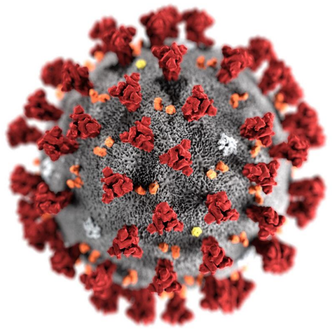
COVID-19 in Children and Transplantation



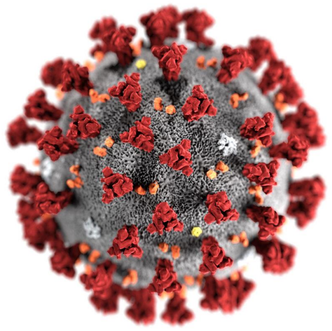
Prof. AJ Baker

King's College Hospital NHS
NHS Foundation Trust

KING'S College LONDON

King's College Hospital

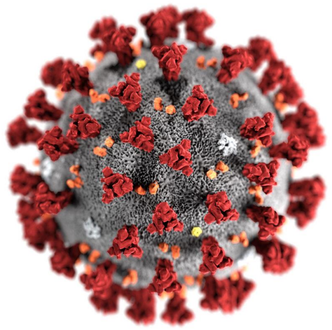
COVID-19 in children



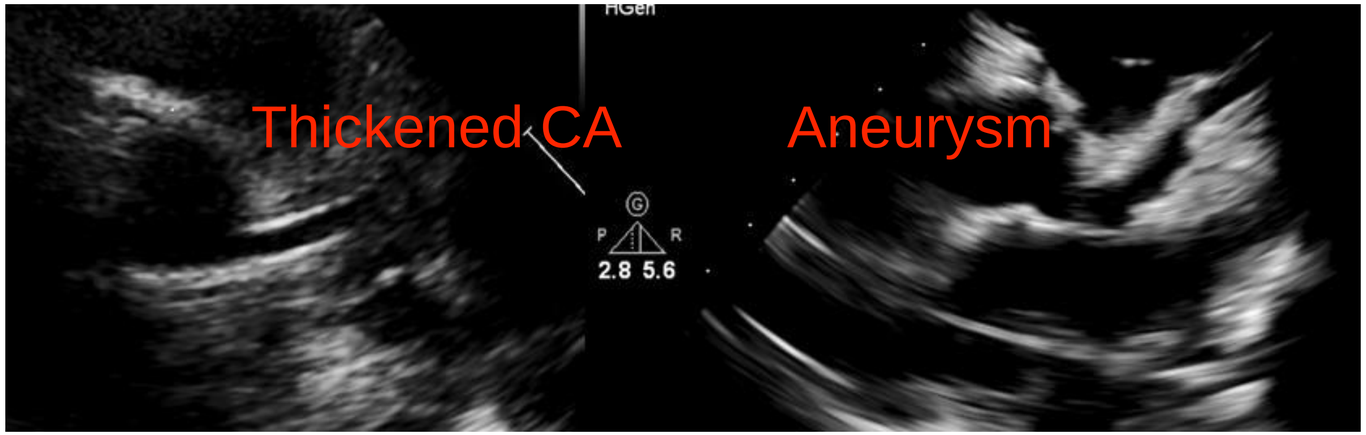
- Probably similar infection and excretion rate to adults
- Many less symptoms in children
- Testing not yet consistent making interpretation hazardous
- Symptom severity of second phase very low
- 12 deaths in UK to date - including 1 age 13 without co-morbidities of pneumonia at KCH and 1 term newborn in Cambridge
- Kawasaki/Toxic shock syndrome late phenomenon - international description of up to 100 cases
- Deaths in New York:

AGE	Number of Deaths	Share of deaths	With underlying conditions	Without underlying conditions	Unknown if with underlying cond.	Share of deaths of unknown + w/o cond.
0 - 17 years old	9	**0.06%**	6	3	0	0.02%
18 - 44 years old	601	**3.9%**	476	17	108	0.8%
45 - 64 years old	3,413	**22.4%**	2,851	72	490	3.7%
65 - 74 years old	3,788	**24.9%**	2,801	5	982	6.5%
75+ years old	7,419	**48.7%**	5,236	2	2,181	14.3%
TOTAL	**15,230**	100%	11,370 (75%)	99 (0.7%)	1,551 (24.7%)	25.3%

COVID-19 with Kawasaki or Toxic Shock-like features



- 8 children, 4-14 years, 5 male, 6 raised BMI, 6 no co-morbidities
- Previous COVID exposure, fever, rash, abd. pain,
- Liver USS - 1 bright portal tracts, GB hydros and ascites
- Toxic shock, coronary aneurysms, Resp support, 1 ECMO
- Treatment IgG, antibiotics, aspirin
- 3/8 evidence of COVID present or previous
- 1 died of large cerebral infarct
- 7 survived - coronary surveillance



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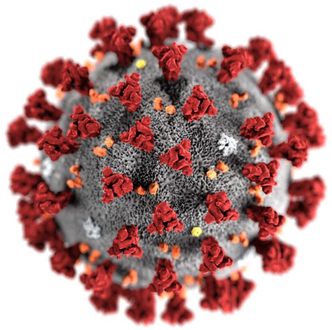
Hyperinflammatory shock in children during COVID-19 pandemic

Shelley Riphagen et al.

COVID-19 in children with chronic illnesses



- Co-morbidites associated:-
- 5: cerebral palsy, prematurity, chronic lung disease, Wilson disease, and dilated cardiomyopathy.
- 4 patients (80%) were from a BAME group
- Respiratory support was required in 3
- 5 received antibiotics, 1 received antiviral therapy (remdesivir), 1 was treated with hydroxychloroquine
- 2 had pre-existing liver disease, 2 others had liver dysfunction
- During the same period of time, 7 without co-morbidities were admitted with COVID-19
- No deaths among these

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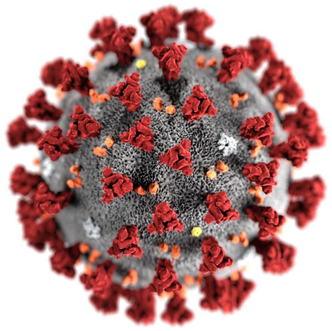
Ethnicity and COVID-19 in children with comorbidities Katharine Harman

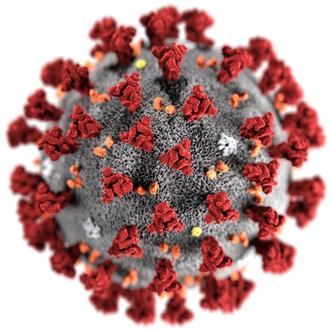
COVID-19 and transplantation



- Reduced organ donation
- Reduced access to transplant facilities
- Staff redistributed
- Hesitancy to transplant during pandemic
- Unknown additional events and risks
- Risk to live donors
- Italian data - Transplant Programs reduced their outpatient activity both in terms of pre-transplant evaluation (68% of the centers) and transplant recipient follow-up (100%); a reduction in transplant activity was observed in the first two weeks of March only in the north-central macro area (23 LTs vs 39 in 2018 and 60 in 2019)
- UK Organ donation of livers fell from 22/m to 12/m

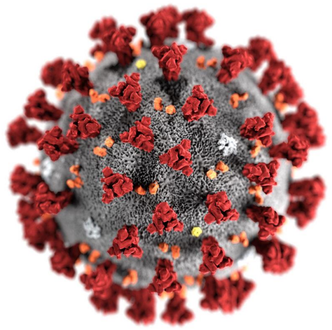
Preliminary Analysis of the Impact of COVID-19 Outbreak on Italian Liver Transplant Programs

COVID-19 in children at time of transplantation



- 2 cases described
- 1 Complications include increased duration of ventilation
- 1 LROLT from Italy developed COVID on D4 with fevers, diarrhea and moderate respiratory distress. Peak of transaminases D6. Recovered with hydroxychloroquine, reduced immunosuppression and intravenous gamma globulin (IVIG).
- Our experience - 1 case in liver failure of WD, mild symptoms, cleared over 3 weeks, transplanted uneventfully afterwards.

COVID-19 in children under immunosuppression



- 18 children from 16 paediatric nephrology centres across 11 affected countries

Underlying kidney disease and reason for immunosuppression	
Kidney transplantation	11 (61%)
Nephrotic syndrome	3 (17%)
Antineutrophil cytoplasmic antibody-associated vasculitis	2 (11%)
Atypical haemolytic uraemic syndrome	1 (6%)
End-stage kidney disease with inflammatory bowel disease	1 (6%)

Glucocorticoids	12 (67%)
Tacrolimus	12 (67%)
Mycophenolate Mofetil	9 (50%)
Rituximab	3 (17%)
Azathioprine	2 (11%)
Basiliximab	1 (6%)
Cyclophosphamide	1 (6%)

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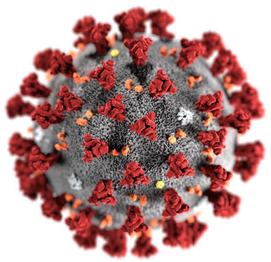
The severity of COVID-19 in children on immunosuppressive medication

Matko Marlais

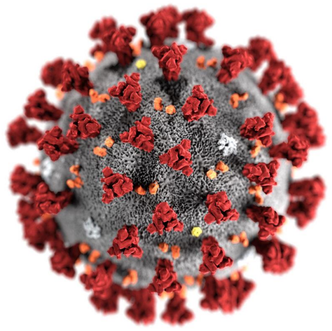
COVID-19 in children under immunosuppression



- 18 children from 16 paediatric nephrology centres across 11 affected countries
- The low number of children in a global survey is consistent with a study from Lombardy, Italy. 3 reported cases of children with transplants in Italy who tested positive for COVID-19. None of those children developed lung disease.
- Similar experience in cardiac transplant patient on tacrolimus - de novo donor-specific Class II antibodies were also detected during the infection
- ‘Child with liver transplant recovers from COVID-19 infection. A case report’ - CXR changes, reduced immunosuppression, no specific treatment.

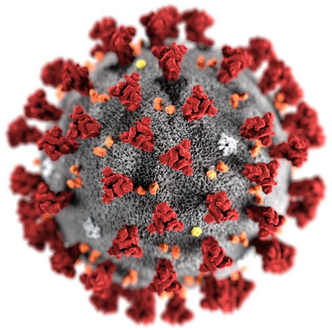
Maximal respiratory support required		
	High-flow nasal cannula oxygen	1 (6%)
	Supplemental face mask oxygen	2 (11%)
	None	15 (83%)
Outcome		
	Admitted to intensive care	0 (0%)
	Admitted to hospital	11 (61%)
	Not admitted to hospital at any point	7 (39%)

COVID-19 in children under immunosuppression



- Few problems in children so far
- However, adult general mortality (50%) is associated with vasculopathies and DM
- Long term immunosuppression is associated with DM and metabolic syndrome
- An additional complication on any future complication?
- Isolation of at risk patients and short timescale mean that full picture is not clear
- Influencing factors to be elucidated

Conclusions



- Covid endemicity seems likely - a problem here to stay for Tx
- Ensure patients are negative at Tx - sequential screening protocol
- Infection at Tx has significant risk but mortality is uncommon
- Organ availability and resources reduced - increased costs of Tx
- Covid could complicate later events such as PTLD
- Long term risks of COVID with immunosuppression and metabolic syndrome possible

Thank you