UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Morning Brief :
Scientific Review

27 April 2020

The purpose of the Morning Brief is to **summarise** and present key information, research articles and other relevant publications pertaining to critical care and COVID-19. We aim to prioritise information, articles and publications released in the preceding 24-48 hours.

Stellenbosch University Research Response Team

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Content

- World data
- South African update
- Topic discussed: Pathology of COVID-19
- References

UNIVERSITEIT STELLENBOSCH UNIVERSITY

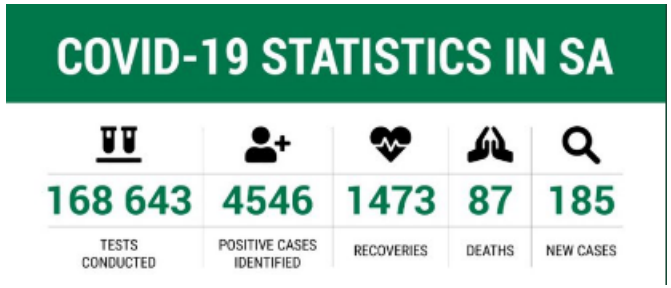
Global data

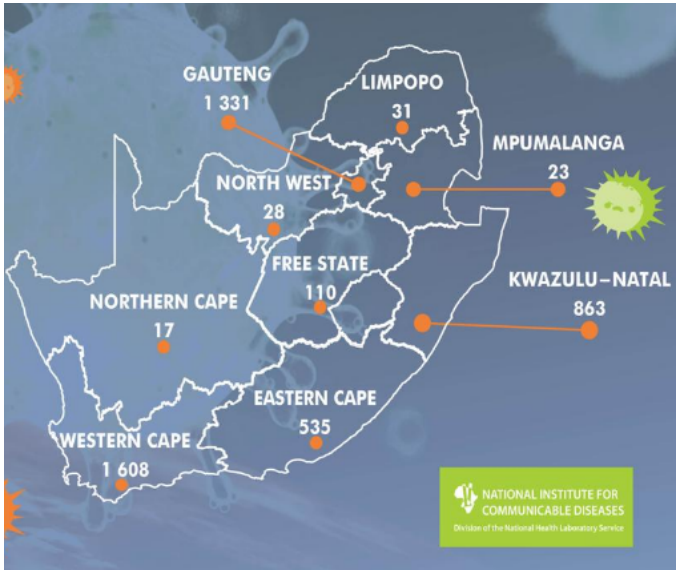
- >2.9 million confirmed cases worldwide
- >870 000 recoveries and >200 000 deaths
- African countries with over 3 thousand cases: South Africa, Egypt, Morocco, Algeria
- Spain continues to ease lockdown
- USA now over 970 000 cases

Source: Statistics - https://www.worldometers.info/coronavirus/
News update – WHO Newsroom https://www.who.int/health-topics/coronavirus#tab=tab_1

UNIVERSITEIT STELLENBOSCH UNIVERSITY

South African update





217 Cuban healthcare workers left Cuba on Saturday to join the fight against coronavirus pandemic in South Africa.

"The advantage of Cuba is that they are a community health model, one that we would like to use,"

Health Minister Zwelini Mkhize

Province	Deaths	Recoveries
Eastern Cape	10	19
Free State	5	76
Gauteng	8	843
KwaZulu-Natal	29	241
Limpopo	2	24
Mpumalanga	0	15
North West	0	13
Northern Cape	0	6
Western Cape	33	236

Source: www.sacoronavirus.co.za Accessed 26 April 2020

Viral pneumonia pathology summarised

- Viral replication and gene expression within respiratory lining epithelial cells leads to cell death and secondary inflammation
- This results in impaired pulmonary defences
- Involvement may be patchy or involve whole lobes
- Pattern: interstitial – widening of alveolar septae by mononuclear inflammatory cells
- Alveolar spaces – proteinaceous exudate may be present
- Ventilation perfusion mismatch results
- Pneumonia may resolve or be complicated by ARDS
- ARDS = pink hyaline membranes (DAD) – generic reaction to many iniuries

Published reports of the pathology of COVID-19

Pulmonary pathology of early phase 2019 novel coronavirus (COVID-19) pneumonia in two patients with lung cancer

Sufang Tian, Weidong Hu, Li Niu, Huan Liu, Haibo Xu, Shu-Yuan Xiao

PII: S1556-0864(20)30132-5
DOI: https://doi.org/10.1016/j.jtho.2020.02.010
Reference: JTHO 1723

To appear in: *Journal of Thoracic Oncology*

- Lobectomy specimens from two patients
- Asymptomatic from COVID-19 at the time
- Early features of the disease
- Typical viral pneumonia is described

Pathological findings of COVID-19 associated with acute respiratory distress syndrome

Zhe Xu, Lei Shi*, Yijin Wang*, Jiyuan Zhang, Lei Huang, Chao Zhang, Shuhong Liu, Peng Zhao, Hongxia Liu, Li Zhu, Yanhong Tai, Changqing Bai, Tingting Gao, Jinwen Song, Peng Xia, Jinghui Dong, Jingmin Zhao, Fu-Sheng Wang*

Lancet Respir Med 2020; 8: 420–22

- Post mortem biopsies – lung, heart, liver
- 50 year old man
- Typical viral pneumonia with organisation and DAD/ARDS

COVID-19 Autopsies, Oklahoma, USA

Lisa M. Barton, MD, PhD,[1] Eric J. Duval, DO,[1] Edana Stroberg, DO,[1] Subha Ghosh, MD,[2] and Sanjay Mukhopadhyay, MD[2]

Am J Clin Pathol 2020;XX:1-9

Pulmonary and Cardiac Pathology in Covid-19: The First Autopsy Series from New Orleans

Sharon E. Fox,[1,2*] Aibek Akmatbekov,[1], Jack L. Harbert,[1], Guang Li,[3] J. Quincy Brown,[3] Richard S. Vander Heide[1*]

https://doi.org/10.1101/2020.04.06.20050575.

- Six patients (2 Oklahoma, 4 New Orleans)
- Typical features of a viral pneumonia and ARDS
- Describe vascular changes – fibrin thrombi
- One acute bronchopneumonia – bacterial infection

Fatal outcomes i COVID-19

Zhonghua Bing Li Xue Za Zhi. 2020 Mar 15;49(0):E009. doi: 10.3760/cma.j.cn112151-20200312-00193. [Epub ahead of print]

[A pathological report of three COVID-19 cases by minimally invasive autopsies].

[Article in Chinese; Abstract available in Chinese from the publisher]
Yao XH[1], Li TY[2], He ZC[1], Ping YF[1], Liu HW[3], Yu SC[1], Mou HM[3], Wang LH[4], Zhang HR[1], Fu WJ[1], Luo T[1], Liu F[1], Chen C[1], Xiao HL[5], Guo HT[1], Lin S[1], Xiang DF[1], Shi Y[1], Li QR[1], Huang X[6], Cui Y[6], Li XZ[7], Tang W[3], Pan PF[6], Huang XQ[2], Ding YQ[8], Bian XW[1].

Methods

Minimally invasive autopsies from lung, heart, kidney, spleen, bone marrow, liver, pancreas, stomach, intestine, thyroid and skin

Report on 3 deceased patients in Chongqing, China

Hematoxylin and eosin staining (HE) and histochemical staining used

PCR was carried out to detect the RNA of 2019-nCoV

- Pulmonary pathology – key role
- Features in other organs – not well described
- Degeneration and necrosis of parenchymal cells
- Hyaline thrombi in small vessels
- More autopsy studies are needed to expand and clarify these findings

J Thromb Haemost. 2020 Apr 17. doi: 10.1111/jth.14849. [Epub ahead of print]

Thromboinflammation and the hypercoagulability of COVID-19.

Connors JM[1], Levy JH[2].

Methods

Peer-reviewed, article is a commentary

- Fibrin thrombi in vessels has been described in the autopsy cases discussed previously in the lung and other organ systems
- It is uncertain if this may also play a role in fatal outcomes

Summary

- We have very limited information at this stage
- Autopsy and lobectomy specimens published to date – less than 10 patients
- Typical viral pneumonia with or without complications of ARDS and bacterial pneumonia
- No known unique features of COVID-19 pathologically at this stage
- Pulmonary pathology leading to respiratory failure – leads to a fatal outcome
- The pathology in other organ systems not yet well described
- There is a need for more autopsy studies to clarify many unanswered questions.

This summary was prepared by
Dr Bruce-Brand
at Stellenbosch University as part of the daily brief to the TBH ICU Team