

# Appendicitis in COVID19 Pandemic Era.

## Early experience of an International Referral Center of Pediatric Surgery



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### Appendicitis in COVID19 Pandemic Era. Early experience of an International Referral Center of Pediatric Surgery

**AIM:** We describe treatments of acute appendicitis at "Bambino Gesù" Children's Hospital during the peak of the Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) pandemic in Italy.

**MATERIAL AND METHODS:** From March 1st to May 31st, all suspected appendicitis admitted to hospital entered this study. Following Institutional COVID19-protocol, between March 1st-21st, only patients with respiratory symptoms and/or history of recent travel to risk areas received nasopharyngeal swab. From March 22nd to May 31st, protocol was adapted to worsening epidemic conditions and a pre-triage area has been arranged to accommodate all patients undergoing the swab.

**RESULTS:** 14 out of 53 patients were hospitalized between March 1st-21st, 39 from March 22nd to May 31st. Swab was performed in 2 patients of first group and in all of second.

**DISCUSSION:** During the study period, no COVID19-contagion occurred in hospital staff by COVID19-patients.

**CONCLUSION:** Our COVID19-protocol protected staff and patients allowing the maintenance of our standard of treatment.

**KEY WORDS:** Appendicitis, Children, COVID19, SARS-CoV-2

### Introduction

We focused on the treatment of acute appendicitis at the Surgery Department of Bambino Gesù Children's Hospital during the acute phase of the Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) pandemic in Italy.

We thought to share our experience based on the latest relevant guidelines<sup>1,2</sup>.

### Materials and Methods

All patients admitted to our Institution from March 1st to May 31st with suspected appendicitis, were included in this retrospective study.

According to institutional COVID19-protocol, from March 1st to March 21st, the nasopharyngeal swab (polymerase chain reaction for Coronavirus SARS-CoV-2) was performed only in patients with a history of respiratory symptoms and/or travel to risk areas in the previous 2 weeks. From March 22nd to May 31st, Institutional COVID 19 protocol has been adapted to worsening conditions of international epidemic situation and all patients with fever and/or respiratory symptoms received the swab in a pre-triage area specially set-up. All evaluations were performed with a third level Personal Protective Equipment (PPE) (Filtering Face Piece (FFP3) masks, gloves, glasses and full suit).

Until the results of the nasopharyngeal swabs these patients were admitted to a dedicated ward. According to our protocol, COVID19-positive patients were then transferred to a previously equipped secluded facility of the Hospital. Negative patients were sent to the reference departments. In this way, the central seat of our Institution never hosted COVID19-positive patients, protecting hospitalized patients and healthcare personnel. All patients with suspected appendicitis underwent blood tests and abdominal ultrasound<sup>3</sup>. Patients were kept fast-

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## ABBREVIATIONS

Corona Virus Disease 2019 (COVID19)  
 Filtering Face Piece (FFP3)  
 Personal Protective Equipment (PPE)  
 Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2)

ing with fluid and antibiotic therapy (Ceftriaxone and Metronidazole). Waiting for the swab's result, C-reactive Protein, blood count and a new physical examination were repeated if the general conditions worst. For patients in stable or improving conditions conservative treatment was continued. Patients worsening underwent surgery.

## Results

Of the 53 total patients with diagnosed appendicitis (Table I), 14 were hospitalized from March 1<sup>st</sup> to March 21<sup>st</sup>. Of these, 12 patients didn't perform swab and were treated with appendectomy (11 patients: 9 laparoscopy, 2 open surgery) or conservative therapy (1 patient); 2 patients performed the swab and underwent laparoscop-

ic appendectomy using endoloop to close the appendix stump <sup>4</sup>.

The remaining 39 patients, hospitalized from March 22<sup>nd</sup> to May 31<sup>st</sup>, performed the nasopharyngeal swab. Four patients received antibiotic therapy. Thirty-five patients underwent laparoscopic appendectomy: 1 during the swab analysis, 34 after the result. No patient had any surgical or anesthetic complications <sup>5</sup>. All patients who performed the swab tested negative for COVID19.

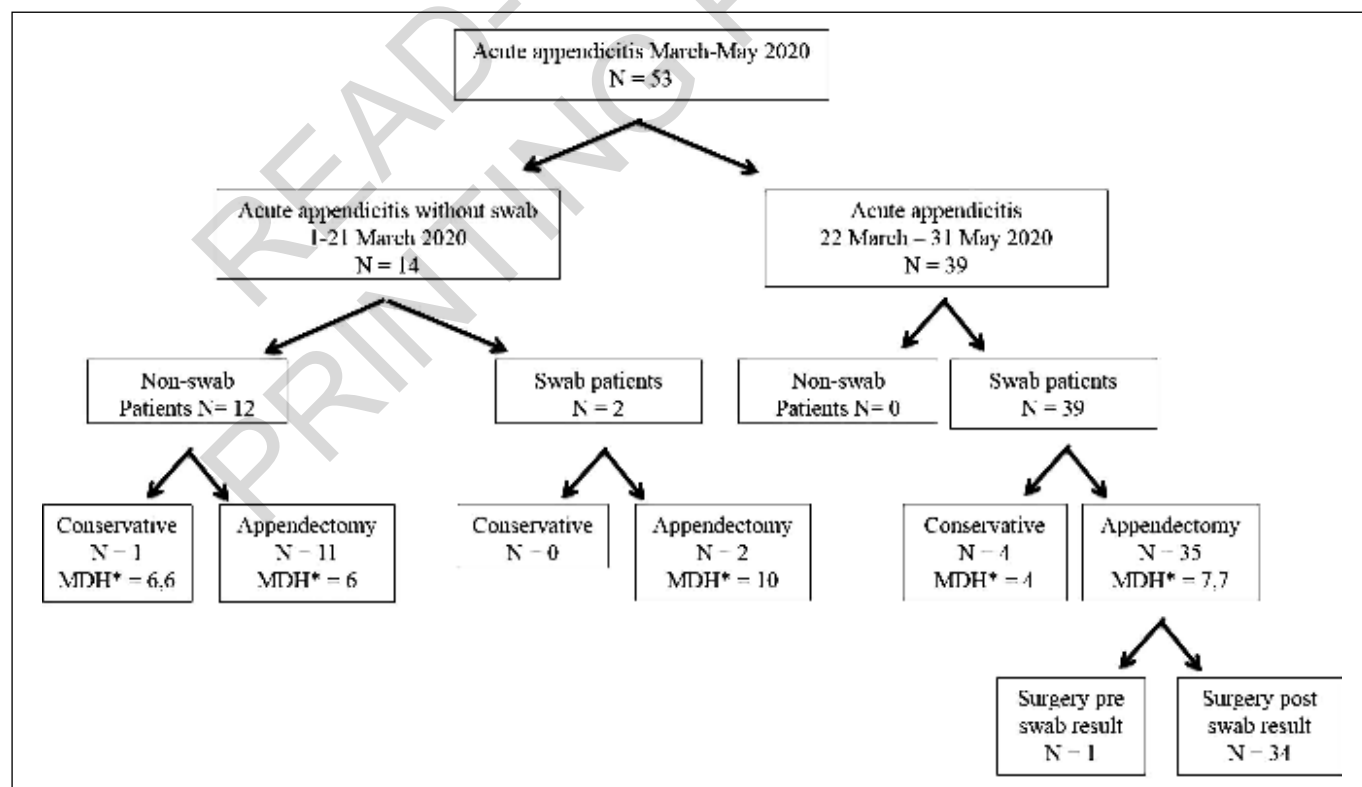
We found no significant differences between length of stay in the treatment of appendicitis in the same period of 2019 and during the pandemic ( $p > 0.05$ ), neither about the complications rate (Table I).

## Conclusions

On January 2020, the World Health Organization declared SARS-CoV-2 an international public health emergency <sup>6,7</sup>. In this COVID19 pandemic, the paediatric population is affected mildly by the virus as compared to adults.

Ti et al. suggested that all patients should be intubated and extubated in the operating room in order not to contaminate other areas <sup>8</sup>. Even in our institute, these procedures were performed within the same operating room, which was then sanitized, according to our COVID19-protocol.

TABLE I - Flowchart treatment appendicitis March-May 2020.



\*MDH = Mean days of hospitalization.

Other Authors recommended the use of PPE for all the staff in the operating room and suggested the importance of a smoke extraction system during surgery. They also recommended a low pneumoperitoneum pressures during laparoscopic surgery <sup>1,2</sup>.

In our case, we mainly performed laparoscopic operations using low pneumoperitoneum pressures and gas aspiration systems, especially during the trocar's extraction.

Only 1 patient underwent surgery before the swab's result; all the surgical staff were equipped with PPE, as per protocol.

Based on the course of patients treated for appendicitis during this period (length of stay and evolution of clinical conditions), we believe that conservative treatment is advisable whenever possible, leaving surgery to worsening or complicated cases.

In our opinion, surgery should not be delayed pending the outcome of the nasopharyngeal swab if patient's clinical conditions are critical or could become so.

In our experience, in only one patient it was necessary to perform surgery before the result of the nasopharyngeal swab, due to an important peritonitis at the access to the emergency room.

From March 2020 to May 2020, we had no COVID19 infections in our Hospital staff transmitted by positive patients. This is the result of our COVID19-protocol, which provides an evaluation of suspect patients in a pre-triage area and subsequent hospitalization in a dedicated ward, pending swab's result. We created two different paths, for COVID19-positive patients and negative ones using two branches of our Hospital. In this way, all surgical staff and hospitalized patients were protected, allowing the maintenance of the standard of treatment without having a delay in diagnosis.

This study presents some limitations, one is certainly the small number of cases included to analysis for the limited time available for this preliminary study, which would require a multicenter study to have a wider and more significant case history with a longer follow-up.

### Riassunto

SCOPO DELLO STUDIO: L'obiettivo del nostro studio è stato quello di descrivere il trattamento dei pazienti giunti presso l'Ospedale Pediatrico Bambino Gesù, affetti da appendicite acuta, durante il picco della pandemia da Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) in Italia.

**MATERIALI E METODI:** Sono stati presi in considerazione tutti i pazienti giunti presso il nostro Ospedale affetti da appendicite acuta tra il 1° marzo ed il 31 maggio. Seguendo il protocollo del nostro Ospedale per il COVID19, tra il 1° e il 21 marzo, solo i pazienti con sintomi respiratori e/o storia di viaggi recenti in aree a rischio sono stati sottoposti a tampone nasofaringeo. Dal 22 marzo al 31 maggio, il protocollo è stato adattato al peggioramento delle condizioni epidemiche ed è stata predisposta un'area pre-triage per accogliere tutti i pazienti sottoposti al tampone in attesa del risultato.

**RISULTATI:** 14 pazienti su 53 sono stati ricoverati tra l'1 e il 21 marzo, 39 dal 22 marzo al 31 maggio. Il tampone è stato eseguito in 2 pazienti del primo gruppo ed in tutti quelli del secondo.

**DISCUSSIONE:** durante il periodo preso in considerazione per il nostro studio, nessun contagio COVID19 si è verificato nel personale ospedaliero da parte dei pazienti COVID19.

**CONCLUSIONI:** Questo studio conferma come il nostro protocollo per il COVID19 ha protetto sia il personale che i pazienti consentendo il mantenimento del nostro standard di trattamento.

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