

The ICU during the Covid-19 pandemic



Diederik Gommers,
Intensivist

Webinar organised by ESICM

VIEWPOINT

Characteristics of and Important Lessons From
the Coronavirus Disease 2019 (COVID-19) Outbreak in China
Summary of a Report of 72 314 Cases From
the Chinese Center for Disease Control and Prevention

JAMA Published online February 24, 2020

Zunyou Wu, MD, PhD
Chinese Center for
Disease Control and
Prevention, Beijing,
China.

**Jennifer M.
McGoogan, PhD**
Chinese Center for
Disease Control and
Prevention, Beijing,
China.

among 44,415 cases

mild cases
80%

severe cases
15%

critical cases
5%

Diagnostic Criteria

severe

- hypoxemia ($SpO_2 < 93\%$) @ RA

critical

- hypoxemia requiring NIV/IMV
- shock
- other organ failure

Erasmus MC



ACUTE RESPIRATORY DISTRESS IN ADULTS

DAVID G. ASHBAUGH
M.D. Ohio State

ASSISTANT PROFESSOR OF SURGERY

D. BOYD BIGELOW
M.D. Colorado

ASSISTANT IN MEDICINE AND AMERICAN THORACIC SOCIETY-NATIONAL
TUBERCULOSIS ASSOCIATION FELLOW IN PULMONARY DISEASE

THOMAS L. PETTY
M.D. Colorado

ASSISTANT PROFESSOR OF MEDICINE

BERNARD E. LEVINE
M.D. Michigan

AMERICAN THORACIC SOCIETY-NATIONAL TUBERCULOSIS ASSOCIATION
FELLOW IN PULMONARY DISEASE*

*From the Departments of Surgery and Medicine,
University of Colorado Medical Center, Denver, Colorado, U.S.A.*

Summary The respiratory-distress syndrome in 12 patients was manifested by acute onset of tachypnoea, hypoxaemia, and loss of compliance after a variety of stimuli; the syndrome did not respond to usual and ordinary methods of respiratory therapy. The clinical and pathological features closely resembled those seen in infants with respiratory distress and to conditions in congestive atelectasis and postperfusion lung. The theoretical relationship of this syndrome to alveolar surface active agent is postulated. Positive end-expiratory pressure was most helpful in combating atelectasis and hypoxaemia. Corticosteroids appeared to have value in the treatment of patients with fat-embolism and possibly viral pneumonia.

Hallmark of ARDS: pulmonary edema

PEEP dramatically improved survival

August 1967

Erasmus MC

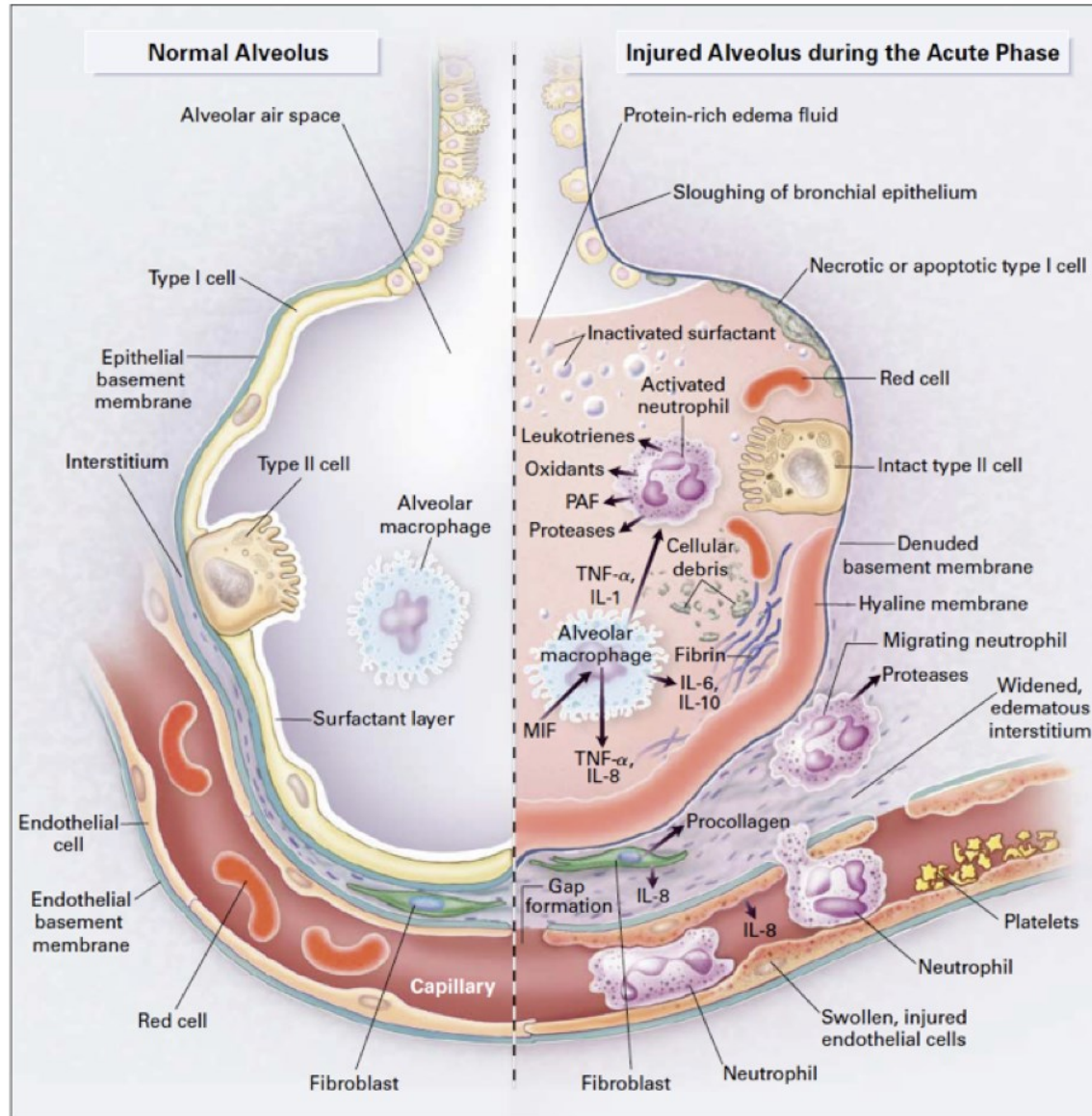


*From the Departments of Surgery and Medicine,
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Summary The respiratory-distress syndrome in 12 patients was manifested by acute onset of tachypnoea, hypoxaemia, and loss of compliance after a variety of stimuli; the syndrome did not respond to usual and ordinary methods of respiratory therapy. The clinical and pathological features closely resembled those seen in infants with respiratory distress and to conditions in congestive atelectasis and postperfusion lung. The theoretical relationship of this syndrome to alveolar surface active agent is postulated. Positive end-expiratory pressure was most helpful in combating atelectasis and hypoxaemia. Corticosteroids appeared to have value in the treatment of patients with fat-embolism and possibly viral pneumonia.

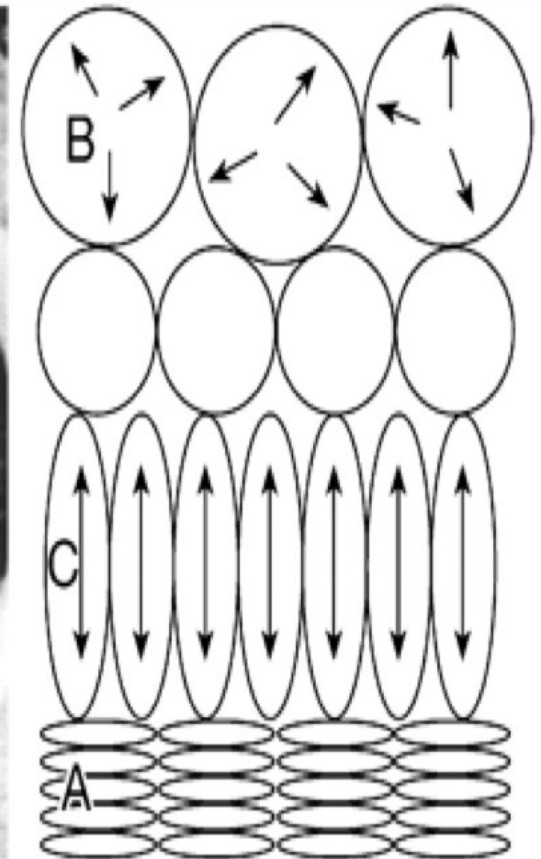
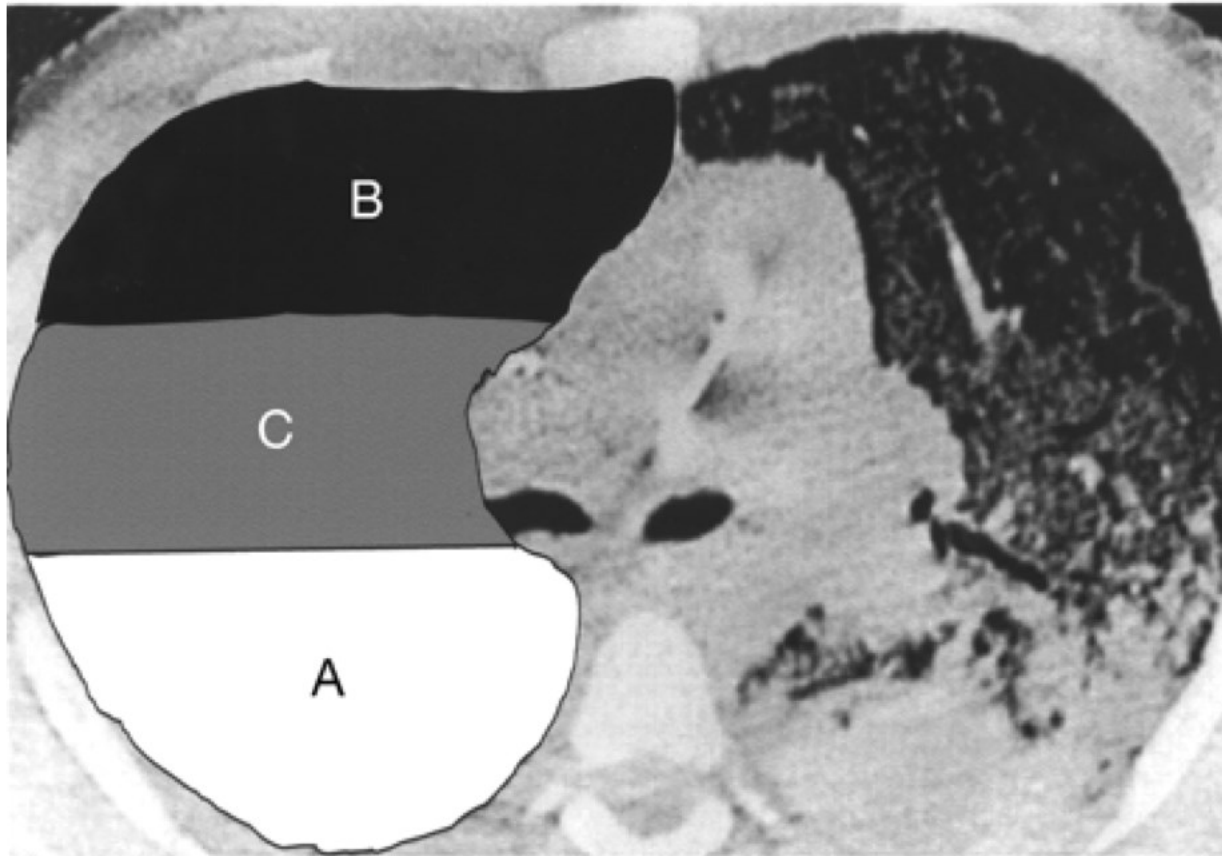
August 1967

ARDS or wet lung



characteristic ARDS: alveolo-capillary leakage

ARDS and VILI (ventilator induced lung injury)



The New England Journal of Medicine

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NUMBER 18



VENTILATION WITH LOWER TIDAL VOLUMES AS COMPARED WITH TRADITIONAL TIDAL VOLUMES FOR ACUTE LUNG INJURY AND THE ACUTE RESPIRATORY DISTRESS SYNDROME

THE ACUTE RESPIRATORY DISTRESS SYNDROME NETWORK*

VARIABLE	GROUP RECEIVING TRADITIONAL TIDAL VOLUMES	GROUP RECEIVING LOWER TIDAL VOLUMES
Ventilator mode	Volume assist-control	Volume assist-control
Initial tidal volume (ml/ kg of predicted body weight)†	12	6
Plateau pressure (cm of water)	« 50	« 30
Death before discharge home and breathing without assistance (%)	39.8	31.0

ORIGINAL ARTICLE

Prone Positioning in Severe Acute Respiratory Distress Syndrome

Claude Guérin, M.D., Ph.D., Jean Reignier, M.D., Ph.D.,
 Jean-Christophe Richard, M.D., Ph.D., Pascal Beuret, M.D., Arnaud Gacouin, M.D.,
 Thierry Boulain, M.D., Emmanuelle Mercier, M.D., Michel Badet, M.D.,
 Alain Mercat, M.D., Ph.D., Olivier Baudin, M.D., Marc Clavel, M.D.,
 Delphine Chatellier, M.D., Samir Jaber, M.D., Ph.D., Sylvène Rosselli, M.D.,
 Jordi Mancebo, M.D., Ph.D., Michel Sirodot, M.D., Gilles Hilbert, M.D., Ph.D.,
 Christian Bengler, M.D., Jack Richecœur, M.D., Marc Gannier, M.D., Ph.D.,
 Frédérique Bayle, M.D., Gaël Bourdin, M.D., Véronique Leray, M.D.,
 Raphaële Girard, M.D., Loredana Baboi, Ph.D., and Louis Ayzac, M.D.,
 for the PROSEVA Study Group*

Table 3. Primary and Secondary Outcomes According to Study Group.*

Outcome	Supine Group (N = 229)	Prone Group (N = 237)	Hazard Ratio or Odds Ratio with the Prone Position (95% CI)	P Value
Mortality — no. (% [95% CI])				
At day 28				
Not adjusted	75 (32.8 [26.4–38.6])	38 (16.0 [11.3–20.7])	0.39 (0.25–0.63)	<0.001
Adjusted for SOFA score†			0.42 (0.26–0.66)	<0.001
At day 90				
Not adjusted	94 (41.0 [34.6–47.4])	56 (23.6 [18.2–29.0])	0.44 (0.29–0.67)	<0.001
Adjusted for SOFA score†			0.48 (0.32–0.72)	<0.001
Successful extubation at day 90 — no./total no. (% [95% CI])	145/223 (65.0 [58.7–71.3])	186/231 (80.5 [75.4–85.6])	0.45 (0.29–0.70)	<0.001

ARDS:

Prim. insult: inflammatory injury

Sec. insult: mechanical ventilation

Visit Bernhoven hospital: March 19, 2020:

Hypoxemia:

Rapid breathing

No sputum or cough

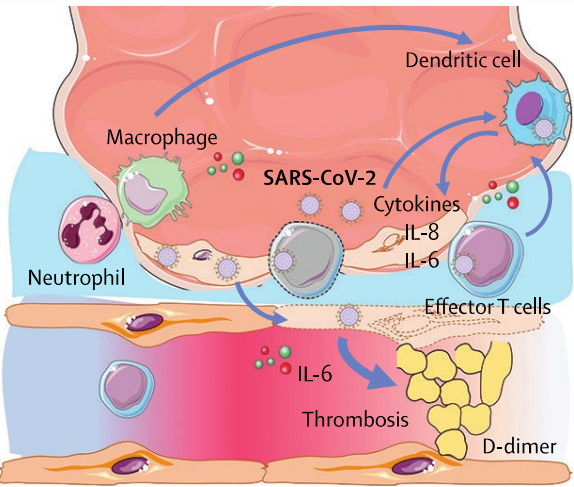
Clear mind (no delirium)



Cytokine elevation in severe and critical COVID-19: a rapid systematic review, meta-analysis, and comparison with other inflammatory syndromes

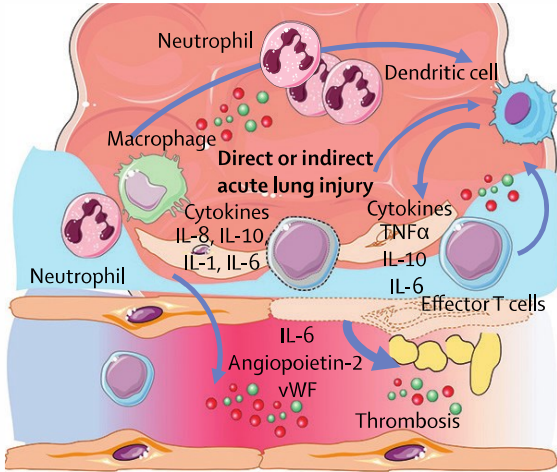


Daniel E Leisman*, Lukas Ronner*, Rachel Pinotti, Matthew D Taylor, Pratik Sinha, Carolyn S Calfee, Alexandre V Hirayama, Fiore Mastroianni, Cameron J Turtle, Michael O Harhay, Matthieu Legrand, Clifford S Deutschman



COVID-19

Acute-phase reactants	
D-dimer	+++++
CRP	+++
Ferritin	++
LDH	++
PCT	-
Leucocytes	
Lymphocytes	↓↓
Neutrophils	↑
Effector function*	↓↓
Cytokines	
IL-6	+
TNFα	+
Chemokines	++
IFNs	↓



ARDS

Acute-phase reactants	Hyper-inflammatory	Hypo-inflammatory
D-dimer	+++	+
CRP	++	++
Ferritin	+ / ++	+ / ++
Leucocytes		
Lymphocytes	--	--
Neutrophils	--	--
Effector function*	?	?
Cytokines		
IL-6	++++	++
TNFα	++++	++
Chemokines	++++	++
IFNs	?	?

Incidence of thrombotic complications in critically ill ICU patients with COVID-19

Klok FA¹, Kruip MJHA², van der Meer NJM³, Arbous MS⁴, Gommers DAMPJ⁵, Kant KM⁶, Kaptein FHJ¹, van Paassen J⁴, Stals MAM¹, Huisman MV^{1*}, Endeman H^{5*}

Results

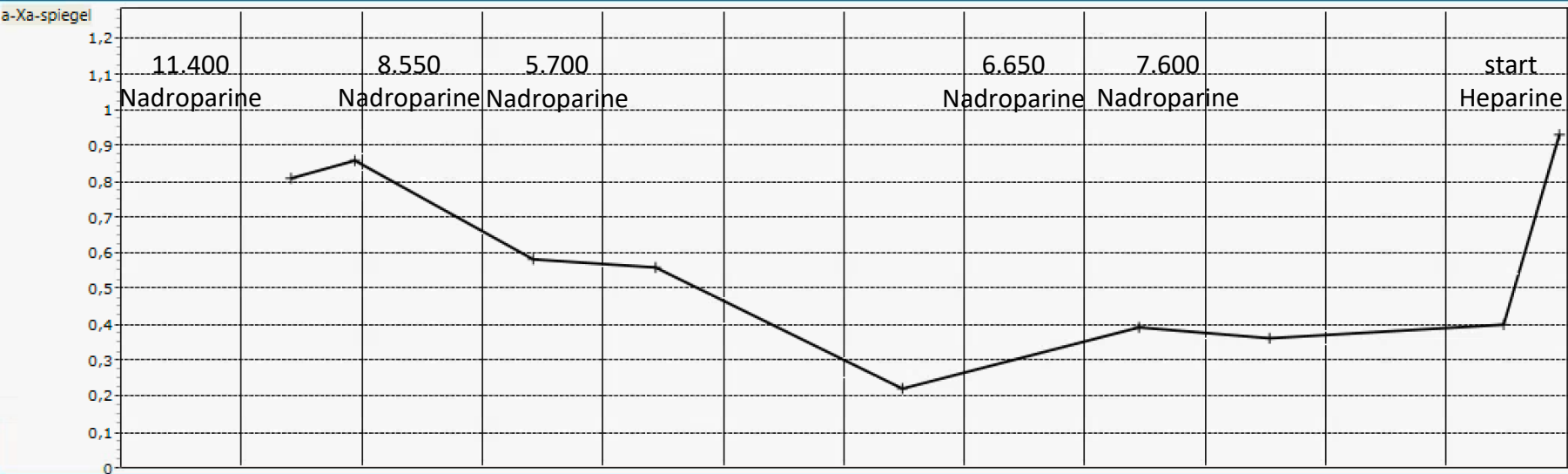
- We studied 184 ICU patients with proven COVID-19 pneumonia of whom 23 died (13%), 22 were discharged alive (12%) and 139 (76%) were still on the ICU on April 5th 2020.
- PE was the most frequent thrombotic complication (n=25, 81%)

Conclusion

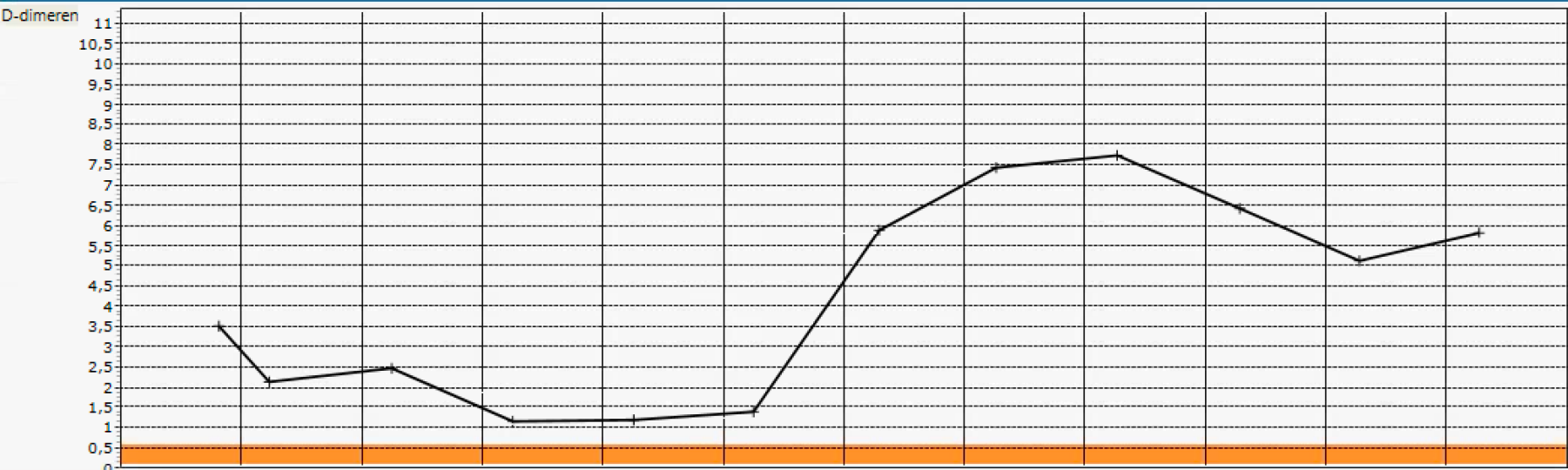
The 31% incidence of thrombotic complications in ICU patients with COVID-19 infections is remarkably high.

Our findings reinforce the recommendation to strictly apply pharmacological thrombosis prophylaxis in all COVID-19 patients admitted to the ICU, and are strongly suggestive of increasing the prophylaxis towards high-prophylactic doses, even in the absence of randomized evidence.

a-Xa-spiegel (U/mL)



D-dimeren (mg/L)

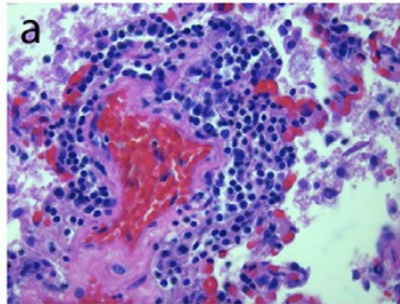


Persistence of viral RNA, pneumocyte syncytia and thrombosis are hallmarks of advanced COVID-19 pathology

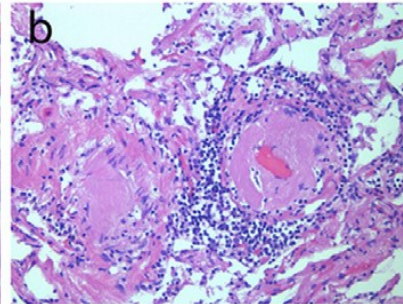


Rossana Bussani^{a,1}, Edoardo Schneider^b, Lorena Zentilin^b, Chiara Collesi^{a,b}, Hashim Ali^c, Luca Braga^{b,c}, Maria Concetta Volpe^b, Andrea Colliva^b, Fabrizio Zanconati^a, Giorgio Berlot^a, Furio Silvestri^a, Serena Zacchigna^{a,b,1,*}, Mauro Giacca^{a,b,c,1,*}

Perivascular inflammation

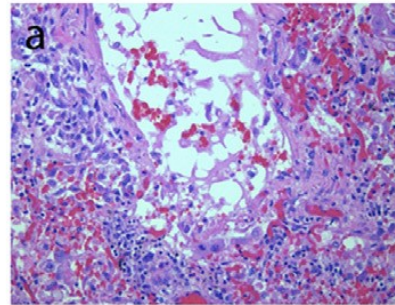


Patient: 207.20
Staining: H&E

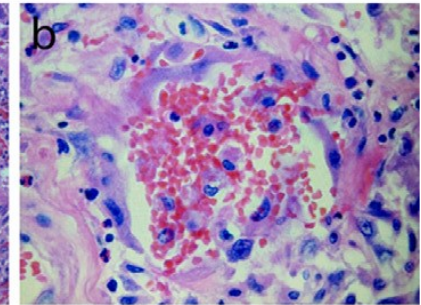


Patient: 325.20
Staining: H&E

B Endothelial damage

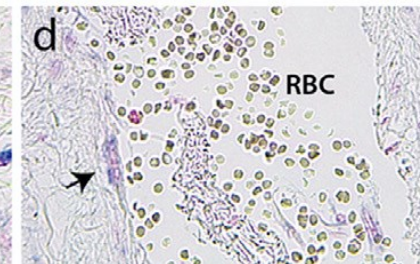
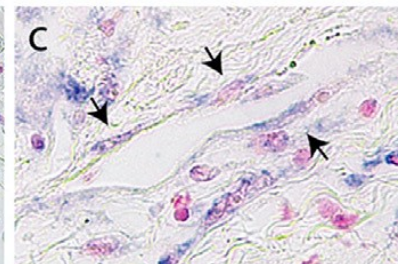
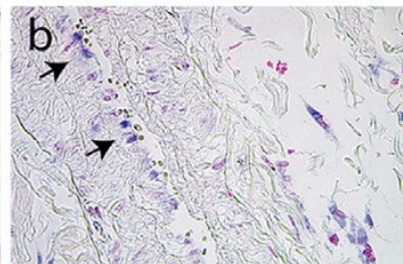
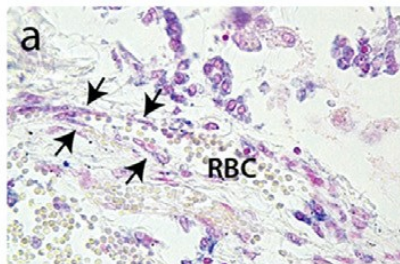


Patient: 210.20
Staining: H&E



Patient: 207.20
Staining: H&E

Endothelial cell infection (SARS-CoV-2 RNA)

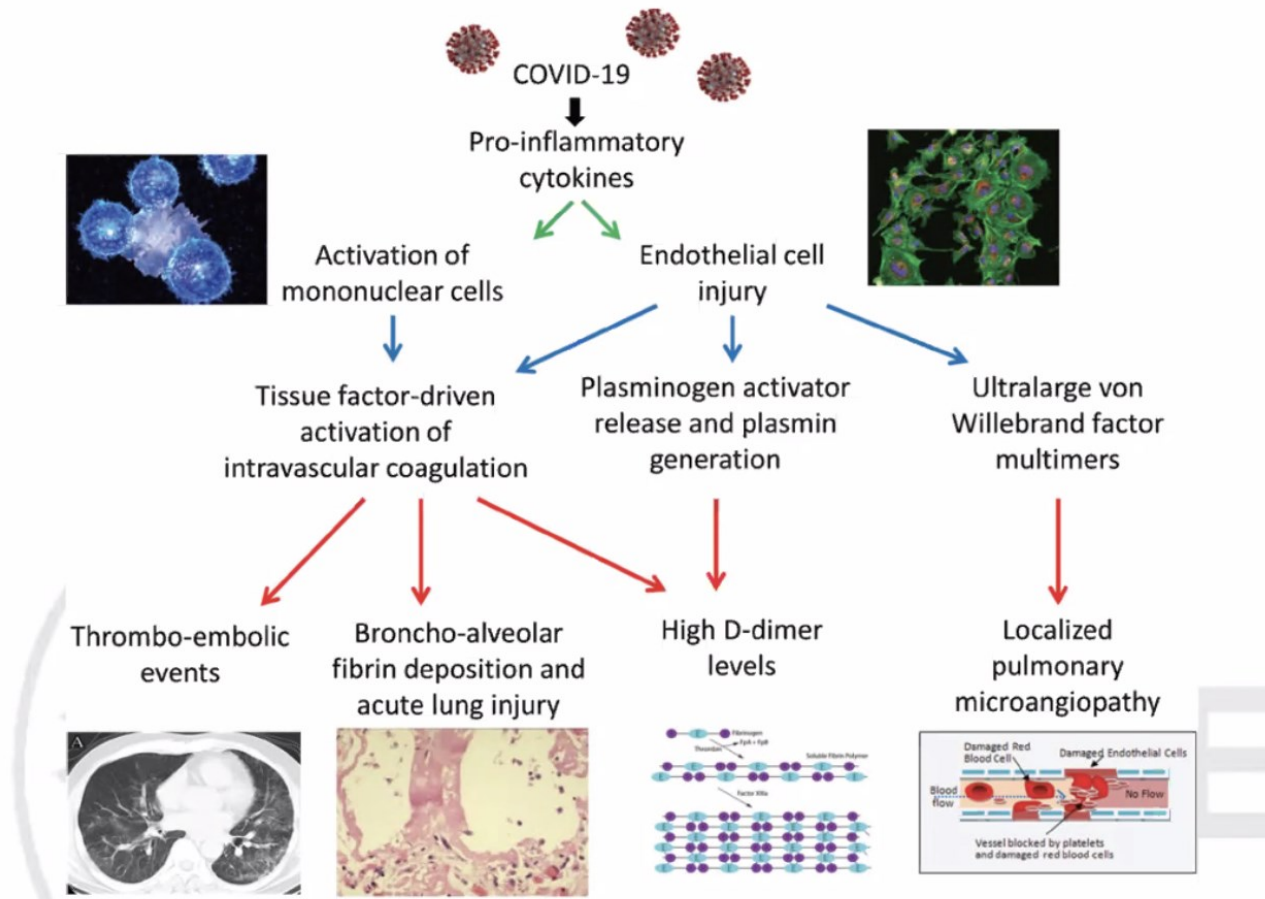


Conclusion:

COVID-19 is a unique disease characterized by extensive lung thrombosis, long-term persistence of viral RNA in pneumocytes and endothelial cells.

Coronavirus Disease 2019 Coagulopathy: Disseminated Intravascular Coagulation and Thrombotic Microangiopathy—Either, Neither, or Both

Marcel Levi, MD, PhD, FRCP^{1,2} Jecko Thachil, MD, FRCP³

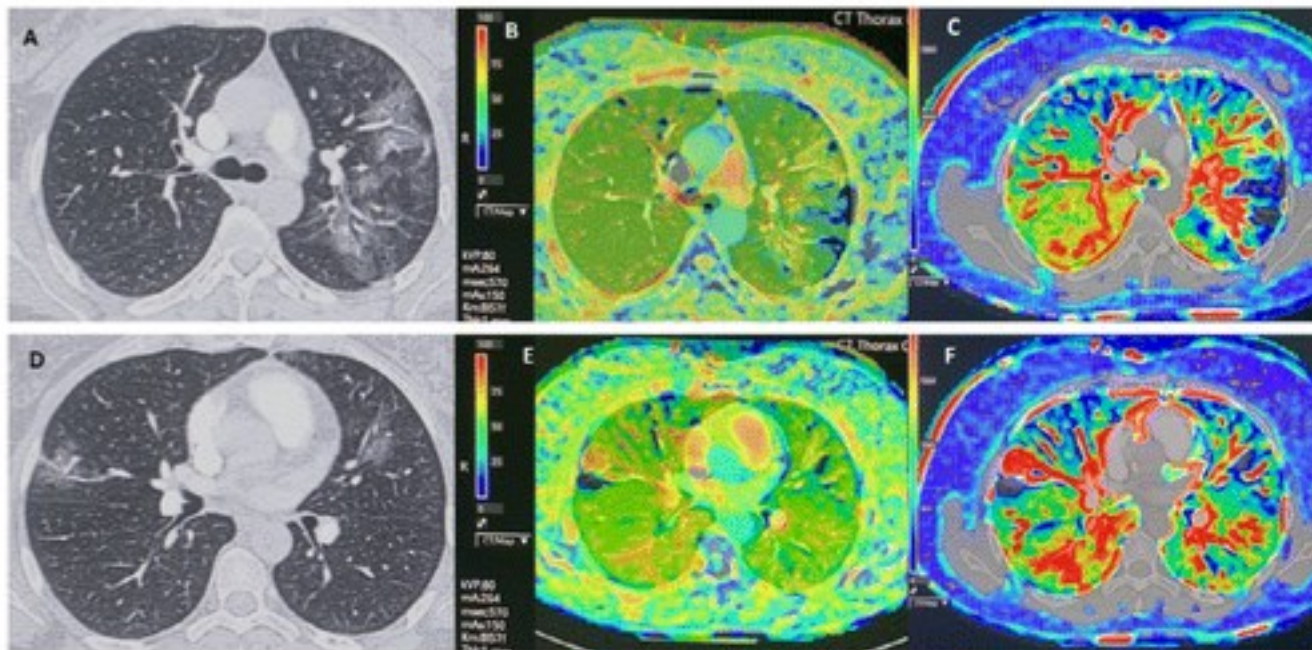


Diagnosis, Prevention, and Treatment of Thromboembolic Complications in COVID-19: Report of the National Institute for Public Health of the Netherlands

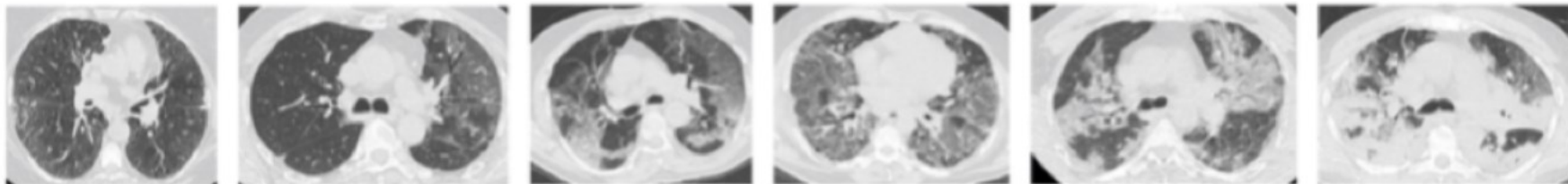
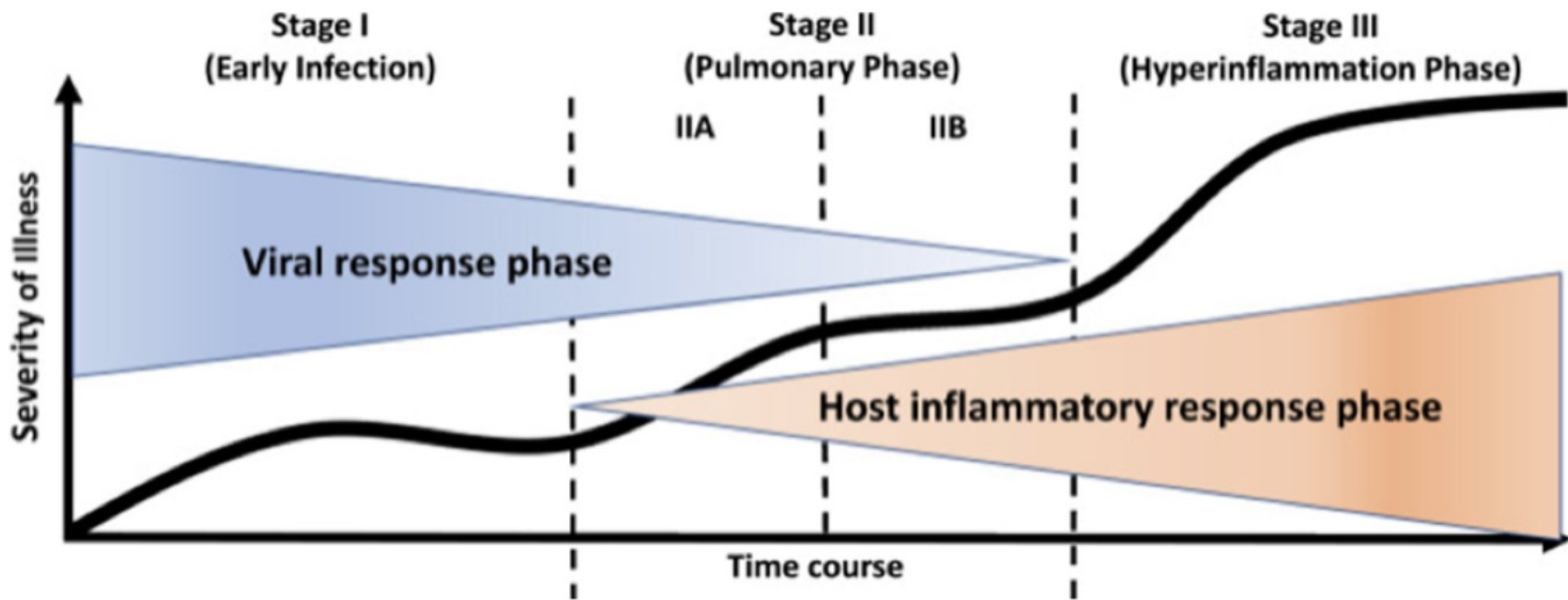
Matthijs Oudkerk, Harry R Büller, Dirkjan Kuijpers, Nick van Es, Sitse F Oudkerk, Theresa C McCloud, Diederik Gommers, Jaap van Dissel, Hugo ten Cate, Edwin J van Beek ✉

Author Affiliations

Published Online: Apr 23 2020 | <https://doi.org/10.1148/radiol.2020201629>



Groundglass opacities
and vascular enlargement

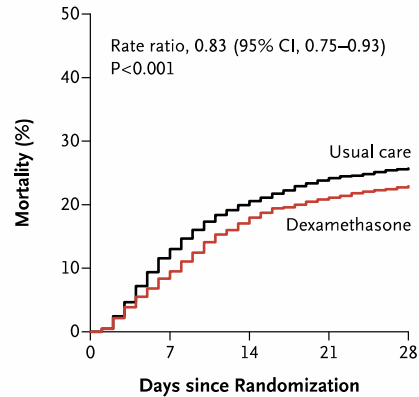


ORIGINAL ARTICLE

Dexamethasone in Hospitalized Patients with Covid-19 — Preliminary Report

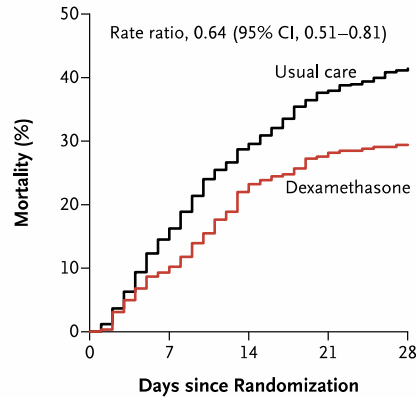
The RECOVERY Collaborative Group*

A All Participants (N=6425)



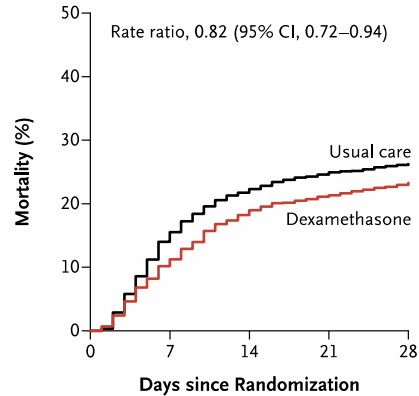
No. at Risk	0	7	14	21	28
Usual care	4321	3754	3427	3271	3205
Dexamethasone	2104	1903	1725	1659	1621

B Invasive Mechanical Ventilation (N=1007)



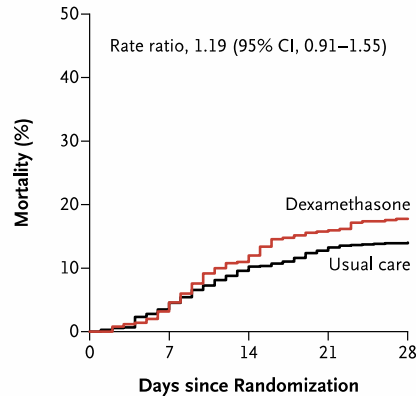
No. at Risk	0	7	14	21	28
Usual care	683	572	481	424	400
Dexamethasone	324	290	248	232	228

C Oxygen Only (N=3883)



No. at Risk	0	7	14	21	28
Usual care	2604	2195	2018	1950	1916
Dexamethasone	1279	1135	1036	1006	981

D No Oxygen Received (N=1535)

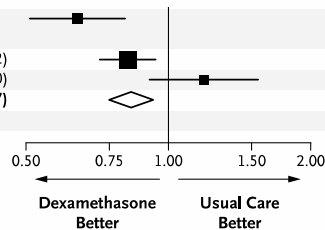


No. at Risk	0	7	14	21	28
Usual care	1034	987	928	897	889
Dexamethasone	501	478	441	421	412

Respiratory Support at Randomization

	Dexamethasone	Usual Care	Rate Ratio (95% CI)
	no. of events/total no. (%)		
Invasive mechanical ventilation	95/324 (29.3)	283/683 (41.4)	0.64 (0.51–0.81)
Oxygen only	298/1279 (23.3)	682/2604 (26.2)	0.82 (0.72–0.94)
No oxygen received	89/501 (17.8)	145/1034 (14.0)	1.19 (0.91–1.55)
All Patients	482/2104 (22.9)	1110/4321 (25.7)	0.83 (0.75–0.93)

Chi-square trend across three categories: 11.5



This article was published on July 17, 2020, at NEJM.org.



The NEW ENGLAND JOURNAL of MEDICINE

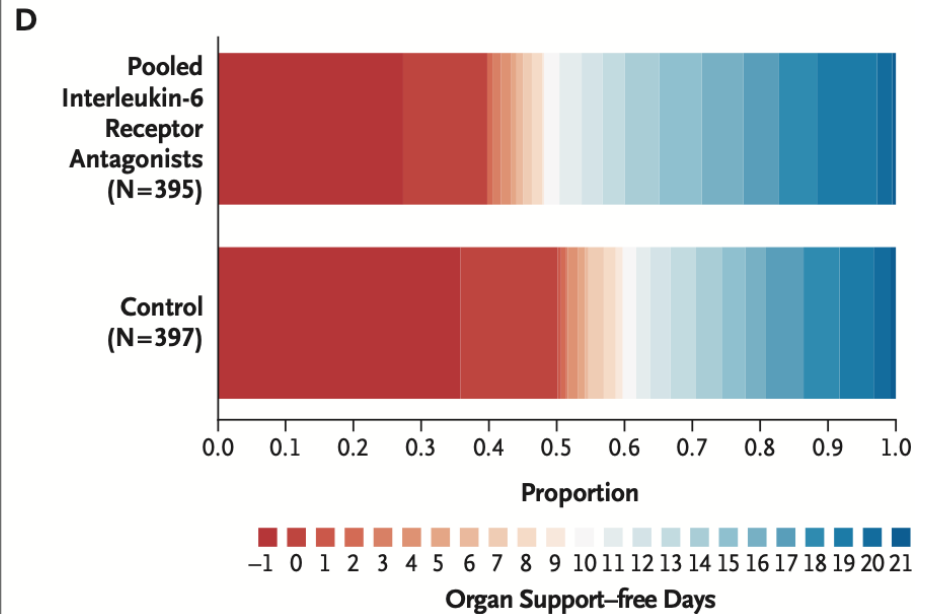
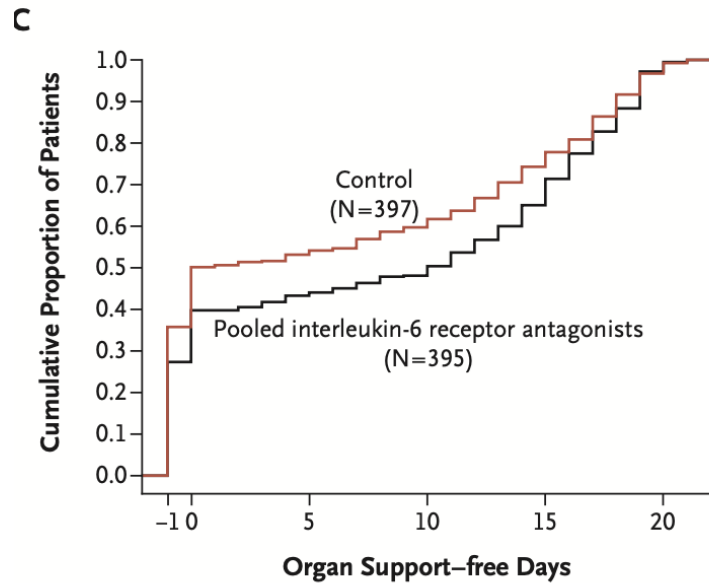
ESTABLISHED IN 1812

APRIL 22, 2021

VOL. 384 NO. 16

Interleukin-6 Receptor Antagonists in Critically Ill Patients with Covid-19

The REMAP-CAP Investigators*



Treatment Covid-19 nowadays on the ICU:

- Oxygen: starting with high-flow nasal oxygen (HFNO)
- Dexamethason (10 days 6 mg/day) and low molecular heparin
- Hyperinflammation-inhibition: Tocilizumab or Methylprednisolon (3 days 1 gr)



Figure 1.—An awake, mobilized patient undergoing mechanical ventilation (with permission).

Conclusion:

- Organise webinars
- Databases: local, national and international



Federatie
**Medisch
Specialisten**

Agenda Webinar Nieuwe Inzichten COVID-19.

Aan: Sprekers en panelleden

Datum: 01-10-2020



COVID-19 op de Nederlandse Intensive Cares;

Patiëntkarakteristieken en uitkomsten

vergeleken met pneumonie patiënten op de IC in 2017-2019

Versie 10 april 2020



COVID-19 - bericht van de voorzitter

zondag 8 maart 2020

COVID-19 - bericht van de voorzitter

8 maart 2020

Beste Collega's,

Het is nog stilte voor de storm en wij nuchtere Nederlanders bagatelliseren graag en denken dat het allemaal wel mee zal vallen. Ik wil graag een oproep doen dat iedereen ervoor zorgt dat de intensive care van ieder ziekenhuis er klaar voor is. Veel beleidsmakers vinden het spannend en wij als intensivisten kunnen hen helpen. Als voorzitter van de NVIC schuif ik wekelijks aan bij het overleg van het Outbreak Management Team (OMT) van het RIVM en wij voorzien hen van kennis van de ARDS-patiënt op de intensive care. Ook hebben wij hen erop kunnen attenderen dat de eerste versie van de medicamenteuze behandelingsopties te ver ging en deze is mede op ons advies aangepast (zie versie 7 maart jl.). Verder houdt de Taskforce van de NVIC, onder voorzitterschap van Lennie Derde, de ontwikkelingen nauwlettend in de gaten; zij komen met adviezen die we publiceren op onze website. Bovendien weet ik dat veel collega's zitting hebben in een crisisteam en dat wij als intensivisten betrokken zijn bij hoe we dit samen zo goed mogelijk aan kunnen pakken.

Dus zorg dat je bent voorbereid, help je lokale beleidsmedewerkers en laten wij de buitenwereld zien dat je kan bouwen op intensivisten en op de NVIC.

Uiteraard is er veel media-aandacht. Wij vragen jullie als je benaderd wordt, te verwijzen naar de NVIC. Alle vragen worden direct beantwoord. Mocht je toch zelf in de media optreden, neem dan graag vooraf contact met mij op zodat ik je van de laatste stand van zaken op de hoogte kan brengen.

Met vriendelijke groet,
Diederik Gommers
Voorzitter NVIC

'Schaduwkabinet' staat premier bij in de crisis

Wetenschappers en top-ambtenaren geven adviezen



DIEDERIK GOMMERS (NEDERLANDSE VERENIGING VOOR INTENSIVE CARE, LINKS) EN JAAP VAN DISSEL (RIVM). FOTO ANP

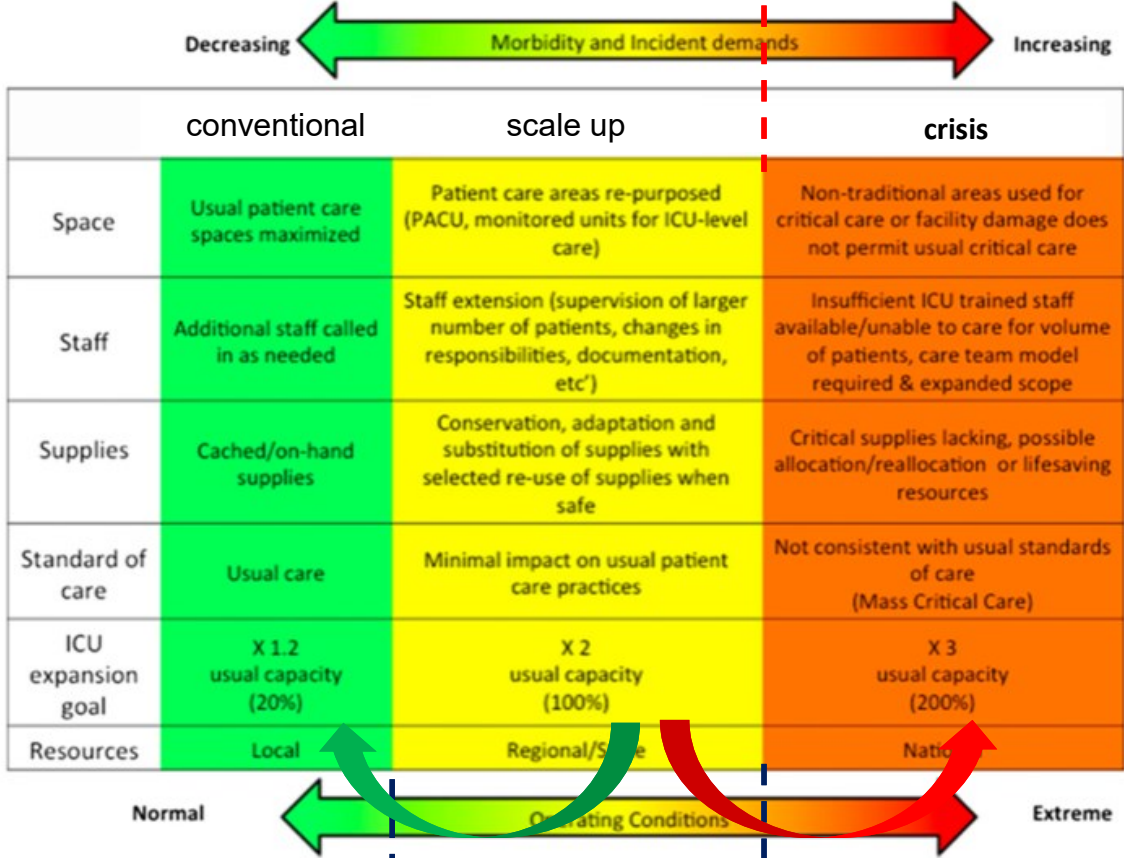
Premier Mark Rutte zegt met zijn beleid te varen op het 'kompas' van de deskundigen. Maar wie zijn dat en hoe komen besluiten

Mooi beschreven

Pandemic Script

published on 9 March 2020 on website: www.nvic.nl

Decision of minister of health



1150 IC beds:
 - 575 COVID
 - 575 non-COVID

+/- 2400 IC beds:
 - 1900 COVID
 - 500 non-COVID





Pediatric intensive care unit - Credit: [sudok1 / DepositPhotos](#) - License: [DepositPhotos](#)

HEALTH DIEDERIK GOMMERS CODE BLACK CORONA VIRUS ERASMUS MEDICAL CENTER
INTENSIVE CARE

FRIDAY, 23 APRIL 2021 - 14:31

SHARE THIS:



ICU expert says Dutch hospitals in Covid trouble; Warns of "Code black situation"

Dutch Association for Intensive Care chair Diederik Gommers said he feared the country was approaching a ["Code Black" situation](#), where hospitals have to choose between patients for the last remaining ICU admissions. "We are afraid that next week we might end up at code black if the number of infections does not drop quickly. This morning we had a national meeting, where colleagues really indicated that we are really heading that way," Gommers said during his weekly podcast.

Conclusion:

- do you have pandemic script ready for scaling up in capacity
- 'code black situation' -> script ready ?
- work together with politicians

LCPS: landelijk coördinatiecentrum patiënten spreiding = national center spreading of patients between hospitals



ZWN: $540 \times 0,143 = 77 \rightarrow$ er lagen er 87 dus $87 - 77 = +10$

Landelijk beeld IC | Dinsdag 02 maart 11:00 uur

Dit overzicht is een weergave van het aantal patiënten dat een regio afstaat van het evenredig aandeel, hierin is de prognose niet meegenomen. Bij een volledig evenredige verdeling zou elke regio op 0 uitkomen. De tabel is het beeld van dinsdag 02 maart 11:00 uur. Wij vragen elke regio zich **maximaal** in te spannen om **minimaal** te voldoen aan het evenredig aandeel.

IC-bezetting t.o.v. Verdeelsleutel

Regio	Verdeelsleutel	Huidige bezetting COVID-positieve patiënten (excl. BOSS-bedden)	Huidige bezetting ontlabelde COVID patiënten	Totaal aantal te leveren capaciteit (excl. BOSS-bedden)	Boss-bedden	Overbezet/onderbezet	Capaciteit beschikbaar gesteld	Uitplaatsingsverzoeken en (tot 11 uur)
Euregio	3.34%	17	5	18	3	+4	0	0
AZNN	10.49%	52	6	57	9	+1	0	0
Oost	8.21%	32	5	44	6	-7	1	0
Brabant	14.29%	57	12	77	10	-8	1	0
NAZL	9.73%	44	8	53	6	-1	0	0
West	9.57%	40	6	52	7	-6	0	1
Zwolle	6.53%	30	8	35	6	+3	0	0
AMC+NW	15.20%	76	12	82	10	+6	0	3
ZWN	14.29%	66	21	77	10	+10	0	1
Midden	8.36%	39	4	45	4	-2	1	0
Totaal	100%	453	87	540	71	0	3	5

- **Verdeelsleutel:** De verdeelsleutel voor deze COVID-capaciteit per regio is conform het [Opschalingsplan COVID-19](#)
- **Huidige bezetting COVID-positieve patiënten (excl. BOSS-bedden):** Actueel aantal bezette bedden met COVID+ patiënten
- **Huidige bezetting ontlabelde COVID patiënten:** Actueel aantal bezette bedden met ontlabelde patiënten (inmiddels COVID- geteste patiënten)
- **Totaal aantal te leveren capaciteit:** Totaal aantal bedden wat een regio beschikbaar zou moeten hebben volgens de vastgestelde norm van deze week aangepast naar het totaal opgenomen patiënten en de verdeelsleutel.
- **Overbezet/onderbezet:** Te veel patiënten opgenomen t.o.v. verdeelsleutel of te weinig patiënten opgenomen t.o.v. verdeelsleutel
- **Capaciteit beschikbaar gesteld:** Aantal beschikbare bedden aangemeld bij het LCPS
- **Uitplaatsingsverzoeken:** Actueel aantal uitplaatsingsverzoeken

Transport: MICU



OMT: outbreak management team



Conclusion:

- central coordination of capacity is essential
- transport of patient is time consuming
- budget of hospital should be guaranteed

Competition between talkshows: OP1 and Jinek



#ikdoenietmeermee
'I don't participate anymore'

Zeer sterk optreden van **Diederik Gommers** zojuist bij **Eva Jinek** tijdens bijzonder gesprek met F(e)amke Louise Meijer.

Heb echt ongeloofelijk veel respect voor Gommers, die naast een gave voor medisch specialisme, klaarblijkelijk ook een gave voor effectief communiceren heeft.....



Famke Louise reageert: 'Geen schijt aan coronamaatregelen, maar mensen wille...



Voer hier uw
commentaar in...

@ Plaatsen



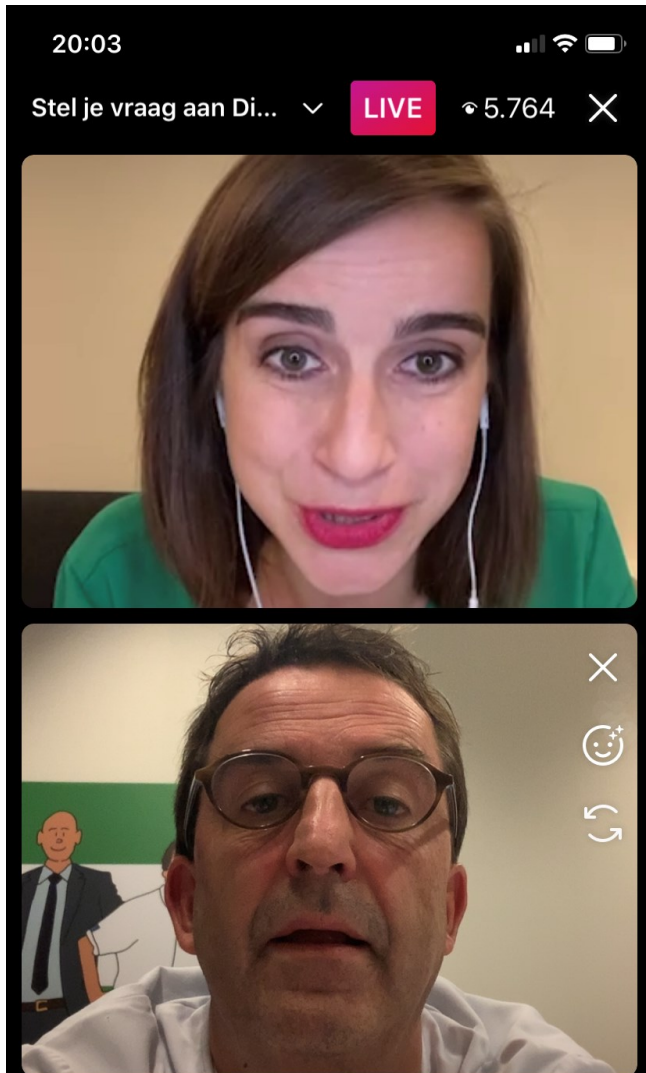
Diederik Gommers maakt debuut op Instagram

02 oktober 2020 10:26



Diederik Gommers (56) heeft na zijn optreden in 'Jinek' flink wat lof ontvangen. Hij ging in het programma in gesprek met Famke Louise (21) na het #ikdoenietmeer-mee-debacle. Het gesprek heeft niet alleen Famke het licht doen zien, maar ook een ware influencer van Diederik gemaakt.





 **Hét wetenschapsfestival voor kinderen!**



**nationale
wetenschaps
agenda**

23:0

4G 



Top

**Publiekswegsite Nationale
Wetenschapsagenda**

/video's



HenriettevanderZiel @HenriettevdZiel · 3 u

Diederik Gommers nu online op ISTA. Al bijna 6000 mensen kijken mee, luisteren, posten een ❤️ of stellen een vraag. Gaaf initiatief!



1



Suzanne Kruyswijk @alwaysuus · 3 u

Diederik Gommers is live op Instagram en ik kan het iedereen aanraden. Super helder en zonder erge negativiteit! 🙌🙌



Kim @KLDvL · 3 u

#diederikgommers is goed bezig! Nu live op Instagram...

us MC

zafing

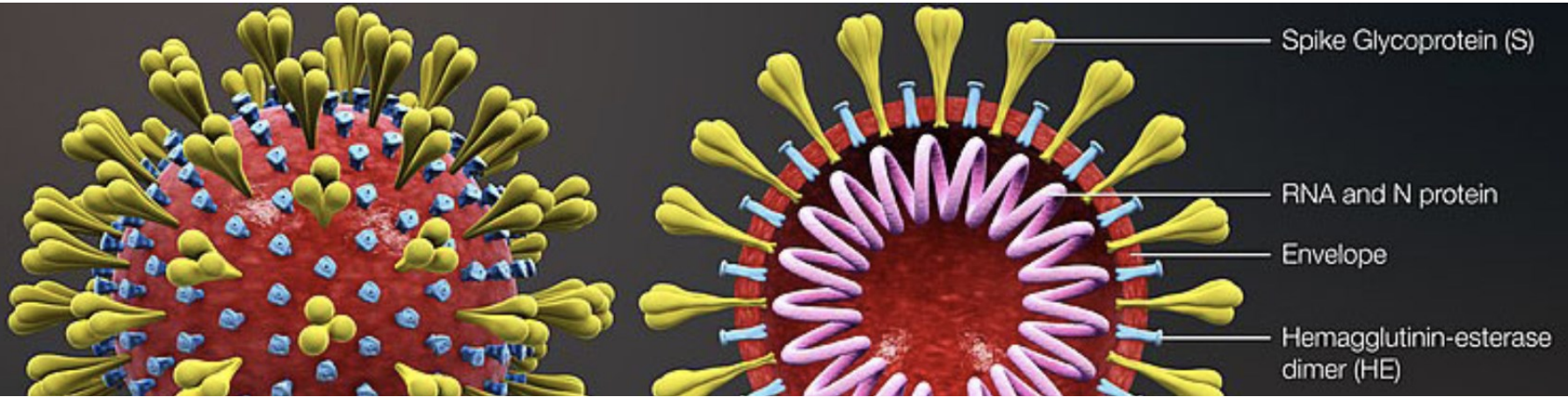


Ha Diederik, de eerste aflevering van de podcast staat online. We krijgen er veel positieve reacties op en ook flink wat nieuwe vragen op binnen.

10:02

Conclusion:

- television and newspapers are more for elderly
- use social media -> 'your own broadcast'
- make your own podcast



Conclusion:

1. *Collaboration is essential between hospitals and partners*
2. *Central coordination of capacity is essential*
3. *Budget should be guaranteed*
4. *Webinars, podcasts, open source publications*
5. *Use social media to reach the young adults*



d.gommers@erasmusmc.nl