

BRIEF COMMUNICATION

Increased incidence of complicated appendicitis during the COVID-19 pandemic

The fog of uncertainty surrounding COVID-19 has begun to clear as information about the virus accumulates from around the world. Governments have had varying responses to the pandemic, indicative of this uncertainty. The Australian government's restrictions have to date been effective in slowing spread of viral infections but may have had unintended consequences on other health conditions as a result. Paediatric emergency department presentations have decreased as people are reluctant to leave home and risk contracting the virus whilst attending hospital.¹ These delays to presentation have the potential to increase morbidity and mortality from non-COVID-19 related diseases.

Our institution is the largest children's hospital in Australia and performs between 350 and 400 appendectomies each year. Using appendicitis as a bellwether, we wanted to see if there was evidence for later presentations in our hospital.

Methods

We conducted a retrospective audit of appendectomies during the COVID-19 pandemic and compared the incidence of complicated appendicitis to the same period in 2019 and to long-term historical data. We used the period from 16 March to 5 May 2020, which represents the period from when border closures and social distancing measures were introduced to when restrictions began to ease. Complicated appendicitis is a marker of late presentation and is defined as free pus, gangrene or perforation on histopathology. Uncomplicated appendicitis is defined as transmural (rather than just mucosal) inflammation without the

above features. Statistical tests were conducted using Stata Version 14 (StataCorp Pty Ltd, College Station, TX, USA). An exemption of ethics review was granted by the local Human Research Ethics Committee.

Results

There were no significant demographic differences across time periods (Table 1). There was no significant change in the number of appendicitis cases. Complicated appendicitis was significantly more common during the pandemic (60.5% of confirmed cases) relative to the same period last year (30.4%), and to historical controls from our hospital (34.2%). The operation time and hospital length of stay were similar during the three time periods.

Discussion

The observed increase in complicated appendicitis is most likely due to COVID-19. There have been neither changes in patient demographics nor the rate of appendicitis during the pandemic to explain the change. Children are being seen more promptly in the emergency department and operations are being done sooner due to the reduction in elective surgery.

These findings, although based on a relatively small sample, indicate a worrying trend towards delayed presentation of appendicitis. This has the potential to increase morbidity from this common childhood condition and is perhaps a marker of a broader problem. A reduction in appropriately timed medical

Table 1 Demographics and incidence of complicated appendicitis

	COVID-19 period 2020 (<i>n</i> = 48)	Corresponding period 2019 (<i>n</i> = 57)	Historical data 2014–2018 (<i>n</i> = 1332)	<i>P</i> value
Age, years, median (IQR)	11.0 (7.8–13.0)	10.2 (8.4–13.3)	10.8 (8.4–12.8)	0.98
Sex, female, <i>n</i> (%)	20 (41.7)	22 (38.6)	539 (40.5)	0.95
ASA status classification, <i>n</i> (%)				0.55
1	38 (79.2)	49 (86.0)	1071 (80.4)	
2	8 (16.7)	6 (10.5)	237 (17.8)	
3	2 (4.2)	2 (3.5)	21 (1.6)	
4	0 (0.0)	0 (0.0)	3 (0.23)	
Appendicitis on histology, <i>n</i> (%)	38 (79.2)	46 (80.7)	1079 (81.0)	0.85
Complicated appendicitis (of confirmed appendicitis cases), <i>n</i> (%)	23 (60.5)	14 (30.4)	369 (34.2)	0.006
Complicated appendicitis (of entire cohort), <i>n</i> (%)	23 (47.9)	14 (24.6)	369 (27.7)	0.02
Operation time, min, median (IQR)	53 (39–71)	52 (37–68)	46 (34–61)	0.76

P values presented for χ^2 comparisons between proportions and Kruskal Wallis comparison of medians. ASA, American Society of Anesthesiologists; IQR, interquartile range.

care for a range of acute and chronic conditions could lead to an increase in complications and poor outcomes. Parents need to be reassured it is safe to bring their child to hospital, particularly in Australia where community transmission rates are low.

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References

- 1 Isba R, Edge R, Jenner R, Broughton E, Francis N, Butler J. Where have all the children gone? Decreases in paediatric emergency department attendances at the start of the COVID-19 pandemic of 2020. *Arch Dis Child* 2020; **105**: 704.



The physical examination by Dr Subodhini Kulathunga