 딸 집에서 지냄
- 집안을 걸어다니는 정도

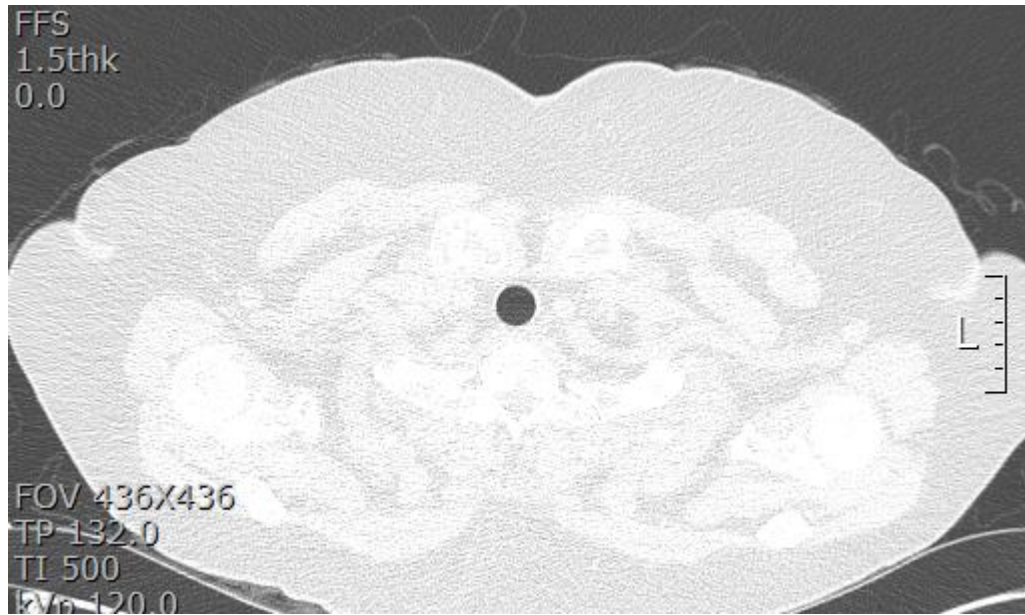


Final Outcome

- 7/9 본인 집으로 이동
- 몇 천보 걸을 수 있다
- 혼자 밥 먹을 수 있는 정도
- Tra site complete close



CT chest (7/30)



2019 SARS-CoV-2 Lesson

- 폐렴의 경과
 - 초기에 급격히 나빠진 후 서서히 좋아지는 양상
- CT chest, 청진기 사용 불가
 - CXR로 판단
- 다른 감염이 안 생긴다
 - CRAB, VAP

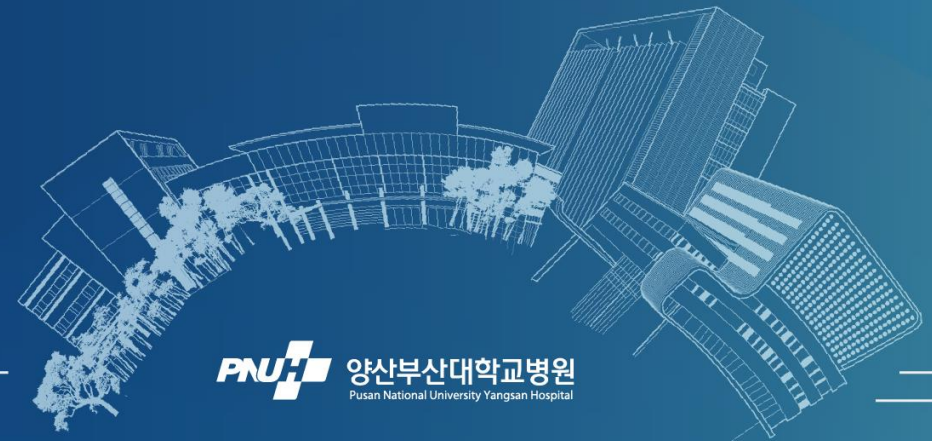


Case 2

O2 apply case



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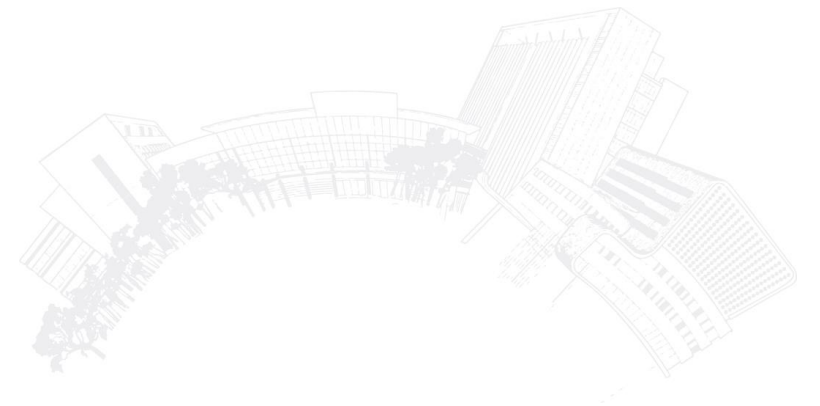
PNUH 양산부산대학교병원
Pusan National University Yangsan Hospital

Patient Information



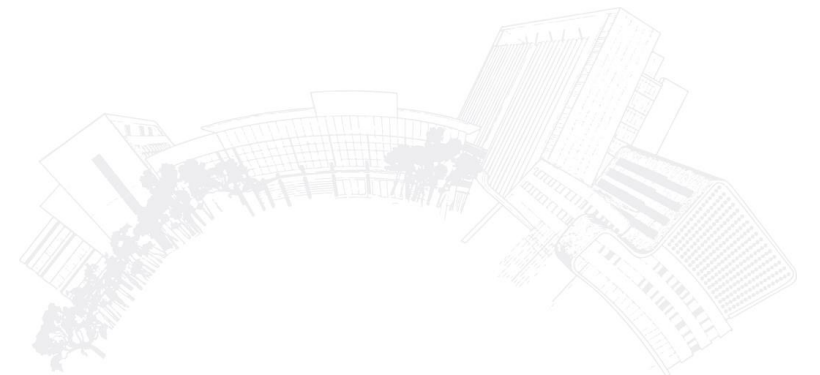
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- 71 M h/o HTN on medication
- 173cm 83kg BMI 27.73



Present Illness

- C.C.> fever
- P.I.>
 - 2/27 fever, cough, purulent sputum, chills, sore throat
 - 3/1 2019-nCoV 확진 이후 김천 의료원에 입원
 - 3/9 CXR 악화 소견 및 uncontrolled fever, chills, myalgia 본원 전원



Family, social History and ROS

- Family History –
- Social History : 30 pack * years ex-smoker, 2000 quit
- Fever, chills and myalgia

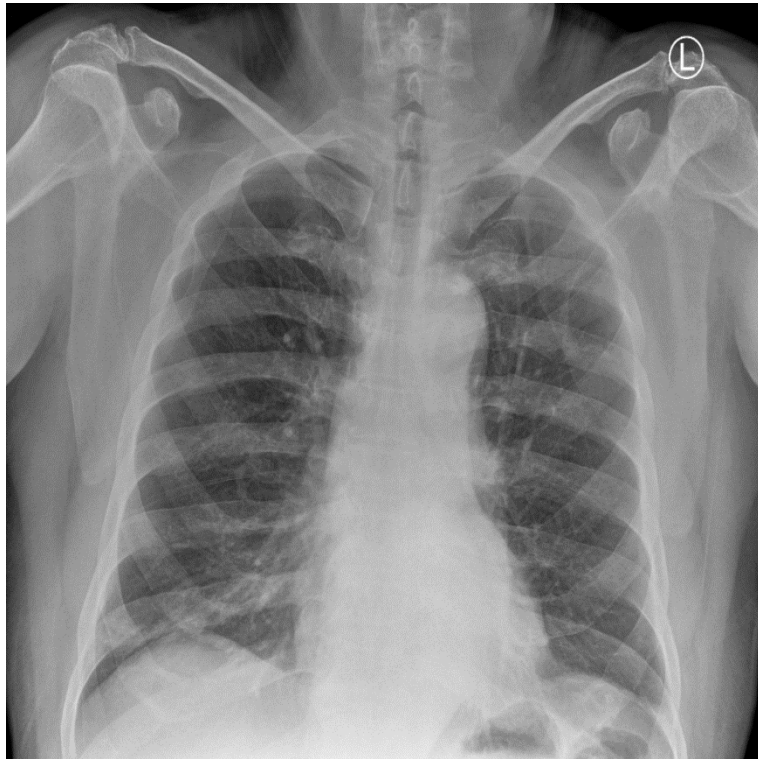


Initial Lab

ABGA		AST	28 IU/L
pH	7.401	ALT	20 IU/L
pCO2	42.2 mmHg	ALP	50 IU/L
pO2	63.0 mmHg	LDH	275 U/L
O2 Saturation	91.7 %	T. Bilirubin	1.0 mg/dL
Base Excess (Blood)	1.1	T. Protein	7.0 gm/dL
Base Excess (ECF)	1.4	Albumin	3.4 g/dL
TCO2	27.5 mM	BUN	9.7 mg/dL
HCO3	26.2 mM	Creatinine	0.77 mg/dL
		eGFRcrea (CKD-EPI)	91 mL/min/1.73m²
		hsCRP (Blood)	7.75 mg/dL
Lactic acid	1.8	BNP	12
WBC	5.26 10E3/uL	Procalcitonin (Blood)	<0.06 ng/mL
Hb	11.6 g/dL		
Platelet	159 10E3/uL		
Neutrophil #	2.67 10E3/uL		

Initial CXR

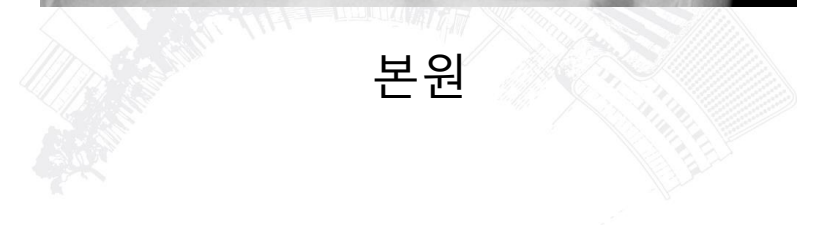
3/1



3/6



3/9



Initial Assessment



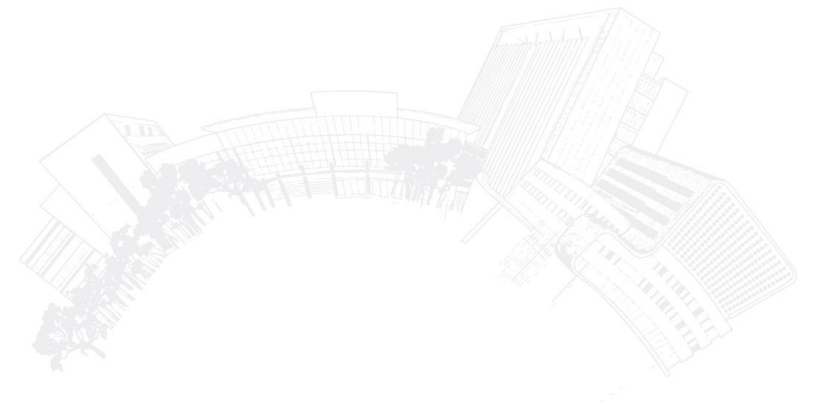
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- CAP d/t viral and COVID-19

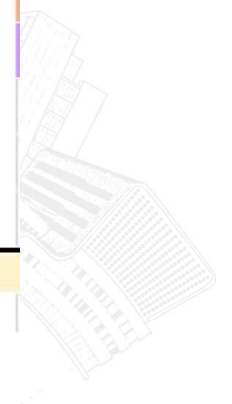
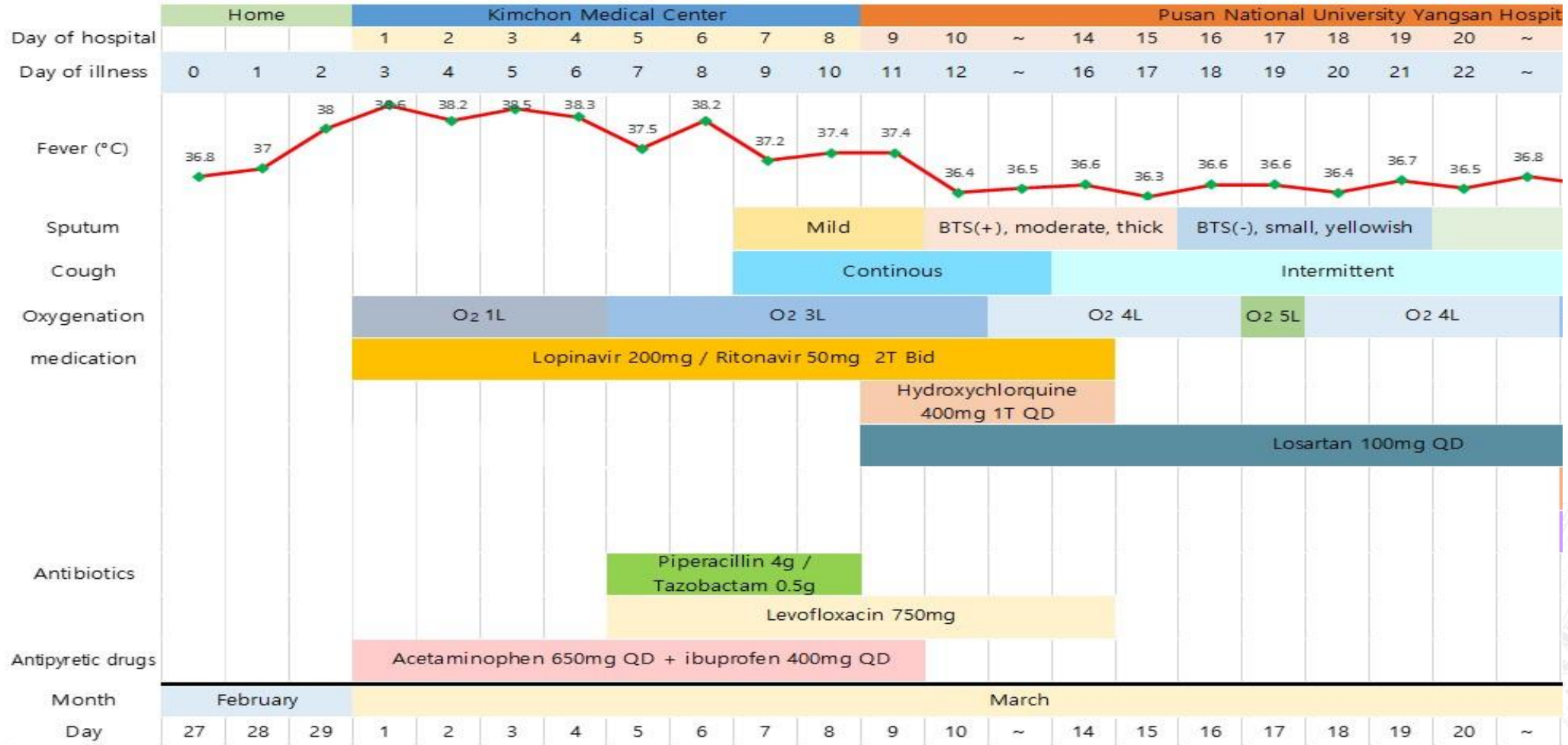


Plan and Treatment

- Piperacillin (4g)/tazobactam, Levofloxacin
- O2 apply - nasal cannula 2L
- supportive care - intravenous fluids, antipyretic drugs
- lopinavir (200mg)/ritonavir (50mg) (Kaletra)
- Losartan (100mg), hydroxychloroquine (400mg) every 24 hours



Clinical symptoms, fever and treatment according Day of illness and hospital



Result of RT-PCR tests for 2019-nCoV according to treatment progress

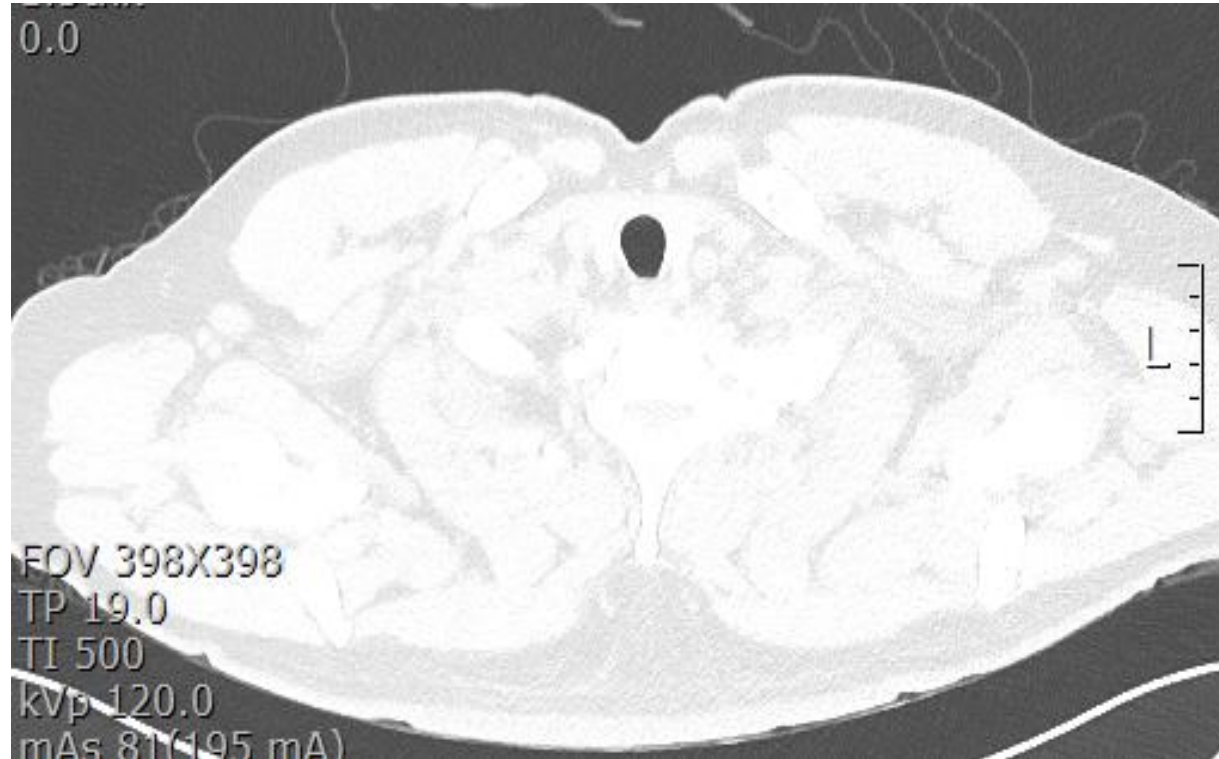


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Specimen	Illness Day 11 3/9	Illness Day 15 3/13	Illness Day 18 3/16	Illness Day 19 3/17	Illness Day 28 3/26	Illness Day 35 4/3
Nasopharyngeal swab	Positive E gene Ct: 33.9 RdRp gene Ct: 34.6	Indeterminate E gene Ct: Not detected RdRp gene Ct: 35.30 N gene Ct: 36.72	Negative	Negative	Negative	Negative
Oropharyngeal swab	Positive E gene Ct: 34.8 RdRp gene Ct: 34.4	Indeterminate E gene Ct: Not detected RdRp gene Ct: Not detected N gene Ct: 38.85	Negative	Negative	Negative	Negative

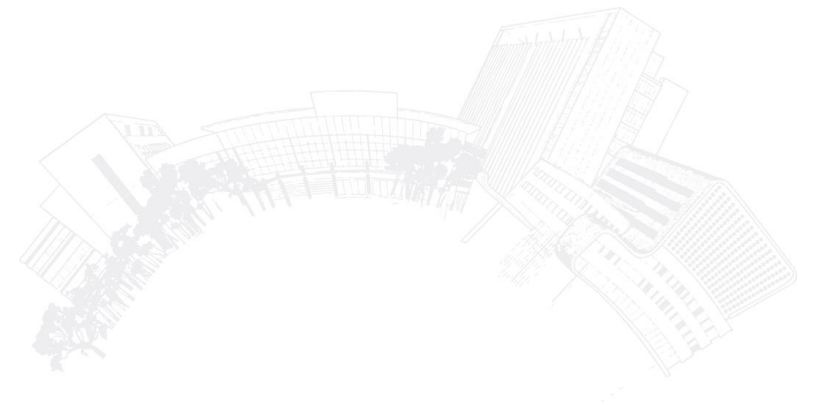
Ct: cycle threshold, RdRp: RNA-dependent RNA polymerase

CT chest



Re-assessment

- BOOP d/t virus

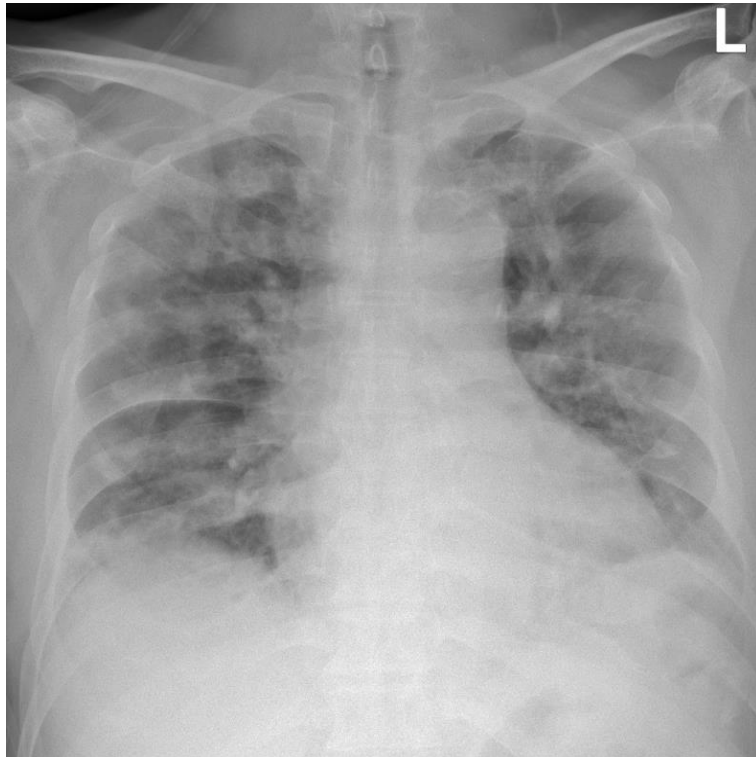


Plan and Treatment

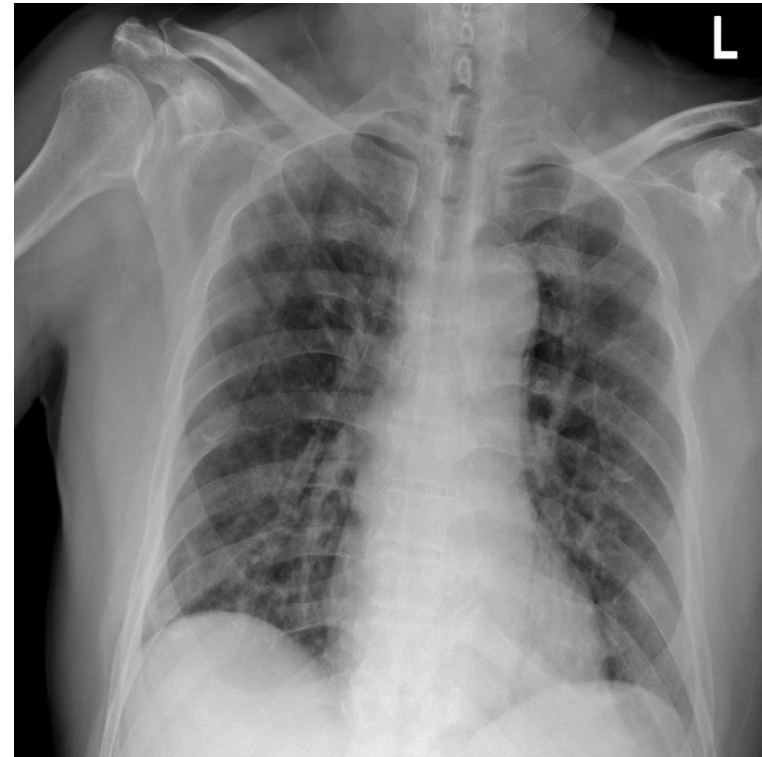
- Steroid - prednisolone (30 mg)
- Dyspnea improved dramatically after 2 days
- 4/11 Discharge



Series CXR



Pre steroid

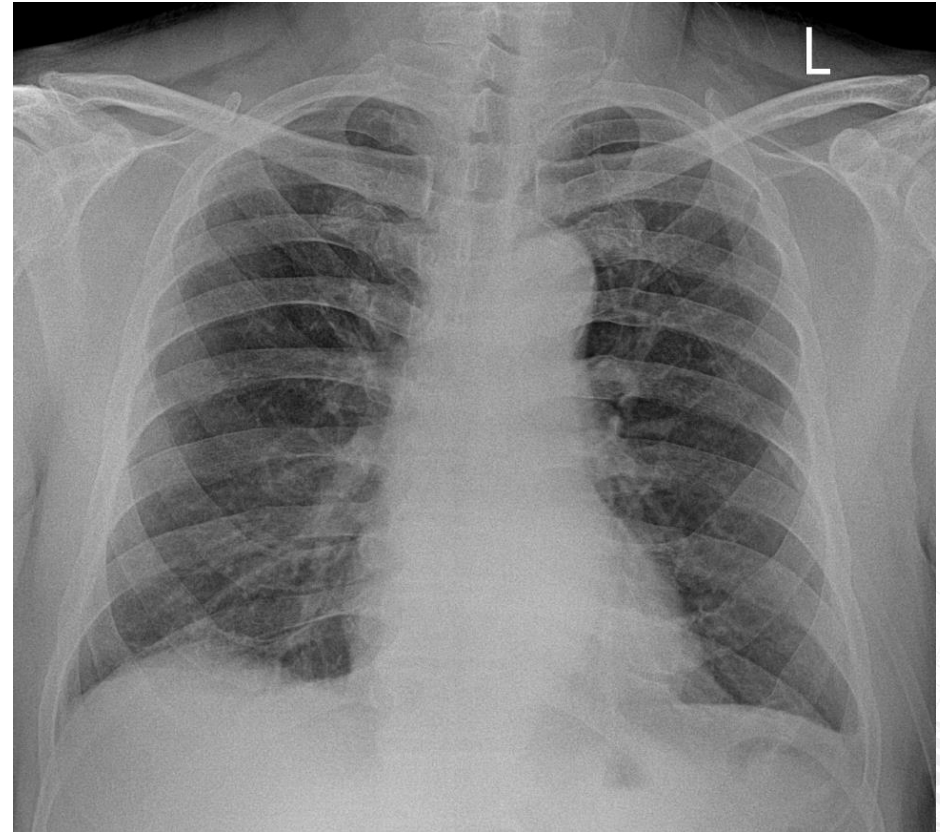


post steroid

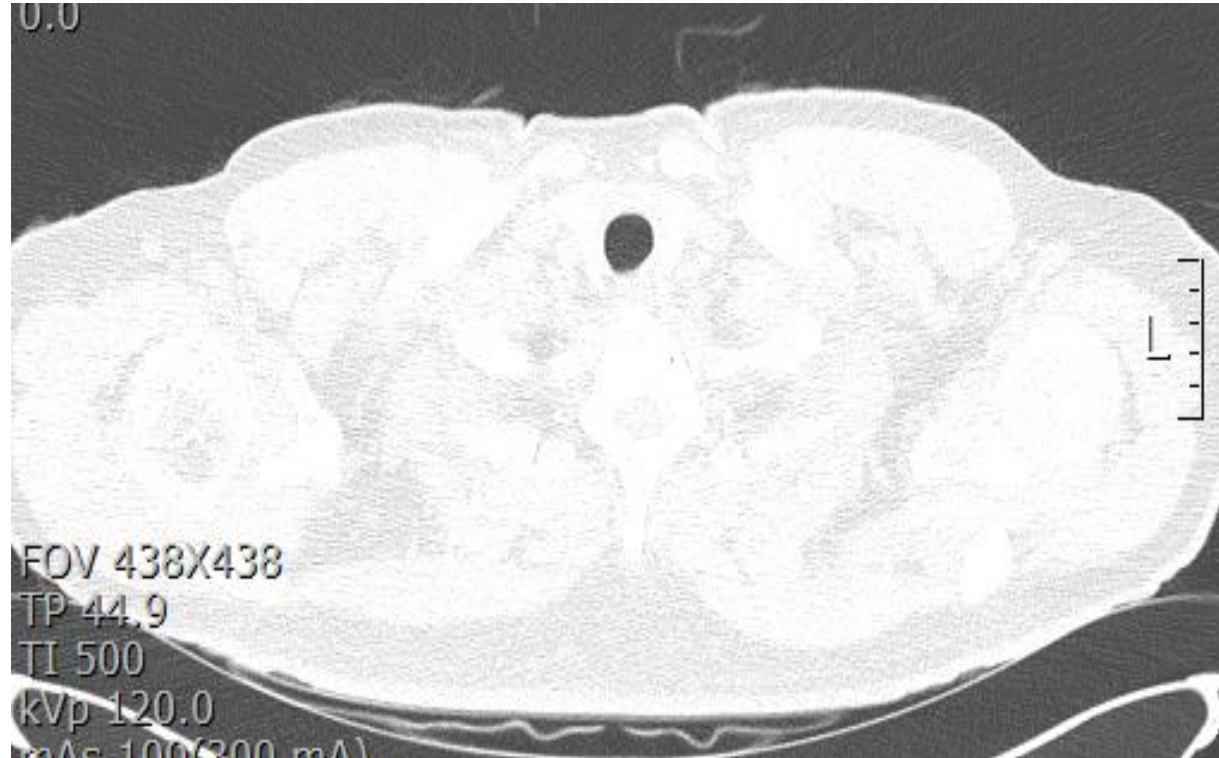


Final Outcome

- 4/14 안심 외래 방문
- 산소 2L 로 퇴원
- 조금 좋아진 것 같다
산소는 계속 하고 있다
- 외래에서 산소 안 하고 15분 뒤에
측정한 산소 포화도 97%



CT chest (7/4)



2019 SARS-CoV-2 Lesson

- 다른 병으로 이행을 항상 의심해야 한다.
 - If symptoms persist even after the infection has been controlled following treatment for viral infection.
 - It is reasonable to suspect a different diagnosis or a transition to another disease.
- Daily assessment 중요성



Original Research Article | [Open Access](#) | **Published: 23 June 2020**

Lopinavir-Ritonavir in the Treatment of COVID-19: A Dynamic Systematic Benefit-Risk Assessment

Vicki Osborne , [Miranda Davies](#), [Samantha Lane](#), [Alison Evans](#), [Jacqueline Denyer](#), [Sandeep Dhanda](#), [Debabrata Roy](#) & [Saad Shakir](#)

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIALS



Hydroxychloroquine for the Prevention of Covid-19 — Searching for Evidence

Myron S. Cohen, M.D.

This editorial was **published on June 3, 2020**, at NEJM.org.



Health Topics ▾

Countries ▾

Newsroom ▾

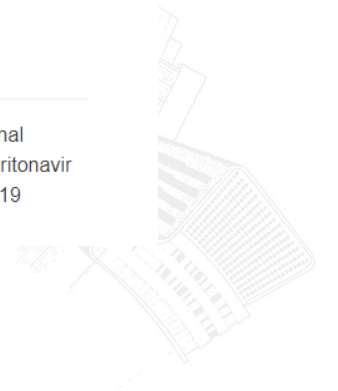
Emergencies ▾

[Home](#) / [WHO discontinues hydroxychloroquine and lopinavir/ritonavir treatment arms for COVID-19](#)

WHO discontinues hydroxychloroquine and lopinavir/ritonavir treatment arms for COVID-19

4 July 2020 | News release | Reading time: Less than a minute (221 words)

WHO today accepted the recommendation from the Solidarity Trial's International Steering Committee to discontinue the trial's hydroxychloroquine and lopinavir/ritonavir arms. The Solidarity Trial was established by WHO to find an effective COVID-19 treatment for hospitalized patients.



Letter | [Open Access](#) | **Published: 23 June 2020**

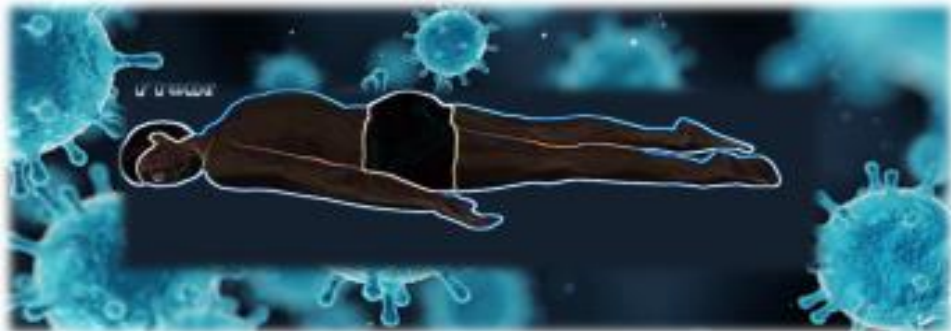
Protocol for awake prone positioning in COVID-19 patients: to do it earlier, easier, and longer

[Guy Bower](#) & [Hangyong He](#) 

Critical Care 24, Article number: 371 (2020) | [Cite this article](#)




**Editor's
PICK**



Research | [Open Access](#) | **Published: 06 October 2020**

Awake prone positioning does not reduce the risk of intubation in COVID-19 treated with high-flow nasal oxygen therapy: a multicenter, adjusted cohort study

[Carlos Ferrando](#) , [Ricard Mellado-Artigas](#), [Alfredo Gea](#), [Egoitz Arruti](#), [César Aldecoa](#), [Ramón Adalia](#), [Fernando Ramasco](#), [Pablo Monedero](#), [Emilio Maseda](#), [Gonzalo Tamayo](#), [María L. Hernández-Sanz](#), [Jordi Mercadal](#), [Ascensión Martín-Grande](#), [Robert M. Kacmarek](#), [Jesús Villar](#), [Fernando Suárez-Sipmann](#) & for the COVID-19 Spanish ICU Network

Critical Care 24, Article number: 597 (2020) | [Cite this article](#)



ORIGINAL ARTICLE

Remdesivir for the Treatment of Covid-19 — Final Report

CONCLUSIONS

Our data show that remdesivir was superior to placebo in shortening the time to recovery in adults who were hospitalized with Covid-19 and had evidence of lower respiratory tract infection. (Funded by the National Institute of Allergy and Infectious Diseases and others; ACTT-1 ClinicalTrials.gov number, [NCT04280705](#).)

[Int J Infect Dis](#). 2020 Oct; 99: 214–218.

Published online 2020 Jun 23. doi: [10.1016/j.ijid.2020.06.064](#)

PMCID: [PMC7308750](#)

PMID: [32585284](#)

Therapeutic plasma exchange in adults with severe COVID-19 infection

[Faryal Khamis](#),^{a,*} [Ibrahim Al-Zakwani](#),^b [Sabria Al Hashmi](#),^c [Samata Al Dowaiqi](#),^a [Maher Al Bahrani](#),^d
[Nenad Pandak](#),^a [Huda Al Khalili](#),^d and [Ziad Memish](#)^e

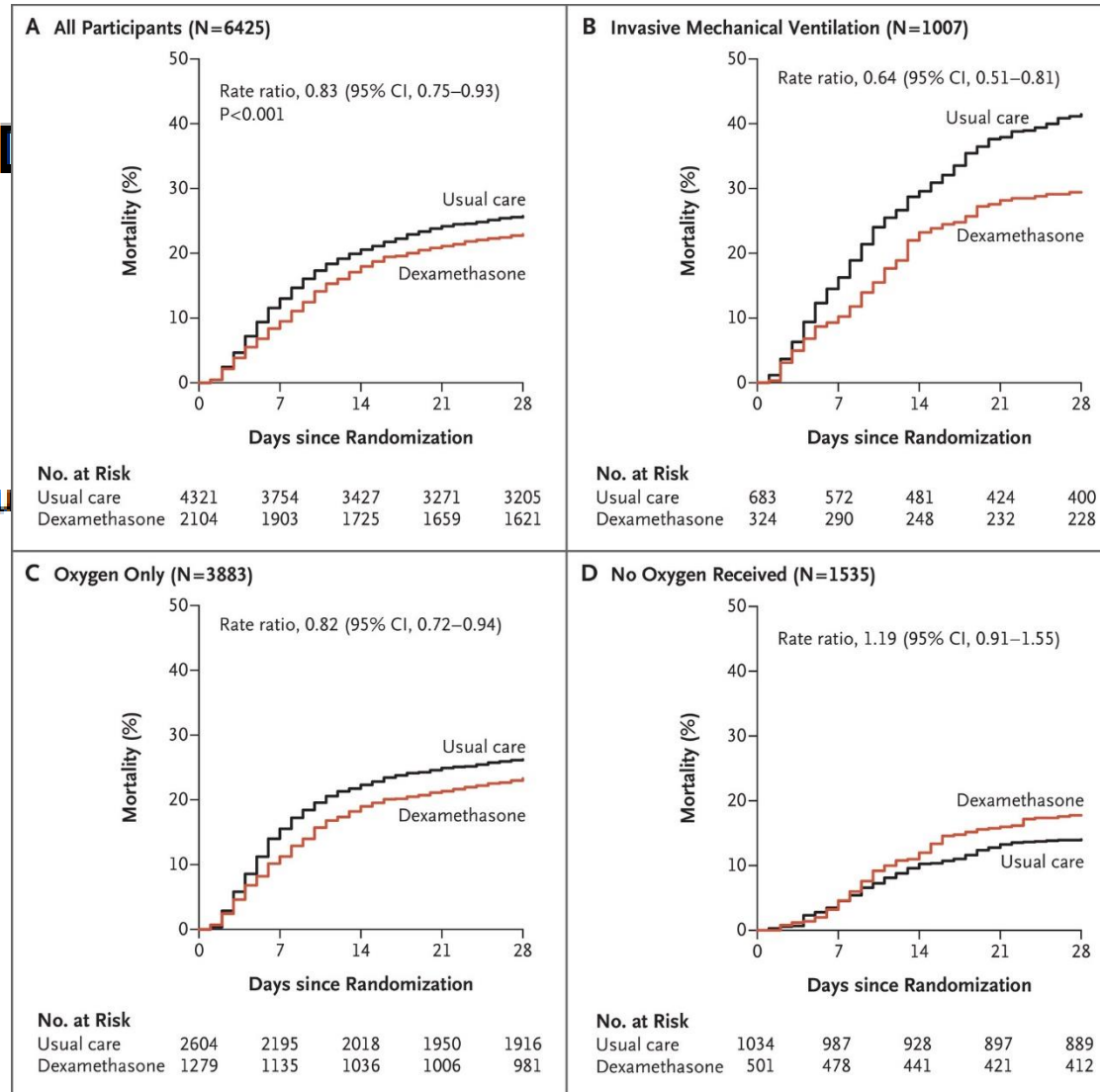


Effect of I

ients with

Ru

port



CONCLUSIONS

In patients hospitalized with Covid-19, the use of dexamethasone resulted in lower 28-day mortality among those who were receiving either invasive mechanical ventilation or oxygen alone at randomization but not among those receiving no respiratory support.

(Funded by the Medical Research Council and National Institute for Health Research and others; RECOVERY ClinicalTrials.gov number, [NCT04381936](#); ISRCTN number, [50189673](#).)



REGN-COV2



Monoclonal antibodies directed against SARS-CoV-2: synthetic neutralizing antibodies, the REGN-COV2 antibody cocktail

October 7, 2020

Robin E Ferner^{*†}, Jeffrey K Aronson
On behalf of the Oxford COVID-19 Evidence Service Team
Centre for Evidence-Based Medicine



RECOVERY TRIAL Dexamethasone in COVID

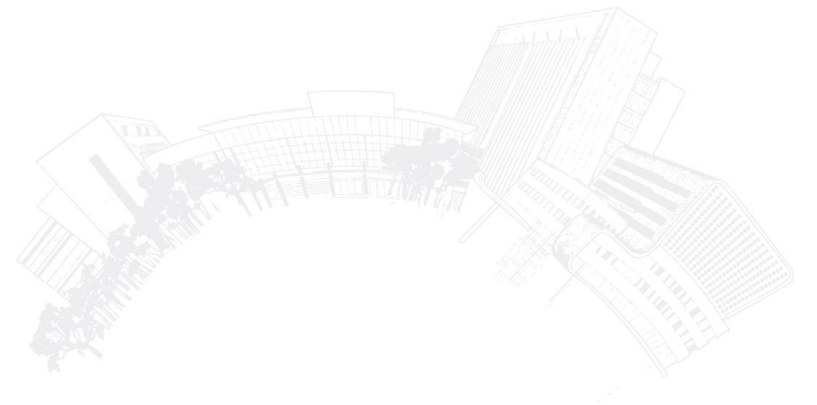


First10EM



2019 SARS-CoV-2 Lesson

- Effect vs not effect
- 그 당시 그 현장에서는 의사들은 믿음을 가지고 치료
- 혼돈의 상황
- 최선을 다 할 뿐



Vaccination

- 총 198개 후보 백신 연구개발
- 154 candidate vaccines in preclinical evaluation
- 44 candidate vaccines in clinical evaluation
- 백신 플랫폼(Platform)별
(RNA 4, DNA 4, Vector 9, inactivated 7, protein subunit 9, virus like particle 1)

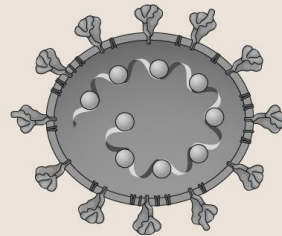
DRAFT landscape of COVID-19 candidate vaccines – 19 October 2020 WHO



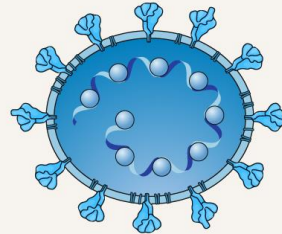
An overview of the different vaccine platforms in development against COVID-19

Classical platforms

Whole-inactivated virus
Example: Polio vaccine
COVID-19:
PiCoVacc in phase 1
clinical trials



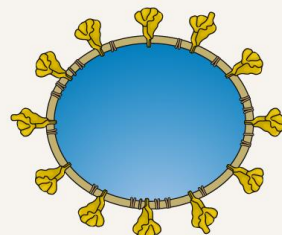
Live-attenuated virus
Example: MMR vaccine
COVID-19:
in preclinical stage



Protein subunit
Example: Seasonal
influenza vaccine
COVID-19:
NVX-CoV2373 in
phase 1/2 clinical trials

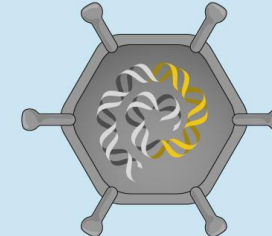


Virus-like particle
Example: Human
papillomavirus vaccine
COVID-19:
in preclinical stage



Next-generation platforms

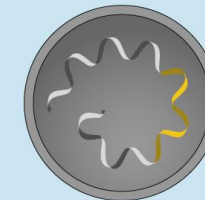
Viral vector
Example:
VSV-Ebola vaccine
COVID-19:
AZD1222, Ad5-nCoV
in phase 1/2/3 clinical trials



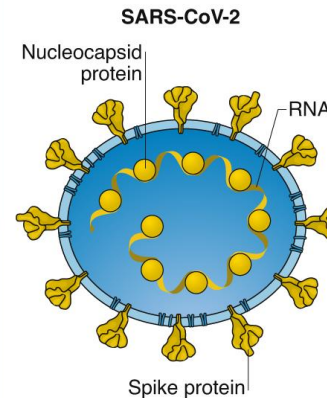
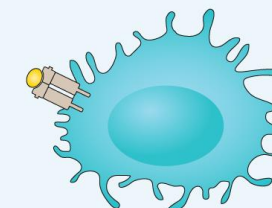
DNA
Example:
Not currently licensed
COVID-19:
INO-4800 in phase 1
clinical trials



RNA
Example:
Not currently licensed
COVID-19:
mRNA-1273, BNT162
in phase 1/2 clinical trials



Antigen-presenting cells
Example:
Not currently licensed
COVID-19:
LV-SMENP-DC,
COVID-19/aAPC
in phase 1/2 clinical trials



Vaccination 3상 진입

developer/manufacturer	Vaccine platform	Type of candidate vaccine	Number of doses	Timing of doses	Route of Administration
University of Oxford/AstraZeneca	Non-replicating viral vector	ChAdOx1-5	1		IM
Sinovac	Inactivated	Inactivated	2	0,14 days	IM
Wuhan Institute of Biological Products/Sinopharm	Inactivated	Inactivated	2	0,21 days	IM
Beijing Institute of Biological Products/Sinopharm	Inactivated	Inactivated	2	0,21 days	IM
Moderna/NIAID	RNA	LNP-encapsulated mRNA	2	0,28일	IM
BioNTech/Fosun Pharma/Pfizer	RNA	3 LNP-mRNAs	2	0,28일	IM
CanSino Biological Inc./Beijing Institute of Biotechnology	Non-replicating viral vector	Adenovirus type 5 vector	1		IM

Vaccination 3상 진입

developer/manufacturer	Vaccine platform	Type of candidate vaccine	Number of doses	Timing of doses	Route of Administration
Gamaleya Research Institute	Non-replicating viral vector	Adeno-based (rAd26-S+rAd5-S)	2	0,21 days	IM
Janssen Pharmaceutical Companies	Non-Replicating Viral Vector	Ad26COVS1	2	0,56 days	IM
Novavax	Protein Subunit	Full length recombinant SARS CoV-2 glycoprotein nanoparticle vaccine adjuvanted with Matrix M	2	0,21 days	IM

COVID-19 Outbreak and Its Association with Healthcare Workers' Emotional Stress: a Cross-Sectional Study

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COVID-19 Outbreak and Its Association with Healthcare Workers' Emotional Stress: a Cross-Sectional Study

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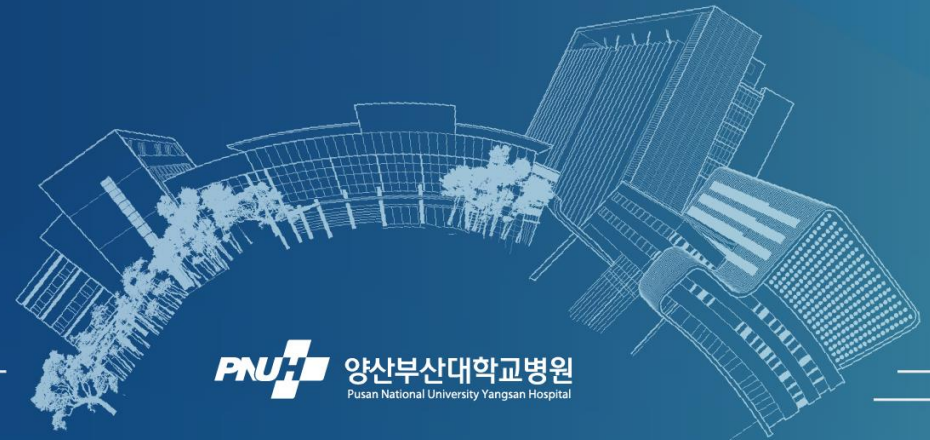
Conclusion : The COVID-19 outbreak is correlated with healthcare workers' emotional stress, and specific types of jobs and duties involving close contact with these patients can be risk factors. Interestingly, even low-exposure groups reported significant depression and anxiety as a result of social stigma and uncertainty. Adequate and timely management measures for emotional stress are required for vulnerable and at-risk groups.

경청해 주셔서 감사합니다.

Thank you for your
attention

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