



# COVID-19 INFECTION EMERGING AS AETIOLOGY FOR INTUSSUSCEPTION IN CHILDREN: A CASE SERIES AND LITERATURE REVIEW

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## ABSTRACT



Covid-19 infection has been a catastrophic medical emergency worldwide. A total of 505, 817, 903 cases has been reported worldwide with 6,213,876 deaths. Children are not spared from the infection and latest Malaysian statistics states that 580, 000 Covid 19 infection has been confirmed among children. Intussusception has been shown to be a gastrointestinal manifestation of Covid-19 and we are reporting a case series of 3 children. Covid-19 presents mostly with respiratory symptoms and from a review of 23 studies, gastrointestinal symptoms are rare. Angiotensin II converting enzyme used by this virus to enter the enterocytes causes the symptoms and this is supported by a study that found most children had persistent virus cultured from rectal swab despite clearance from respiratory tract. These leads to hypertrophy of Peyer's patches and intussusception. So far there has been 11 case reports worldwide on intussusception presented with Covid-19 infection. We discuss 3 children of which 2 of them had successful ultrasound guided hydrostatic reduction and one had spontaneous reduction. Knowing the relationship and early identification of gastrointestinal symptoms associated with Covid-19 infection will aid in early detection and management of Intussusception.

Keywords: Covid-19, Intussusception, Children.

## INTRODUCTION

Covid 19 infection has been a catastrophic medical emergency causing devastating situations in all the health care centres worldwide. Up to April 2022 WHO has reported 505,817,903 of confirmed infections worldwide with 6,213,876 deaths.

Malaysia confirmed its first case on 4/2/2020 and as of April 2022 4,310,599 cases has been confirmed in Malaysia with 35 500 deaths. Up to January 2022 a total of 580,000(13%) cases confirmed among children with 269,773 cases between the age of 5 to 11. A total of 144(0.4%) deaths has been reported among children. This data is almost similar to the American Academy of Paediatrics reporting 12,900,231(19%) cases to date.

Common symptoms among children are respiratory symptoms, fever followed by gastrointestinal symptoms. More serious infection can lead to Multi System Inflammatory Syndrome in Children (MIS-C) and between Jun 2020 to December 2021, 174 cases of MIS-C was identified and treated among children in Malaysia.

Intussusception is one of the surgical emergency in paediatric patients. The reported incidence is 0.33-0.71/1000 person. Some are caused by pathological lead points where else some are associated with viral illness. Covid 19 presenting with intussusception is very rare and to date there are only few case reports published.

## CASE SUMMARIES

### Case Summary 1

A 3 months old boy presented to district Hospital with fever. RTK test done was positive and child was admitted for category 2 illness. Apart from fever he was still able to tolerate breast feeding. On day two of admission he developed diarrhoea and stool was noted to have blood streak. Day three of admission child started to have non billious vomiting. He was kept nil by mouth and referred to our centre. An urgent ultrasound was arranged in HSJ which confirmed a finding of Ileo-Colic intussusception.

He was transferred to HPP and resuscitated upon admission. BP was 100/74, pulse rate 130 bpm, respiratory rate of 30 breath per minute, temperature 37°C and SPO2 of 99%. Abdomen was soft and not distended with no palpable mass. He underwent ultrasound guided hydrostatic saline reduction which was successful at the first attempt with apex over the hepatic flexure. After 4 hours from reduction he was allowed oral and discharged after 2 days of observation.

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### Case Summary 2

A 1 year 3 months old child was referred from a district Hospital. He contacted covid from his mother and develop fever and cough. Covid PCR was positive and he was monitored at home by parents. However on day 7 of illness he develop diarrhoea and noted to have blood streaks. He then develop non billious vomiting.

Upon admission he was tachycardia with pulse rate of 124 bpm, BP 107/69, temperature 37°C, SPO2 97% on room air. He was resuscitated and transferred to HPP. Ultrasound guided Hydrostatic saline reduction was successful at single attempt with apex noted over the splenic flexure region. He was allowed feeding 8 hours post reduction and discharged 36 hours after observation.

### Case summary 3

A 2 year 3 months old boy was referred from IPT USM for intermittent colicky abdominal pain with non billious vomiting. He also has intermittent mild cough as he recently contacted Covid 19 infection 12 days prior confirmed by a Covid RTK test.

Ultrasound done showed intussusception with target sign over right hypochondriac region. Upon transfer to HPP his pain resolved and a repeat Ultrasound showed spontaneous reduction of intussusception evidenced by thickened ICV and terminal ileum with enlarged mesenteric lymph nodes. He was observed and



Figure 1. Case 1 ultrasound image

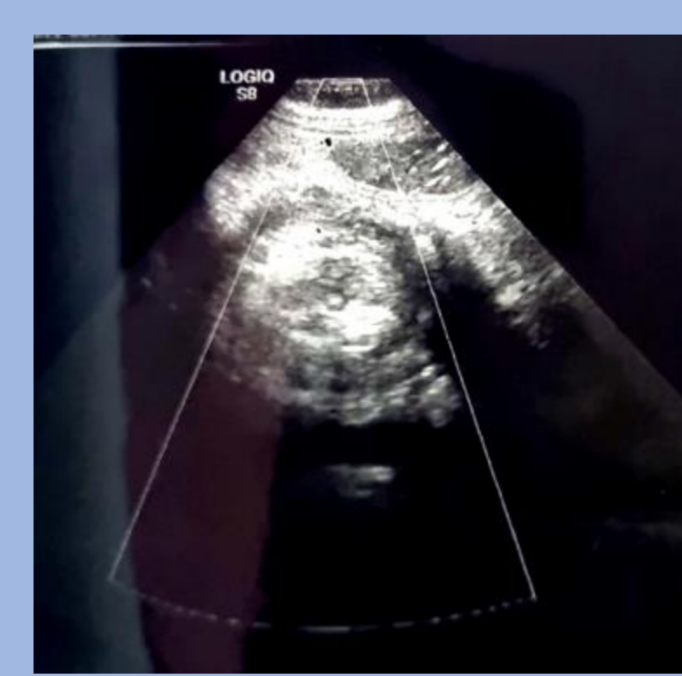


Figure 2. Case 2 ultrasound Image

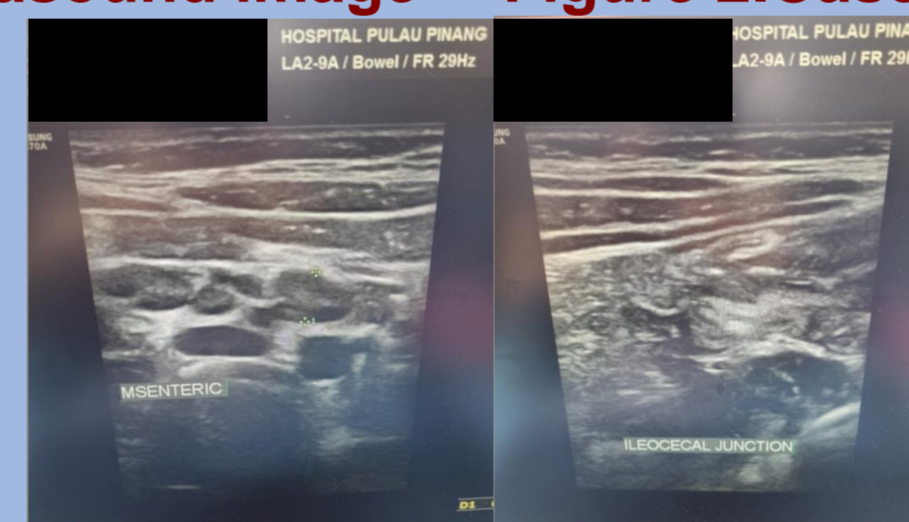


Figure 3. Case 3 ultrasound Image

From a review of 23 studies with 452 patients fever (43.1%) and cough (43.3%) accounts for most common symptoms where else diarrhoea (6.6%) and vomiting (5.8%) only contributes to rare symptoms from Covid-19 infection.

One of the most common cause of intestinal obstruction in children is intussusception. The aetiology remains idiopathic and only 10% has a lead point. Mesenteric lymphadenopathy resulting from hypertrophy of the Peyer's patches secondary to viral infection remains one of the cause. A seasonal variation of viral infection was found to be associated with seasonal variation of intussusception by Butcher et al. Involvement of gastrointestinal tract in Covid 19 is related to Angiotensin II converting enzyme used by this virus to enter the enterocytes of the small intestine and colon. This is supported by a study showing 8/10 COVID-19 children having persistent positive rectal swabs by Xu et al, even after the disappearance of the virus from the respiratory tract.

We are looking at a series of children infected with Covid-19 presenting with intussusception from a single centre. It is rare and up to date there are only about 11 case reports published worldwide from a literature review by Tran C D et al. Table 1 shows the summary of all the cases published till date comparing the demographics, management and outcome of each patients. 2/11 patients from the review succumbed due to complications from Covid 19 infection despite aggressive treatment.

## CONCLUSION

Similar to other viral illness in children, Covid-19 has also emerged to be a predisposing factor leading to intussusception especially in infants. Knowing the relationship and early identification of gastrointestinal symptoms associated with Covid-19 infection will aid in early detection and management of intussusception in children. Thus complications such as bowel ischemia and mortality can be prevented.

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Author	Gender, Age, Country	Respiratory Symptoms	GI Symptoms	Imaging	Treatment	Outcome
Makrinioti et al., (2020)	F, 10M, China	Upon Admission	Vomiting, Blood in stool	US	Pneumatic reduction, Surgery	Deceased
Makrinioti et al., (2020)	F, 10M, UK	Two weeks	Vomiting, Blood in stool	US	Pneumatic reduction, Surgery	Recovered
Bazuaye- Ekwuyas et al., (2020)	M, 9M, US	Four days	Vomiting, pain, blood in stool	US	Hydrostatic reduction	Recovered
Athammah et al., (2020)	M, 2.5M, US	No	Vomiting, pain, blood in stool	US	Pneumatic reduction	Recovered
Moazzam et al., (2020)	M, 4M, Pakistan	One week	Pain, Blood in stool	US	Pneumatic reduction	Recovered
Martinez- Castaño et al., (2020)	M, 6M, Spain	No	Vomiting, pain, blood in stool	US	Hydrostatic Reduction	Recovered
Cai et al., (2020)	F, 10M, China	No	Vomiting, Blood in stool	NA	Surgery	Deceased
Rajalakshmi et al., (2020)	M, 8M, India	No	Vomiting, Blood in stool	US	Pneumatic reduction	Recovered
Mercado- Martinez et al., (2021)	M, 8M, Mexico	No	Vomiting, Blood in stool	US	Surgery	Recovered
Mercado- Martinez et al., (2021)	F, 7M, Mexico	One week	Vomiting, Blood in stool	X-Ray	Surgery	Recovered
Noviello et al., (2021)	M, 7M, Italy	No	Vomiting, pain, diarrhoea, blood in stool	US	Hydrostatic reduction, Surgery	Recovered

Table 1: Summary of Case reports worldwide