

## SURGICAL SITE INFECTIONS BEFORE AND AFTER COVID IN OPEN UMBILICAL HERNIOPLASTY PATIENTS

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### Abstract

**Background:** Given the unprecedented nature of the COVID-19 pandemic and its potential to have an impact on healthcare systems, it is crucial to investigate potential changes in surgical site infection rates in particular surgical procedures, like open umbilical hernioplasty. Understanding how the pandemic has affected SSIs can help us better allocate resources, improve patient outcomes, and evaluate the effectiveness of infection control strategies. The objectives are to investigate the rate of SSI before and after COVID-19 infection pandemic with those who underwent the same surgery in the non-pandemic control period a year ago and explore the factors associated with SSI. **Materials and Methods:** This single-centre retrospective study included the period between March 2018 to January 2019 as pre-pandemic period and between March 2022 and January 2023 as the control period. The study included all patients who were operated for Open Umbilical hernioplasty in the Department of General Surgery at BGS Global Institute of medical sciences and hospital, Bengaluru. Patients who were operated for eventration or evisceration were excluded from the study. **Result:** Total 340 patients underwent open umbilical hernioplasty in which 26% (88) were done in pre-pandemic period while 74% (252) were done in control period reasons are well understood. Mean age though different in both period but it was not significant. The study was male preponderance and out of 340 cases 42 (12%) had surgical site infection post operatively, 18% pre pandemic period and 10.3% in control period and it was statistically significant. Post-operative complications were 13.6% pre pandemic period and 7% in control period, but it was not significant. Length of hospital stay was 6.65 days pre pandemic period and 6.88 days in control period and it was not significant. **Conclusion:** This study emphasises the importance of ongoing evaluation of healthcare practises and their impact on patient outcomes, even though further research is necessary to determine the precise mechanisms that have contributed to the decreased SSI rates post-COVID. The results highlight the possibility that the pandemic's beneficial changes in infection control procedures can continue even as healthcare systems adjust to their new equilibrium.

## INTRODUCTION

On March 11, 2020, the World Health Organization (WHO) proclaimed COVID-19 illness to be a pandemic.<sup>[1]</sup> The first COVID-19 infection case was documented on that day in since then, country has imposed limitations on reducing touch and transmission across the board because of the Ministry of Health's and all surgical procedures have been delayed throughout, the only cancer treatment and emergency services had been carried out. During the COVID pandemic, reassignment of all medical staff, including surgeons, was necessary to

efficiently manage the spike in patient numbers to limit outpatient admissions and elective surgery because due to the scarcity of hospital beds and equipment used for COVID-19 patients at full capacity. The WHO published the COVID-19 infection mortality rate is about 3 percent.<sup>[2]</sup>

One of the procedures that general surgeons undertake the most commonly is Open Umbilical Hernioplasty.

The aim of this study was to investigate the rate of SSI before and after COVID-19 infection pandemic with those who underwent the same surgery in the

non-pandemic control period a year ago and explore the factors associated with SSI.

## MATERIALS AND METHODS

This single-centre retrospective study included the period between March 2018 to January 2019 as pre pandemic period and between March 2022 and January 2023 as the control period. The study included all patients who were operated for Open Umbilical hernioplasty in the Department of General Surgery at BGS global institute of medical sciences Bengaluru. Patients who were operated for eventration, or evisceration were excluded from the study.

Patients who had mechanical intestinal obstruction or strangulation symptoms underwent immediate surgery, Demographic data (age, gender) the score, comorbidity status, the kind of hernia, and whether resection was carried out, using mesh, Reverse transcription of COVID-19 outcomes of RT-PCR (polymerase chain reaction) tests, chest computed tomography before and after surgery based on CO-RADS categorization (A Categorical) scores. Outcome data collected included the occurrence of SSI, hospital duration of stay. SSI was based on assessment by the responsible surgical team. This was assessed at discharge, 30 days, and 90 days after surgery. This was defined in terms of US Centres for Disease Control and Prevention (CDC) [5] criteria as a diagnosis made by a clinician and affecting the superficial surgical wound site; however, the study allowed SSI to be diagnosed up to 90 days not 30

days. The status of SSI infection both before and after pandemic was assessed.

### Statistical Analysis

The data obtained were subjected to statistical analysis. Data analysis was done by SPSS software @ version 22.0. Descriptive statistical analysis, which included frequency and percentages, was used to characterize the data. Inferential statistics included chi-square test and independent samples t test for different dependent variables of the study and  $p < 0.05$  was considered statistically significant.

## RESULTS

As per [Table 1] total 340 patients underwent open umbilical hernioplasty in which 26% (88) were done pre pandemic period while 74% (252) were done in control period reasons are well understood. Mean age though different in both period but it was not significant. The study was male preponderance and out of 340 cases 42 (12%) had surgical site infection post operatively, 18% pre pandemic period and 10.3% in control period and it was statistically significant.

As per [Table 2] Pre-operative antibiotics are marginally not given in few patients but given in all patients post-operatively.

As per [Table 3] post-operative complications were 13.6% in pandemic period and 7% in control period but it was not significant. Length of hospital stay was 6.65 days in pandemic period and 6.88 days in control period and it was not significant.

**Table 1: Comparative Demographic and Clinical characteristics of patients pre-Pandemic and Control period**

Variables	Pre-Pandemic (n=88)	Control (n=252)	p-value
Mean age	63.16±16.10	54.24±22.34	0.10
Gender Male	56	172	0.01
Female	32	80	
SSI	16	26	0.01
No SSI	72	226	

**Table 2: Treatment comparison in patients with SSI and No SSI**

Variables	SSI (n=42)	No SSI (n=210)	p-value
Preoperative antibiotic	40	205	0.13
Post-operative antibiotics	42	210	0.21

**Table 3: Comparison of postoperative results during pre-pandemic and control period**

Variables	Pre-Pandemic	Control	p-value
Post-operative complications	12 (13.6)	17 (7)	0.61
Length of hospital stay	6.65±7.18	6.88±7.78	0.71

## DISCUSSION

The comparison between the pre-pandemic and control period in this study showed a difference in surgical site infection rates on operated cases of open umbilical hernioplasty patients with a statistical significance. According to earlier studies, there may be a need for using "watchful waiting" with emergency surgery like inguinal hernias are substantially less common than ventral hernias. Non-operative techniques to treating certain individuals

with general surgical emergencies like acute cholecystitis have been advised during the pandemic coupled with acute appendicitis.<sup>[6,7]</sup> Non-surgical therapy methods are ineffective for hernias that are strangulated or incarcerated. It causes tissue ischemia and mechanical blockage, due to this the frequency of urgent hernia surgery needs urgent general surgical procedures.<sup>[8,9]</sup> According to Kokotovic et al.'s analysis of "watchful waiting" in ventral hernias in a study of 1358 patients conducted during a non-pandemic era, the rate percentage individuals with

ventral hernias needing immediate surgery as much as 4 % in 5 years.<sup>[10]</sup> An investigation by Martin et al cited 8.3% as the rate.<sup>[11]</sup> The frequency of urgent repairs according to reports, 0.2% of male patients with the least number of inguinal hernias with symptoms is not operated on.<sup>[11]</sup>

Antibiotic prophylaxis for elective repair of a 'clean' hernia is not strongly supported by evidence.<sup>[12]</sup> Antibiotics' function in this case is not simple skin flora implantation prophylaxis; it may also cover of bacteria that have been transferred from ischemic bowel. Additionally, after surgery, therapy can be necessary to further lower the danger. The International Society of Trauma Surgery provides unconvincing advice on the use of antibiotics for 48-72 hours following a contaminated or contaminated-clean case. This only a few people were affected by the uncertainty in this situation patients getting antimicrobial treatment before or after surgery it is obvious that stronger evidence is needed.<sup>[13]</sup>

The evaluation of the mean length of hospital stays ( $6.65 \pm 7.18$  vs.  $6.88 \pm 7.78$  days) before pandemic and control periods were not statistically significant. Our study has few limitations. Single-centre retrospective nature and small sample size. Participants may have attended alternative healthcare settings for treatment of SSI, meaning the data presented here may be an underestimate of the true event rate.

## CONCLUSION

This study emphasises the importance of ongoing evaluation of healthcare practises and their impact on patient outcomes, even though further research is necessary to determine the precise mechanisms that have contributed to the decreased SSI rates post-COVID. The results highlight the possibility that the pandemic's beneficial changes in infection control

procedures can continue even as healthcare systems adjust to their new equilibrium.

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