



中日友好医院
CHINA-JAPAN FRIENDSHIP HOSPITAL

SARS-CoV-2 viral sepsis: from bedside to bench

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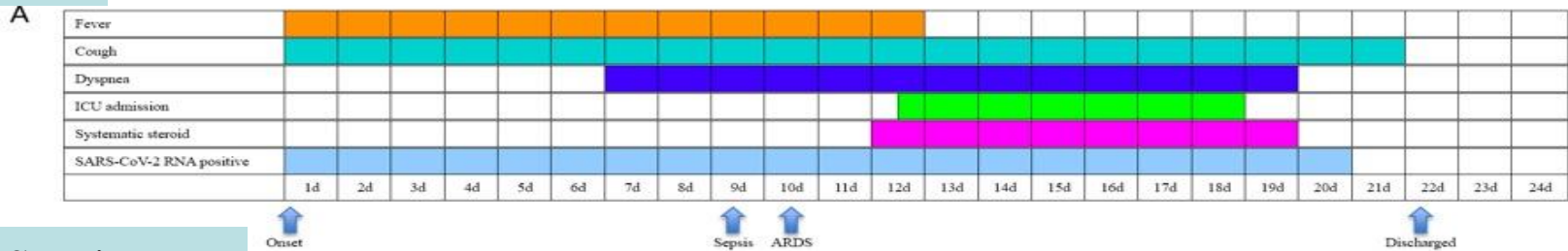
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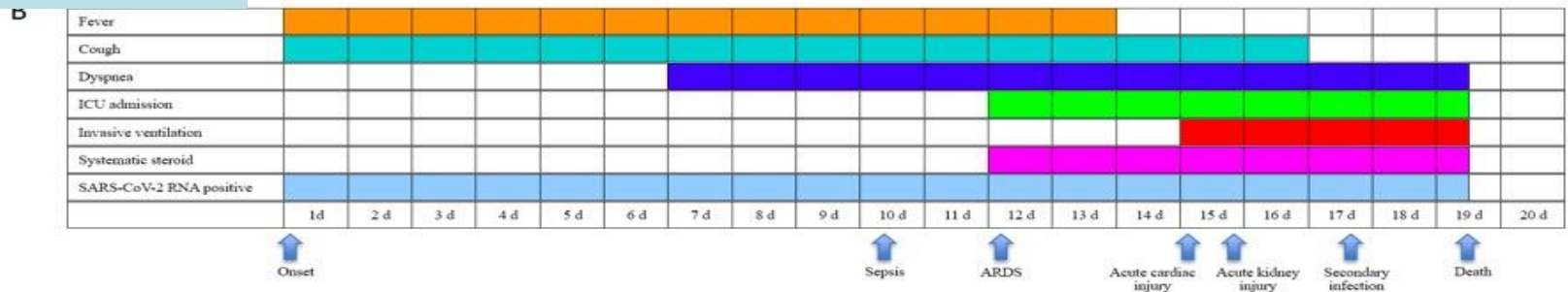
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Survivors

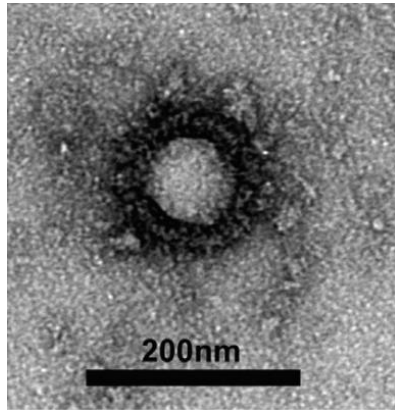


Non-Survivors



Clinical findings of severe or critical COVID-19

Viral infection

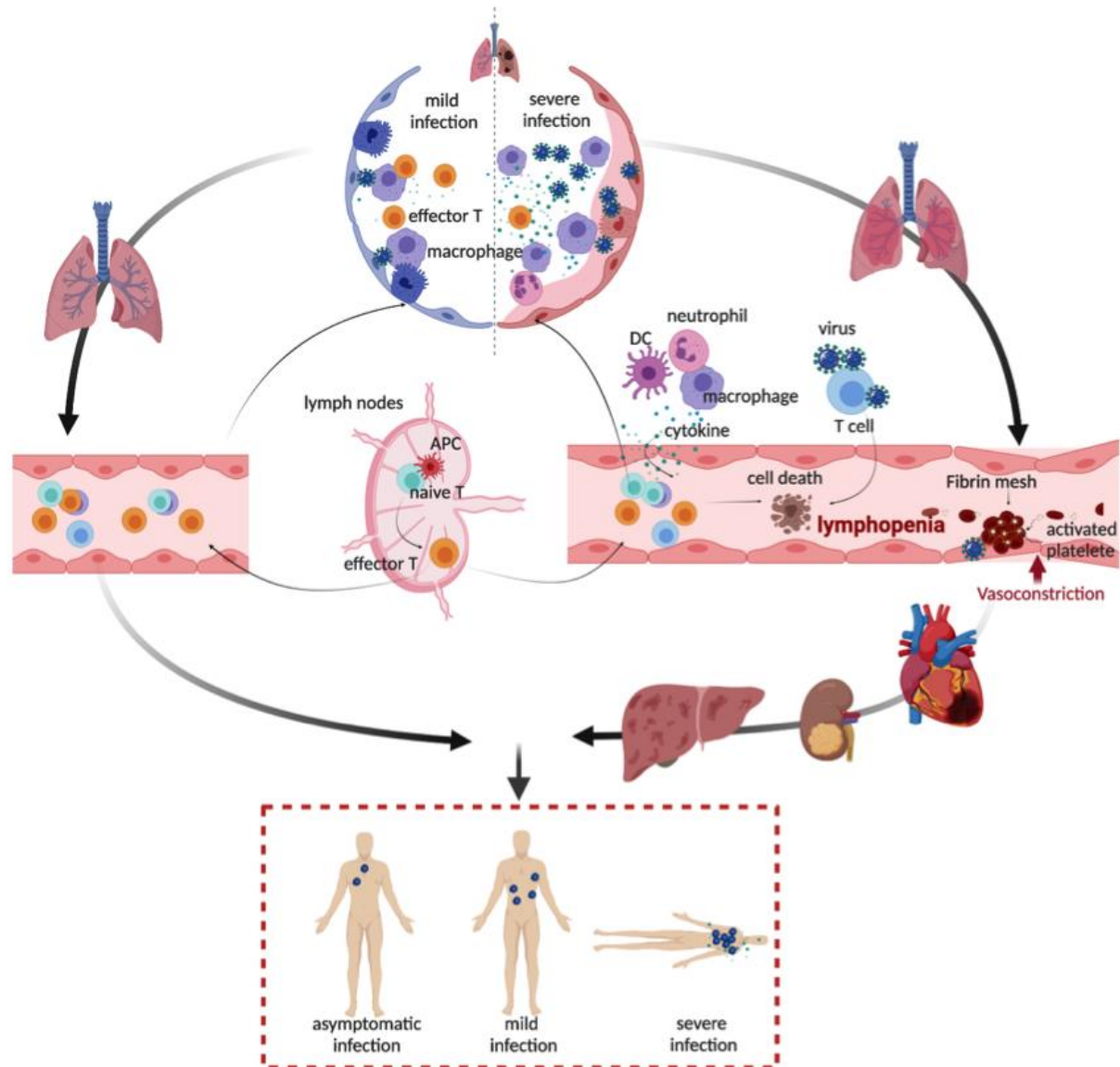


Multi-organ dysfunction

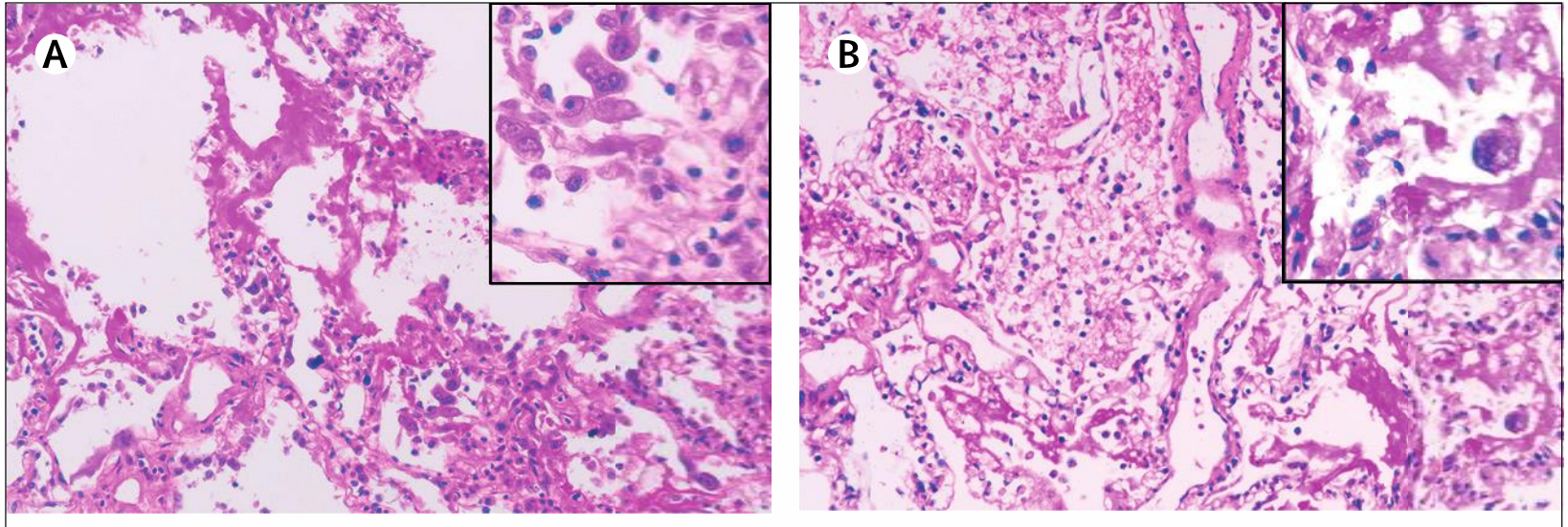
- Pneumonia, Respiratory failure, ARDS
- Metabolic acidosis and internal environment disorders
- AKI
- Acute cardiac injury
-

——Viral sepsis

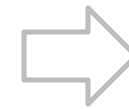
SARS-CoV-2 viral sepsis—Our hypothesis



Virus attack may directly contribute to COVID-19 pathogenesis in multiple organs



- Virus RNA was detected in respiratory specimen, blood, feces and urine
- Viral particles were observed in the bronchial and type 2 alveolar epithelial cells by electron microscopy
- Pulmonary pathology showed diffuse alveolar damage with the formation of hyaline membranes.



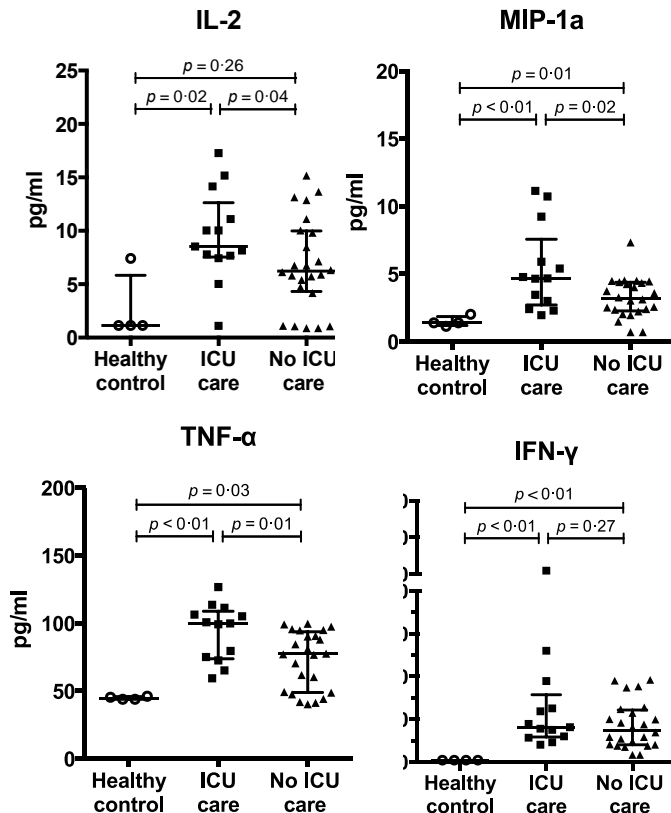
**Effective antiviral
therapy is
essential to
improve outcome**

Antiviral interventions

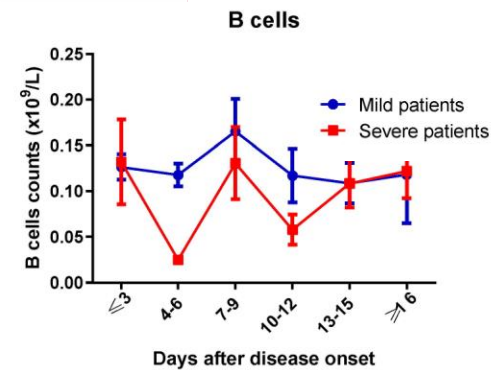
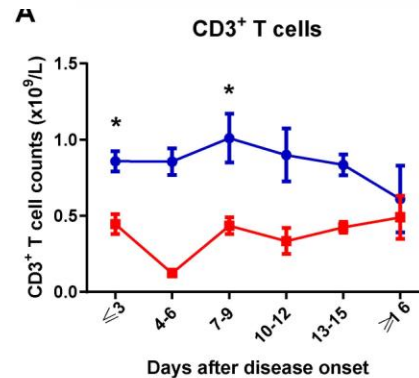
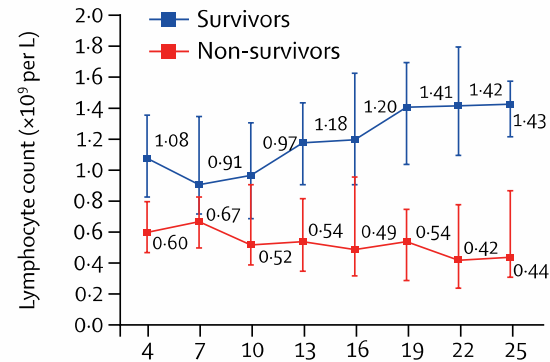
- So far, no specific antiviral against SARS-CoV-2 has been proved
- Clinically evaluated drugs:
 - Lopinavir/ritonavir monotherapy (LOTUS China, ChiCTR2000029308):
completed, unpublished, under peer review
 - Promising results
 - CAP China Remdesivir 1 (mild-moderate pneumonia, NCT04252664):
ongoing
 - CAP China Remdesivir 2 (severe-critical pneumonia, NCT04257656):
ongoing

Emmie de Wit et al. Nature Reviews Microbiology 2016; 14, 523–534
Timothy P Sheahan; Nat Commun 2020; 11 (1), 222
Yeming wang, et al. Trial, 2020, under peer review

Dysregulated host immune response characterized by cytokine storm and lymphopenia



■ IL-1 β , IL-6, G-SCF, IP-10, and MCP1 were significantly elevated



■ Peripheral lymphocyte counts, mainly T cells were substantially reduced in severe COVID-19 patients

—— Host-directed therapies might be an option

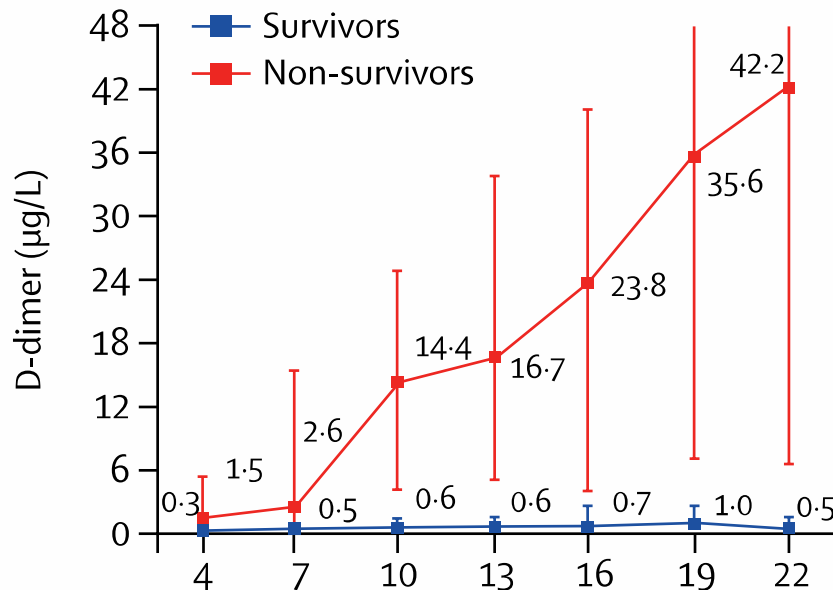
- Corticosteroid
- Convalescent plasma
- tocilizumab

Huang C, et al. *Lancet* 2020; 395(10223): 497-506.

Liu J, et al. *BMJ* 2020; published online Feb 19.

Zhou F, et al. *Lancet* 2020; DOI: [https://doi.org/10.1016/S0140-6736\(20\)30566-3](https://doi.org/10.1016/S0140-6736(20)30566-3).

Abnormal coagulation is present in severe COVID-19 patients



- Significantly increased D-dimer and FDP were associated with poor prognosis
- Thrombosis in pulmonary interstitial vessels were seen on autopsy
- Vascular endothelial cells express high levels of ACE2



Anticoagulation therapy should be initiated for severe COVID-19 patients if otherwise contraindicated.

Take Home Message

- Invasion of SARS-CoV-2 into the lung is an explosive fusion of multi-organ dysfunction in severe or critical COVID-19 patients. More intensive surveillance or individually tailored therapeutic approaches is needed for severe patients with COVID-19.
- Effective antiviral therapy and measures to restore the adaptive immune response, as well as supportive care, are important to improve the outcome of the patients.

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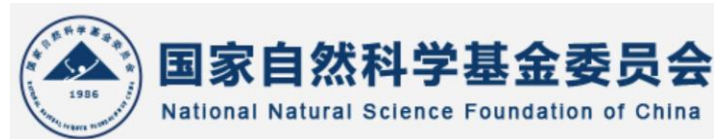
HuaZhong University

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Cooperators:

Wuhan Jinyintan Hospital	Wuhan Tongji Hospital
Wuhan Lung Hospital	The Central Hospital of Wuhan
Zhongnan Hospital of Wuhan University	Renmin Hospital of Wuhan University
Union Hospital	Wuhan First hospital
Wuhan Third hospital	Wuhan Fourth hospital

All health-care workers involved in the diagnosis and treatment of patients in Wuhan





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