COVID-19 AND THE HEART

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• Atypical pneumonia cluster: Wuhan Province, China: Dec 2019
• Jan 13th: First reported case outside China
• Jan 30th: WHO declares a PHEIC
• Early patients: visited wet animal market
• Virus isolation studies → Coronavirus (COVID-19, SARS-CoV-2)
  • Single-stranded enveloped RNA virus
  • 89-96% nucleotide overlap with bat coronaviruses
  • 7th human coronavirus: common cold (229E, OC43, NL63, HKU1), SARS-CoV (2002), MERS (2012)

January
22: PHE threat elevated from very low to low
29: 1st reported case in UK

February
23: Italy; 150 deaths and lockdown imposed
28: 1st person-person transmission in UK reported
28: stock market crash

March
23: UK lockdown
25: Prince Charles tests +ve
27: Boris Johnson and Matt Hancock test +ve

April
5: Boris Johnson hospitalised

1,790,191 US
614,849 Brazil
414,878 Russia
276,156 United Kingdom
239,479 Spain
232,997 Italy
191,356 India
189,010 France
183,508 Germany
164,476 Peru
163,942 Turkey

~40,000 UK deaths

The impact of coronavirus on stock markets since the start of the outbreak

Source: Bloomberg, 27 April 2020, 07:00 GMT
ACE2:
Type II alveolar cells
Myocardium
(Intestines, vascular endothelium, kidneys)

• A beneficial enzyme: converts angiotensin II back to angiotensin I
• Opposite effect of ACE1
• Angiotensin II: harmful cardiovascular actions
  • (hypertension, endothelial dysfunction, salt retention, systemic inflammation, myocardial fibrosis)
• ACE-I & ARBs: widely used in cardiology to inhibit action of ACE1

Meta-analysis: COVID +ve patients
• 8 studies: n=46,248
• High prevalence of cardiac disease
  • HT: 17%
  • DM: 8%
  • CVD: 5%
• Other studies suggest presence of underlying cardiac disease increases risk of COVID-related mortality (2-4 fold)

Cardiac disease is more common in elderly
Cardiac disease is more common in certain ethnic groups

COVID infections in BAME community reflects inherent susceptibility to viral infection or is it a confounding effect:
  ➢ higher prevalence of HT/CHD/diabetes
  ➢ other factors (socio-economics, employment, co-dwelling)

Should I discontinue treatment with ACE-I/ARBs
No, all major cardiology societies advise continuation
COVID-19 and Myocardial Injury

2 patterns described: ~7% of all COVID patients

Early phase: D4
• SOB + mild elevation of cardiac biomarkers
• Persistent low troponin: survivors
• Progressive troponin elevation: non-survivors
  ➢ Parallels ↑ of other inflammatory biomarkers
    (D-dimer, ferritin, IL-6)
  ➢ ?part of cytokine storm and multi-organ failure

Late Phase
• Classical viral cardiomyopathy
• Stress cardiomyopathy
• Thrombo-embolic micro-vascular necrosis