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Clinical Characteristics, Surgical Management And Outcomes Of Abdominal Pain Among SARS-COV-2 Infected Patients: A Chart Review

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Abstract

Introduction: A significant proportion of patients with SARS-CoV-2 present with different gastrointestinal manifestations. Abdominal pain is one such. Surgical referrals are frequently done since it mimics sinister abdominal pathology. However, surgical management and follow up guidelines of abdominal pain are still underdeveloped. Surgical interventions without careful clinical judgment may lead to catastrophic outcomes. Our aim is to determine the characteristics of abdominal pain, management and outcome among selected COVID-19 infected patients.

Martial and Method: A chart review was conducted among COVID-19 patients with abdominal pain who were referred for surgical opinions in a private hospital from February 2021 to September 2021. Demographic, signs and symptoms, clinical findings, biochemical investigations and outcomes were recorded. The site of the abnormal pain was classified according to standard nine quadrants surgical demarcation of the abdomen.

Results: We collected data on 40 (Male n=22, 55%) referred patients (mild: n= 25 [62.5%], moderate: n=15[37.5%] and no severe cases). The median age was 51years. Patients were referred for surgical opinion median day of 4 from the illness. The commonest quadrant of abdominal pain was the right iliac fossa (n=30 [75%]). On clinical examination, 87.5 %(n=35) abdomen was soft and non-tender. Supportive therapy and close observations were carried out. Symptoms were remised within two to three days.

Conclusion: Our study shows that the abdominal pain among COVID-19 patient with mild to moderate disease are not associated with sinister abdominal pathologies and can be managed conservatively. Further studies need to develop surgical management guidelines for this category of patients.

Keywords – COVID-19, Abdominal pain, Right iliac fossa

I. INTRODUCTION

The coronavirus disease 2019 (COVID-19), which is the result of the infection by SARS-CoV-2, was first reported in December 2019. Later it achieved a pandemic status[1]. COVID-19 was represented primarily as a respiratory tract infection, typically endorsed respiratory symptoms, but a varied spectrum of symptoms have been described[2–4]. The disease symptoms can range from mild to severe[2,3].

The gastrointestinal manifestations secondary to SARS-CoV-2 infection can occur through different pathways[5]. Firstly, ACE2 receptors, by which the virus access cellular entry, are expressed in the gastrointestinal tract epithelium and initiate viral replication in the gastrointestinal tract. Secondly, the direct injury of the gastrointestinal system due to an inflammatory response.

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This will destroy the enterocytes and lead to malabsorption, abnormal intestinal secretion, and an activated enteric nervous system resulting in abdominal symptoms[6,7].

Studies demonstrated that approximately 50 % of patients experienced diarrhoea, nausea, vomiting and abdominal pain [6,7]. Furthermore, the onset of gastrointestinal symptoms to hospital presentation is delayed compared to respiratory symptoms (9.0 vs 7.3 days) [8,9]. The studies show that diarrhoea was the most common symptom followed up by anorexia (39.9 %–50.2 %), vomiting (3.6 %–66.7 %), nausea (1 %–29.4 %), abdominal pain (2.2 %–6.0 %), and gastrointestinal bleeding (4 %–13.7 %)[10,11] .

To date, there is no specific antiviral treatment recommended for the treatment of COVID-19. Current treatment options remain primarily supportive therapy. Gastrointestinal symptoms such as nausea, vomiting and abdominal pain are conservatively managed. Antibiotics in abdominal pain remain controversial but are recommended only if an infection is noted[9,12].

To our knowledge, surgical management and follow up guidelines of abdominal pain are still underdeveloped. Surgical interventions without careful clinical judgments may lead to catastrophic outcomes. Our study objective was to determine the characteristics of abdominal pain, surgical management and outcomes among selected COVID-19 infected patients in a private sector hospital.

II. METHOD

Design

A chart review was conducted among PCR confirmed COVID-19 infected forty patients with abdominal pain who were referred for surgical opinion to exclude sinister abdominal pathologies and further care in a private hospital (Nawaloka Hospital PLC) from February 2021 to September 2021. Cases were categorised as mild, moderate and severe based on WHO guidelines [13]. Demographic, signs and symptoms, clinical findings, biochemical investigations and outcomes were recorded. Ethical approval was obtained from Nawaloka hospital ethics committee.

Management of abdominal pain

The site of the abnormal pain was classified according to standard nine quadrants of the abdomen. History and examination to evaluate the characteristics of abdominal pain and associated symptoms were done by a consultant surgeon. White cell count, procalcitonin, full urine report (UFR), Clostridium difficile antigen, serum amylase and lipase, total bilirubin, Gamma GT, aspartate aminotransferase and alanine aminotransferase levels were done for consecutive three days. Imaging such as Ultra Sound Scanning and CT scanning were reserved unless there was an absolute necessity to avoid further exposure and contamination. Abdominal pains were managed with antispasmodics, antacids and analgesics such as paracetamol with standard doses. We did not use any NSAIDS or antibiotics. Associated Gastrointestinal symptoms such as nausea and vomiting are conservatively managed with antiemetic medications. Despite supportive care, close observation of clinical and biochemical parameters was carried out for three days.

Surgical exit criteria for inpatients with abdominal pain

Haemodynamically stable patients, completely symptom-free and with normal haematological and biochemical parameters with regard to abdominal pain and associated GI symptoms for four days.

Surgical follow-up criteria in discharge from the hospital

The patients were seen after two weeks following a period of home quarantine. The patients were facilitated with 24-hour online phone service during those two weeks to seek any necessary health advice.

III. RESULTS

We collected data on 40 referred patients (mild: n= 25 [62.5%], moderate: n=15[37.5%] and no severe cases). The median age was 51years (Male n=25, 62.5%). 70 %(n=28) of the study sample do not have any co-morbidities. Patients having symptoms and were referred for surgical opinion median day of 4 from the onset of illness. The commonest quadrant of abdominal pain was identified in right iliac fossa (n=30 [75%]), followed by central and suprapubic (n=6 [15%], left iliac fossa (n=3[7.5%] and epigastric region (n=1[2.5%]). According to the visual analogue scale of pain, the degree of pain was mild in 62.5% (n=25) and 37.5% (n=15) of the patients. No specific referred or radiation of pain was noted. None of the patients had abdominal symptoms

of Peritonitis. All patients with right iliac, suprapubic and left iliac fossa pain had 2 to 3 episodes of diarrhoea in a day for two days following the onset of symptoms. Among this group, 62.5% experienced nausea, and 60.0% had vomiting. 77.5% had fever on clinical examination, 87.5 %(n=35) abdomen was soft and non-tender. Mild tenderness was detected 10 %(n=4) and moderate tenderness was 2.5 %(n=1). (Table 1).

Table 1: The characteristics of the study population

Variable	Number	Percentage
Age (in years)		
< 40	6	15
41-50	18	45
51-60	12	30
>60	4	10
Gender		
Male	25	62.5
Female	15	37.5
Co-morbidities		
Non	28	70.0
Diabetes	12	30.0
Hypertension	11	27.5
Ischemic heart diseases	6	15.0
CKD*	1	2.5
CLCD**	1	2.5
Asthma	2	5.0
CVA***	1	2.5
Disease severity[1]		
Mild	25	62.5
Moderate	15	37.5
Sever	0	0
Symptoms		
Abdominal pain	40	100
Nausea	25	62.5
Vomiting	24	60.0
Diarrhoea	16	40.0
Fever	31	77.5
Loss of appetite	14	35.0
Site of abdominal pain		
Right iliac fossa	30	75.0
Central and supra pubic region	6	15.0
Left iliac fossa	3	7.5
Epigastric region	1	2.5
Clinical examination findings of the abdomen		
1. Tenderness		
Non-tender	35	87.5

Mild tender	4	10.0
Moderate tender	1	2.5
2. Bowel sound		
Present	35	87.5
Sluggish	5	12.5
Absent	0	-
3. Fluid thrill		
Detected	0	-
Not detected	40	100
4. Hepatomegaly		
Yes	2	5.0
No	38	95.0
5. Splenomegaly		
Yes	0	0
No	40	100

Abbreviations: CKD*: Chronic kidney diseases; CLCD**: chronic liver cell disease; CVA***: Cerebral vascular accidents.

[1] Disease severity categorised based on WHO guidelines. (World Health Organization. Clinical Management of COVID-19: Interim Guidance. World Health Organization; 2020:13–15)

Table 2 shows the COVID-19 patients with different mimicked sinister abdominal pathology that need a surgical opinion. The most common reason for surgical referral was suspected appendicitis (n=30, [75.0%]) followed by enteritis, viscous perforation, colonic diverticulitis and pancreatitis. (Table 2).

Table 2: The site of abdominal pain and reasons for surgical referral

Site of abdominal pain	The mimicked sinister abdominal pathology	Number (%)
Right iliac fossa	Appendicitis	30(75.0)
Central and suprapubic	Enteritis	4(10.0)
	Viscous perforation	2(5.0)
Left iliac fossa	Colonic diverticulitis	3(7.5)
Epigastric	Pancreatitis	1(2.5)

White cell count, procalcitonin, full urine report, serum amylase, serum lipase. Clostridium difficile antigen, Total bilirubin, Gamma-GT, aspartate aminotransferase and alanine aminotransferase levels were normal range among the study sample during the consecutive three days of assessment (Table 3).

Table 3: The characteristics of biochemical investigations

Biochemical investigation	Day one from the onset of symptoms	Day two from the onset of symptoms	Day three from the onset of symptoms
White cell count ($\times 10^9$/L)(Mean±SD)	9231.2±211.1	8976.5±114.2	7891.3±98.2
Procalcitonin, (ug/L) (Mean±SD)	0.04±0.01	0.05±0.001	0.04±0.01
Urine full report (Median[IQR]) Puss cell Red cells Protein Nitrate	 2(1-4) 2(1-3) Nill Nill	Not tested	Not tested
Serum amylase (U/L) (Mean±SD)	56.2±8.7	61.3±7.8	55.6±4.9
Serum lipase (U/L) (Mean±SD)	68.9±7.6	71.2±6.7	69.7±5.7
Clostridium difficile antigen	Negative	-	-
Total bilirubin (mg/dL) (Median[IQR])	0.4(0.2-0.5)	0.6(0.3-0.8)	0.5(0.3-0.8)
Gamma-glutamyl transferase(IU/L) (Median[IQR])	21(16-24)	22(18-25)	Not tested
Aspartate aminotransferase(AST) (U/L) (Median[IQR])	27(21-32)	32(26-34)	26(22-30)
Alanine aminotransferase(ALT) (U/L) (Median[IQR])	28(23-31)	36(29-39)	27(22-30)

Abdominal pains were managed with antispasmodics, antacids and analgesics such as paracetamol with standard doses. We did not use any NSAIDS or antibiotics. Associated Gastrointestinal symptoms such as nausea and vomiting are conservatively managed with antiemetic medications.

All patients had the complete resolve of abdominal pain following 2 to 3 days. None of them had relapses of their symptoms during their home quarantine in the post-discharge second week follow up clinic. (Table 4)

Table 4: Associated symptoms and duration of recovery from abdominal pain following surgical referral.

Type of symptoms	Day one following referral N (%)	Day two following referral N (%)	Day three following referral N (%)
Mild disease (n=25)			
Abdominal pain	25/25(100)	10/25(40)	2/25(8)
Nausea	15/25(60)	5/25(20)	0
Vomiting	14/25(56)	8/25(32)	0
Diarrhoea	10/25(40)	4/25(16)	0
Fever	20/25(80)	10/25(40)	1/25(4)
Loss of appetite	10/25(40)	4/25(16)	0
Moderate disease(n=15)			
Abdominal pain	15/15(100)	10/15(66.6)	3/15(20)
Nausea	10/15(66.6)	6/15(40)	0
Vomiting	10/15(66.6)	4/15(26.6)	1/15(6.6)
Diarrhoea	6/15(40.0)	2/15(13.3)	0
Fever	11/15(73.3)	6/15(40.0)	2/15(13.3)
Loss of appetite	4/15(26.6)	2/15(13.3)	1/15(6.6)

IV. DISCUSSION:

The presence of diarrhoea, nausea, vomiting, anorexia and abdominal pain in mild-moderate and severe COVID-19 is common. However, there can be a higher incidence of abdominal symptoms associated with severe illness[14].

According to some studies, a certain proportion of COVID-19 patients could experience intestinal disorders and abdominal pain due to ischemic changes secondary to thrombosis caused by SARS-CoV-2 infection[4]. However, thrombosis is more likely to occur in patients with severe COVID-19.[15] Our study sample mainly consists of mild to moderate COVID-19 patients. Therefore, we believe that the potential mechanism of abdominal pain was the inflammation rather than thrombosis or ischemia among our group of patients.

The studies summarized no significant difference in total bilirubin, AST, and ALT levels between patients with GI symptoms and those without COVID-19.[16,17] Furthermore, according to studies, the colon has similar ACE2 expression as the liver. The small intestine has a high level of expression than that in the liver, and the expression levels in the colon and small intestine vary

compared to the liver and lung[18]. This may be why we believed that our patient's GI symptoms were more whilst liver parameters were normal.

Among our patients, we have seen that nausea and vomiting is commoner with epigastric pain. The mechanism by which COVID-19 causes nausea and vomiting is still unknown. In general, vomiting is caused by the stimulation of the vomiting centre via the cerebral cortex, vestibular organs, chemoreceptor trigger zone, or the autonomic nervous system[19,20]. To our knowledge, the significantly lower frequency of vomiting in the group lower GI symptoms; the exact reasons remain unclear.

Although the incidence of abdominal pain and diarrhoea in COVID-19 patients varied widely in the published literature[21], all patients in our group with lower abdominal pain had diarrhoea. Furthermore, the mechanism of abdominal pain is complex[22]. The factors of the discrepancy between abdominal pain and diarrheal symptoms in COVID-19 is not well understood[21].

We have not focused on evaluating the abdominal pain with other comorbid diseases since our study was based on the patients who were referred with abdominal pain and the most without comorbidities. However, we believe it is an interesting future forecast. Furthermore, there are no set guidelines on indications and trimming imaging modalities for further evaluation of abdominal pain among the COVID-19 patients. Our study shows that the patients with mild to moderate COVID-19 infection with abdominal pain with no progression or to worsen with stable haemodynamics and biochemical parameters could be conservatively managed with closed observation without imaging.

To our knowledge, there is no consensus concerning the follow up of these patients yet. However, all of our patients had the complete resolve of abdominal pain following 2 to 3 days. None of them relapsed symptoms during their home quarantine or post-discharge second week of follow up clinic.

V. Conclusion:

Our study shows that the abdominal pain among COVID-19 patient with mild to moderate disease are not associated with sinister abdominal pathologies and can be managed conservatively with close observation. The use of imaging can be tailor-made. Further studies need to generalize these findings and to develop surgical management guidelines for this category of patients.

VI. Involvement of Patient and public:

There was no patient or public involvement in study design for this protocol of the research.

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VIII. Author's contribution:

VA conceptualized the study; VA and VA collected the data; VA analyzed the data; VA, CDM and LC wrote the manuscript; VA, LC, CDM and VA conducted critical review and editing. All authors read and approved the final manuscript. VA and CDM are guarantors of the paper.

IX. Funding Source:

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X. Competing interests:

The authors declare no conflict of interest.

XI. Ethical Approval:

Ethical approval for this study was obtained from the ethical committee of Nawaloka Hospital, Colombo, Sri Lanka.

Patient consent: Not required.

Data availability: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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