The influence of the COVID-19 pandemic on the management of pediatric appendicitis; an international multicenter cohort study

CONNECT study

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Disclosures

- No disclosures

Considerable impact of COVID-19 on healtcare systems

Impact of COVID-19 pandemic

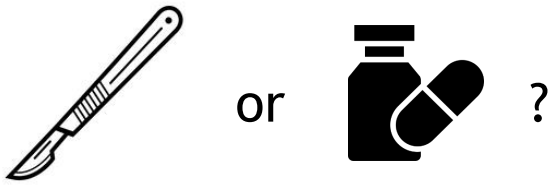
- Hospital resources → ICU/COVID-units
- OR capacity

Decrease of pediatric emergency department visits (1st wave)[1,2]

- Fear for COVID-19?
- Governmental lockdown measures?

Positive results of non-operative treatment of acute appendicitis[3,4]

- More non-operative treatment strategies?



1. Neufeld, Surgery, 2021
2. Tankel, World J Surg, 2020
3. Minneci, JAMA, 2020
4. Huang, JAMA Pediatr, 2017

Aim of the study

To investigate:

- The number of patients treated for complex appendicitis versus simple appendicitis
- Changes in treatment and outcomes
  - Surgical vs non-surgical treatment
  - Complications
- Proportion of patients tested for COVID-19

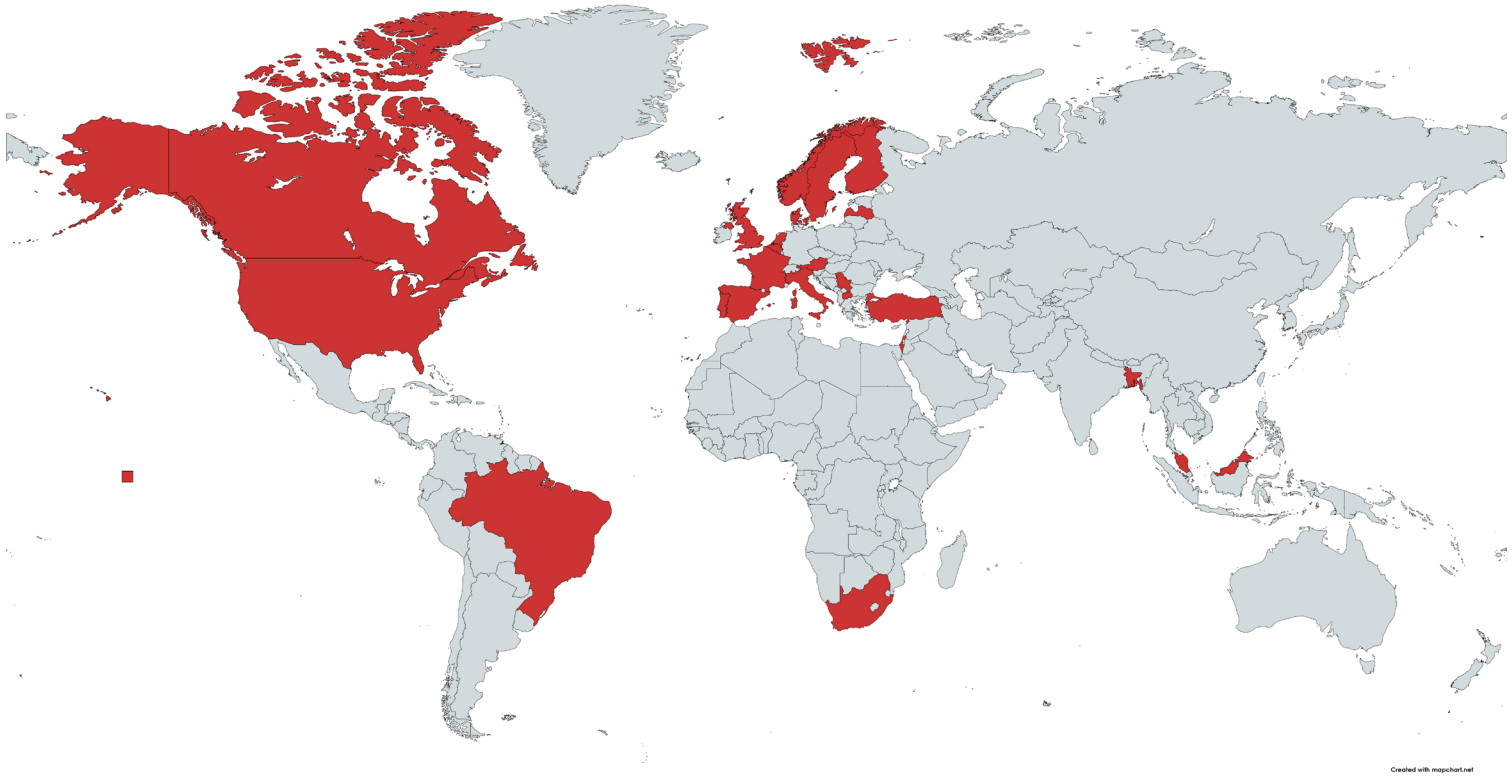
Patients and methods

Multicenter (40 hospitals)
comparative cohort study

2019-2020

Children (<18y) treated
for acute appendicitis

Non-operative treatment
without radiological confirmation of appendicitis



Definitions

Definition of COVID-19 pandemic

- Start date → individually defined by participating centers
- End date = 31st of December 2020

Example: Amsterdam start March 2020

- COVID period: March – December 2020
- Non-COVID period: March – December 2019

Type of appendicitis

- Predefined intraoperative and histopathological criteria

Outcomes and analysis

Outcome measures

- Proportion of patients:
  - treated for complex appendicitis
  - treated non-operatively
  - experiencing a complication
  - tested for COVID-19

Descriptive statistics

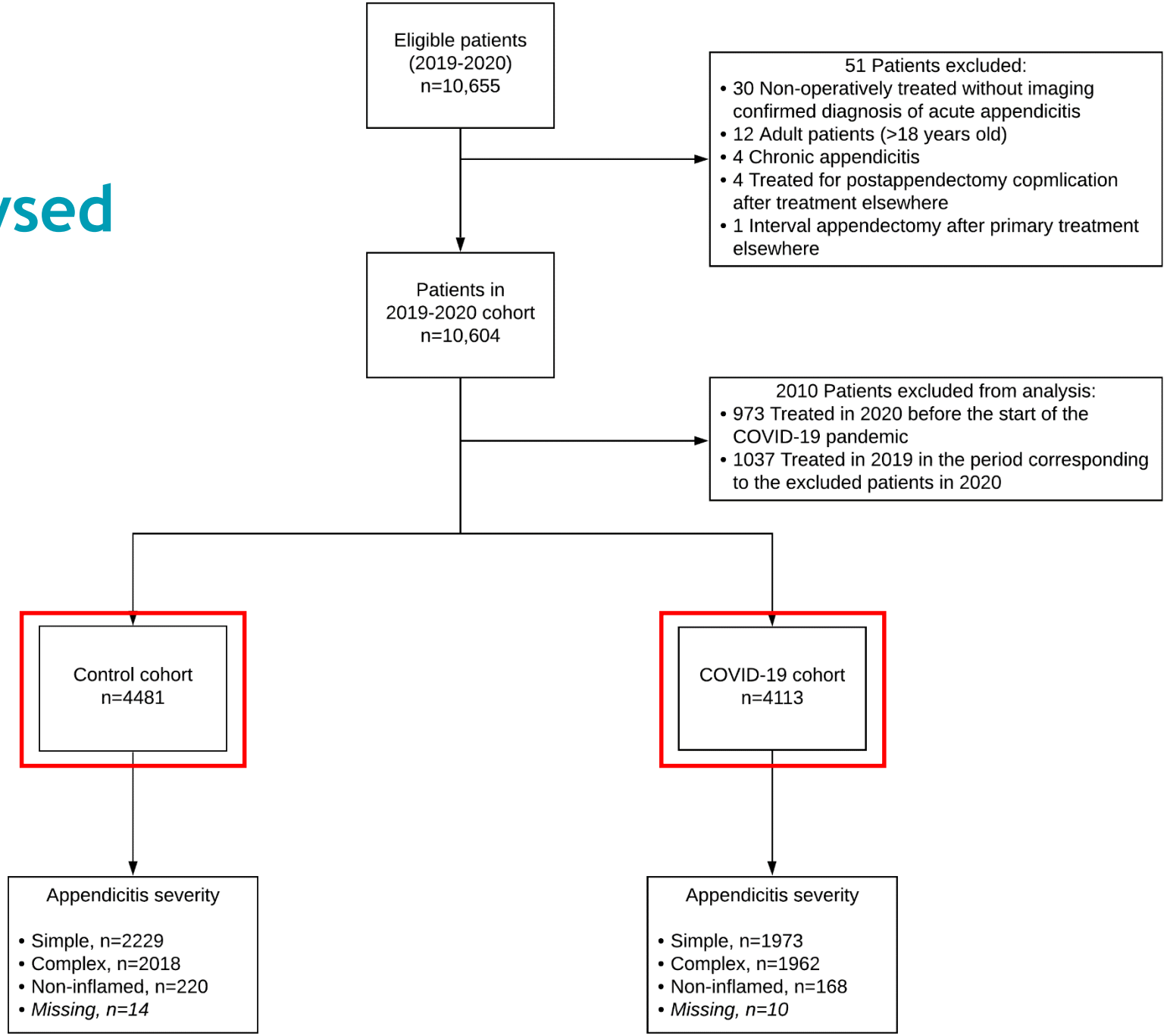
Differences in proportions and 95% CI

>8000 patients analysed

2019-2020

N=10604

N=8594



Significantly higher proportion of patients with complex appendicitis during COVID-19

- Difference in proportion of complex appendicitis = 2.7%; 95%CI 0.5-4.8%

Characteristics	Control cohort (n= 4480)	COVID-19 cohort (n= 4113)	*p*-value
Severity of appendicitis			0.02
- **Simple**	2229 (49.7%)	1973 (48.0%)	
- **Complex**	2017 (45.0%)	1962 (47.7%)	
- **Non-inflamed (sana)**	220 (4.9%)	168 (4.1%)	
Missing values	14 (0.3%)	10 (0.2%)	

No difference in the proportion of patients treated non-operatively

Characteristics	Control cohort (n= 4480)	COVID-19 cohort (n= 4113)	*p*-value
Treatment strategy			**>0.05**
- **Non-operative treatment**	327 (7.3%)	316 (7.7%)	
- **Operative treatment**	4153 (92.7%)	3797 (92.3%)	
Surgical approach			**0.02**
- **Laparoscopic**	2889 (64.5%)	2748 (66.8%)	
- **Open**	1191 (26.6%)	967 (23.5%)	
- **Laparoscopic converted to open**	69 (1.5%)	75 (1.8%)	
- **Other**	4 (0.1%)	7 (0.2%)	

No difference in complications

Characteristics	Control cohort (n= 4480)	COVID-19 cohort (n= 4113)	*p*-value
No. of patients with a complication	496 (11.1%)	478 (11.6%)	**>0.05**
Missing	8 (0.2%)	4 (0.1%)	
Patients with a minor complication (CD I-II)	323 (7.2%)	325 (7.9%)	**>0.05**
Patients with a severe complication (CD III-IV)	168 (3.7%)	149 (3.6%)	**>0.05**
Death (CD V)	1 (<0.1%)	1 (<0.1%)	**>0.05**
Missing	12 (0.3%)	8 (0.2%)	

75.2% of patients were tested for COVID-19

Characteristics	Control cohort (n= 4480)	COVID-19 cohort (n= 4113)
Patients screened for COVID-19		
- **Yes**	-	3095 (75.2%)
- **No**	-	997 (24.2%)
Missing values	-	21 (0.5%)
Test results		
- **Test positive**	-	71 (1.7%)
- **Test negative**	-	2998 (72.9%)
- **Inconclusive/unknown**	-	26 (0.6%)

Limitations

- Definition of COVID period
- Possible shift of patients with complex appendicitis
- Partly retrospective cohort

Diagnosis and treatment of pediatric appendicitis was relatively unaffected by the COVID pandemic

- Slightly higher proportion of patients with complex appendicitis during COVID-19
- No significant difference in proportion of non-operatively treated patients
- Despite the impression that COVID-19 influenced the management of pediatric surgical patients, this was not the case for appendicitis in this large dataset

Thank you for your attention!

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