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Restrictions In Conventional Asepsis as a Result of Protective Gear During Covid – Effects on Postoperative Infections

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ABSTRACT:

Background: The novel coronavirus disease which is caused by SARS CoV 2 became a pandemic and several measures were implemented to contain/prevent its transmission like use of N95 mask, face shield, use of Personal Protective equipment (PPE). The PPE is meant to reduce the transmission of infection from the patient to healthcare workers and to other patients. The surgeons sanitize their hands with alcohol-based solution and wear sterile scrubs over the PPE and perform the surgery. The concept of scrubbing is not applicable when operating in a PPE. The problem arises during surgical management of such cases as PPE causes discomfort and visualization difficulties. This study is therefore aimed at determining if the incidence of surgical site infection has increased despite having stringent hygiene methods and restricted movement of staff and relatives.

Aims and Objectives: To study and compare the surgical site infection (SSI) risk in patients undergoing obstetric and gynaecological surgical procedures during the pre-COVID and COVID era.

Materials and methods: The study was a retrospective observational study conducted at Lady Goschen Hospital, Mangalore which is a tertiary care centre of Dakshinna Kannada and serves as a referral centre for other hospitals, under the Department of OBG, Kasturba Medical College, Mangalore.

The study participants were divided into 2 groups. Group 1 comprising of patients operated at Lady Goschen Hospital in the COVID free period from March 2019 to February 2020 and developed SSIs and the Group 2 comprising of patients operated during COVID era from March 2020 to February 2021 and developed SSIs.

Inclusion criteria: All the patients undergoing obstetric and gynaecological surgical procedures who developed SSIs.

Method: The study was conducted by going through the medical records of the patients operated during the study period and will be assessed for the associated risk factors, type of SSI, and the management done for the SSI. The proportion in the two groups will then be assessed and compared.

Results: In the two study groups, no significant difference was found in the demographic data. The mean BMI between both the groups were also not significant. Some of the risk factors identified were presence of medical disorders like diabetes, hypertension complicating pregnancy. The duration of surgery showed no statistical significance. There was an increase in SSI in the COVID -19 period when compared to pre-pandemic period hence leading to an increased need of secondary suturing.

Keywords: *Personal protective equipment (PPE), surgical site infection, COVID, caesarean section, vaginal delivery.*

1. INTRODUCTION

The year of 2020 started with the world witnessing one of the worst pandemics of history, the 2019 novel coronavirus disease (COVID 19) caused by the SARS -CoV – 2 virus. The outbreak started in December 2019 when the first cases were reported from Wuhan, China and slowly the disease spread rapidly in other areas of the country and worldwide and

was declared a pandemic within 2 months of onset. The common presentations of coronavirus include fatigue, fever, myalgia, dry cough, dyspnoea and radiological evidence of pneumonia. Complications like secondary infection, acute respiratory distress syndrome [ARDS], acute cardiac conditions, arrhythmia, acute kidney injury, shock and mortality may arise in extreme cases [1,2,3,4.] The natural history of SARS-CoV 2 infection is extensive and highly infectious during the incubation period[5]. About 1% of the established cases by laboratory investigation of SARS-CoV-infection[6] are accounted by the asymptomatic carrier cases. These carriers can possibly transfer the virus even during incubation time[7] and hence makes the diagnosis and prevention of the spread of infection highly challenging. In this current pandemic of COVID 19, there are many patients either confirmed/suspected with COVID 19 infection who need planned or emergency surgery that are incapable of be delayed[8]. This applies especially in the field of Obstetrics and Gynecology where emergency procedures like Caesarean sections cannot be delayed in lieu of COVID 19 infection. And also surgical management of malignant gynecological conditions like ovarian tumors or uterine tumors cannot be delayed and have to be dealt with accordingly irrespective of the COVID status of the patient. In high risk population like in India where the COVID infection is at its peak, it becomes difficult to know the COVID status of all pregnant cases when they present in labor. Hence, as a precaution all the cases are treated as suspect till confirmed.

According to the report by CDC[9] Surgical site infections (SSIs) account for almost 46.4% of all infections making it the most frequently encountered hospital acquired infections. Usually the initial site of infection is the site of incision which usually leads to superficial infection limited to skin and subcutaneous tissues and if not treated can progress to deep infection involving deeper tissues. SSIs mostly were noted in those who underwent surgeries for abdominal conditions, and hence most often they are dealt by general surgeons[10]. The problem of SSIs should not be underestimated as it can have an effect on length of hospital stay, patient morbidity, financial burden and mortality. The primary initiative in the prevention of SSIs[9] is the control of the risk factors that can be modified like cessation of smoking, better glycaemic control, hygienic practices, screening for resistant bacteria. World Health Organization (WHO) has launched the "global guidelines for the prevention of SSIs"[11,12] which include the measures like use of antibiotic prophylaxis, use of skin decontamination techniques like alcoholic Chlorhexidine and to ascertain intraoperative homeothermy[13,14,15]. Therefore to bring down the burden of the postoperative SSIs, it is important to utilise proper policy and follow protocols like stringent hand hygiene and maintaining asepsis during wound care[16].

The Personal Protective Equipment (PPE) is worn during the management of COVID infected cases and also as a precaution for COVID suspect cases. The PPE is meant in order to reduce the transmission of infection from the patient to Healthcare workers and to other patients. The problem arises during the surgical management of such cases while wearing a PPE which itself can cause discomfort and visualization difficulties. It is mandatory to use sterile gloves and surgical masks, hand disinfection with alcoholic solution before and after the patients' contact. In spite of stringent hand hygiene methods and restricted movement of hospital staff and relatives, we noticed a slight increase in the incidence of surgical site wound infections. This as such can be attributed to the fact that same PPE is worn from patient to patient and there is no scrubbing prior to surgery. The surgeons sanitize the hand with alcohol based solution and wear sterile scrubs over the PPE and perform the surgery. The concept of scrubbing is not applicable when operating in a PPE. Hence we noticed a slight rise in the incidence of SSI. Though this was quiet contrary to a study conducted by Pasquale Losurdo et al[17], reported a decline in the incidence of SSIs.

2. REVIEW OF LITERATURE

As per the study done by Pasquale Lourdes et al.[17] on the "Impact of lock down for SARS - CoV-2 (COVID - 19) on surgical site infection rates" conducted by General Surgery Department of a tertiary care centre in Italy in April 2020, the incidence of SSIs was lower compared to previous COVID free years. It was noted that there was a dramatic reduction in the number of superficial and deep SSIs with the use of surgical masks for both patient and surgeon during the post-operative period in the surgical unit and the absence of visitors.

The incidence of SSIs noted in our set up was contrary to the above-mentioned study. This could be due to the high risk population in our country and associated comorbidities and the limited available resources. It can also be attributed to the fact that most obstetric surgeries are performed as emergency without knowing the exact health status of the patient which might affect the post-operative wound healing. In current study we aim to analyse the risk factors and the effect of wearing PPE during surgery on the incidence of SSIs.

AIM: - To study and compare the risk of surgical site infection in patients undergoing obstetric and gynecological surgical procedures during the pre COVID and COVID era.

OBJECTIVES: -

To compare the incidence of SSIs in patients undergoing obstetric and gynaecological surgical procedures during the pre COVID and COVID era.

To study and compare the incidence of surgical site infection among COVID infected patients and Non-COVID patients undergoing obstetric and gynecological surgical procedures during COVID era.

3. MATERIALS AND METHODS:

Place of study: – Study was conducted at Lady Goschen Hospital, Mangalore which is a tertiary care centre of Dakshinna Kannada and serves as a referral centre for other hospitals, under the Department of OBG, Kasturba Medical College, Mangalore

Study population: – The study group was divided into 2 groups. Group 1 will comprise of patients operated at Lady Goschen Hospital in the COVID free period from March 2019 to February 2020 and developed SSIs and the Group 2 will comprise of patients operated during COVID era from March 2020 to February 2021 and developed SSIs.

Type of Study: - It was a retrospective observational study.

Duration of study – The study was done over the period of 1 year of COVID free time i.e. from March 2019 to February 2020 and 1 year of COVID time i.e. from March 2020 to February 2021.

Inclusion criteria:

All the patients undergoing obstetric and gynaecological surgical procedures who developed SSIs.

Method:
The medical records of the patients operated during the study period were assessed for the associated risk factors, type of SSI, and the management done for the SSI. The data were plotted on a structured proforma and analysed. The incidence in the two groups were then assessed and compared. The results of the two groups were compared to assess the incidence of SSIs and significance of scrubbing up for surgical procedures performed during COVID free time with the patients operated during COVID era, for whom the procedure was done with PPE. Also, the difficulties faced in visualisation and discomfort while performing the procedure in PPE. Also, the result of group 2, were used to compare incidence of SSIs among COVID infected and non COVID.

OUTCOME VARIALBES

Type of surgical procedure.

Number of SSIs in pre COVID and COVID time.

Number of SSIs in COVID infected and non COVID cases in group 2.

Management of SSI: conservative management/ Surgical management

DATA ANALYSIS

Data was analysed by Statistical Package – SPSS ver.17.0 and a P value of less than 0.05 was considered to be significant. Statistical Analysis was done by -Sensitivity, specificity, positive predictive value and negative predictive value and accuracy rate. Chi square test was done. A master excel sheet was plotted and the data was analysed using various statistical methods.

DATA COLLECTION TOOL: Pre-structured proforma was used.

4. RESULTS:

During the study period in group 1, the total number of deliveries conducted were 5733 which included both cesarean delivery and vaginal delivery. Out of this the number of cesarean delivery were 2494 (43.5%) and vaginal delivery were 3239 (56.5%). The total number of gynecological surgeries done during this period in group 1 were 364 which included hysterectomy (both abdominal and vaginal), staging laparotomy, exploratory laparotomy, myomectomy, cystectomy etc. The total number of patients with surgical site infection in this group were 314 (5.1%), among these 58 patients (18.4%) required secondary suturing of the wound. Among the patients with surgical site infection in this group, the wound swab culture grew Staphylococcus aureus and Klebsiella in 90 per cent of cases. The demographic data of the patients who underwent secondary suturing in this group is shown in table 1. The surgical procedure with mode of delivery of patients who underwent secondary suturing later is shown in table 2.

In group 2, the total number of deliveries conducted were 6474 which included both cesarean delivery and vaginal delivery. Out of this the number of cesarean delivery were 3178 (49.1%) and vaginal delivery were 3296 (50.9%). The total number of gynecological surgeries performed were 210. The total number of patients who developed surgical site infection in this group were 586 (8.8%), among these 30 patients (5.1%) required secondary suturing of the wound. Among the patients with surgical site infection in this group, the wound swab culture mostly grew Klebsiella, Staphylococcus aureus, Citrobacter, Acinetobacter and few showed Pseudomonas. The demographic data of the patients who underwent secondary suturing in this group is shown in table 1. The surgical procedure with mode of delivery of patients who underwent secondary suturing later is shown in table 2.

TABLE 1: AGE DISTRIBUTION FOR PATIENTS UNDERGOING SECONDARY SUTURING IN GROUP 1 AND GROUP 2

Age Group	Group 1	Group 2
<18 years	1	0
18 – 25 years	18	15
26 – 30 years	17	3
31 – 35 years	13	8
36 – 40 years	4	2
41 – 45 years	2	1
46 – 50 years	2	0
>50 years	2	1

TABLE 2: DISTRIBUTION OF PATIENTS REQUIRING SECONDARY SUTURING BASED ON THE TYPE OF PROCEDURE.

Procedure	Group 1	Group 2
Vaginal delivery	29	3
Cesarean section	23	23
Gynecological Surgeries	7	4

There was no notable difference in demographic characteristics between the two groups. The mean BMI between both the groups were also not significant. Some of the risk factors identified were presence of medical disorders like diabetes, hypertension complicating pregnancy. The duration of surgery showed no statistical significance.

5. DISCUSSION:

As per the study the number of deliveries conducted during the COVID era (group 2) was more than the pre COVID period, owing to the fact that our center is a tertiary care center with a large number of high risk referred cases. A rise in the cesarean section rate was noted during the COVID time leading to an increased number of surgical procedures done in the hospital, hence a significant increase in the number of surgical site infection was noted during the COVID era. There was a decrease in the number of gynecological surgeries performed during the COVID era due to lockdown, but the increase in number of surgical site infections was noted to be high, leading to increased hospital stay and need for higher antibiotics and also secondary suturing in some cases. This can be owed to the fact that the surgeries were being performed wearing a PPE with limited aseptic precautions.

6. CONCLUSION:

Surgical site infections (SSIs) is one of the most frequent hospital acquired infections and it should be curtailed by stringent hygienic methods despite the difficulties posed by the pandemic. The problem of SSIs should not be underestimated as it can pose a big impact on patient morbidity, mortality, length of hospital stays and the financial burden. We need to come up with better strategies and protocols to maintain asepsis and decrease the incidence of SSIs.

7. IMPLICATION

This study was directed at identifying effects of COVID 19 infection on incidence of SSIs.

8. KNOWLEDGE GAP

With increasing number of cases each day and limited availability of testing methods its important to take adequate precautions during surgical management especially when wearing a PPE and to treat all patients as suspect till proven negative

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