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The COVID-19 pandemic impact on clinical load of plastic and reconstructive surgery in a tertiary care hospital of north India: A retrospective comparative analysis

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Abstract:

BACKGROUND: The objective of the study was to analyze and determine statistically significant impact of the COVID-19 on clinical load of plastic and reconstructive surgery practices.

MATERIALS AND METHODS: The retrospective analysis and comparison of the number of patients visiting to outpatient clinic, number of patients admitted, number of patients operated in the plastic and reconstructive surgery department during the COVID-19 pandemic months of January 2020–June 2020 with the same months of preceding non-COVID-19 year was done. The data obtained were tabulated in Microsoft Excel spread sheet and the statistical analysis done using MedCalc statistical software.

RESULTS: The mean ± standard deviation of patients attended in outpatient department (OPD), admitted in inpatient department (IPD), emergency surgeries performed, and elective surgeries performed during -COVID-19 versus COVID-19 pandemic period is (651.167 ± 310.42 vs. 212.5 ± 307.591), (83.5 ± 16.263 vs. 34.333 ± 53.74), (5.167 ± 4.243 vs. 3.333 ± 4.95), and (74.333 ± 28.284 vs. 40.833 ± 60.811), respectively. The difference in means is highly significant statistically in the number of patients attended in OPD, admitted in IPD, and elective surgeries performed during pre-COVID versus COVID period; however, the difference in the means is not statistically significant in the number of emergency surgeries performed during pre-COVID versus COVID period.

CONCLUSION: The COVID-19 pandemic has significantly reduced the number of patients attended in OPD, admitted in IPD, and elective surgeries performed in the department of plastic surgery. However, there is a reduction in number of emergency surgeries but statistically insignificant. The strategy is to use telemedicine portal e-Sanjeevani services for OPD, encourage admission of patients with reverse transcription polymerase chain reaction negative for COVID-19, and perform reconstructive and esthetic plastic surgery operative procedures using COVID-19 appropriate precautions.

Keywords:

Aesthetic surgery, coronavirus, COVID -19, pandemic, plastic surgery, telemedicine

Introduction

The year 2020 has brought to us an unexpected event that has affected the working of all health-care facilities worldwide. It started with a small scale epidemic in Wuhan, China in December, 2019, which gradually escalated and soon became a worldwide pandemic. India was hit by its first case on January 30, 2020 and

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by March 2020 most states in India had documented cases of the disease. This led to nationwide lockdown starting from March 25, 2020 to the May 17, 2020 which was extended from time to time according to the regional incidence of the viral transmission.[1] Government issued advisories regarding the disease situation which led to modification in the working protocols of all hospitals so as to reduce the footfall of patients in health-care facilities.

It has become difficult for the people to attend hospitals for the treatment of their illnesses, and at the same time, outpatient services were restricted and subsequently started in graded manner. The patients also had hesitancy to attend hospitals for the correction of deformities and defects which are not of emergency nature. However, the conditions such as trauma which is of emergency nature compelled the patients to attend the hospital. Thus current pandemic of COVID-19 has affected the clinical load of all surgical specialties so is the plastic and reconstructive surgery.

Telemedicine took a prominent role in the management and follow-up of the registered and new patients of the department.[2] Initially, app-based services and later on the Government telemedicine portal e-Sanjeevani were utilized by the patients.[3] This was especially useful for new cleft patients, patients with other visible congenital anomalies, and burn contracture. Wound dressing advices were also successfully given by the faculty to the follow-up patients.

There are few editorial and review articles which describe the impact on the plastic and reconstructive practices. However, at present, there are no studies, which have compared the clinical loads during the COVID-19 pandemic with the non-pandemic preceding year. However, this study may provide the statistically correct evidence regarding the change in clinical load due to the COVID-19 pandemic.

Materials and Methods

Study design and setting

Retrospective review and comparison of the hospital records of registered patients for plastic and reconstructive surgery outpatient department (OPD), patients admitted and operated by plastic and reconstructive surgeons during the COVID-19 pandemic (January 2020–June 2020), and pre-COVID-19 period (January 2019–June 2019).

Study participants and sampling

All patients, who presented to OPD, were admitted in inpatient department (IPD) and were operated under plastic and reconstructive surgery during the said periods as per the records maintained in the department were included in the study.

Data collection tool and technique

The clinical load (data) obtained by reviewing the records maintained electronically in departmental computerized database in terms of number of patients attended OPD, admitted in IPD, and operated by the specialty during the pre-COVID period and during the COVID-19 pandemic was tabulated in Microsoft Excel spread.

Statistical analysis

The data tabulated in Microsoft Excel spread sheet were subjected to statistical analysis using MedCalc statistical software. The unpaired *t*-test was used to compare the quantitative data between the two groups. Statistical significance is set at 5% ($P < 0.05$).

Ethical consideration

The study (protocol/01/BPS) is done in accordance with the declaration of Helsinki version 2013 and the identification of patients is not disclosed.

Results

The department was running OPD services 6 days a week prior to the pandemic which was shut down and replaced by a Screening OPD during the COVID -19 pandemic. The Table 1 and Figure 1 shows the clinical load during pre-COVID-19 period, Table 2 and Figure 2 shows clinical load during COVID-19 pandemic period and Table 3 shows the statistical comparison of the data of two groups. The mean ± standard deviation (SD) of patients attended in OPD of the specialty during pre-COVID versus COVID period is (651.167 ± 310.42 vs. 212.5 ± 307.591). The difference in means with $P < 0.0001$ is highly significant statistically [Table 3 and Figure 3]. This significant reduction in OPD attendance of patients was attributed to the initial complete shutdown of OPD facilities and later restrictions on travel as imposed by the government. The patients that did turn up were the ones who were telephonically called up for follow up or referrals from other departments.

The mean ± SD of patients admitted in the specialty during pre-COVID versus COVID period is (83.5 ± 16.263 vs.

Table 1: Clinical load during pre-COVID-19 pandemic

Month	OPD	IPD	Emergency plastic and reconstructive surgeries	Elective plastic and reconstructive
January 2019	455	85	4	83
February 2019	423	87	4	89
March 2019	518	89	2	93
April 2019	828	79	6	65
May 2019	821	92	8	63
June 2019	862	69	7	53

OPD=Outpatient department, IPD=Inpatient department

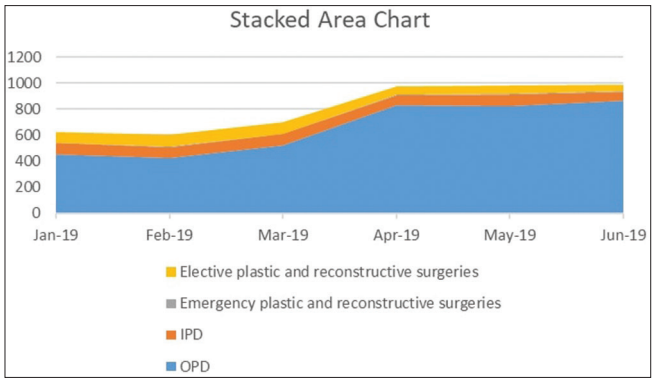

Figure 1: Stacked area chart during pre-COVID-19 pandemic. It depicts the area shaded with different colours by the number of patients attended in outpatient department, admitted in inpatient department, emergency surgeries performed and elective surgeries performed by the speciality during pre-COVID-19 period

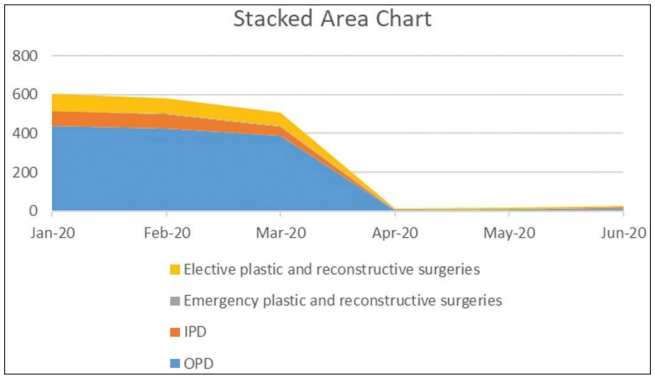

Figure 2: Stacked area chart during COVID-19 pandemic. It depicts the area shaded with different colours by the number of patients attended in outpatient department, admitted in inpatient department, emergency surgeries performed and elective surgeries performed by the speciality during COVID-19 pandemic

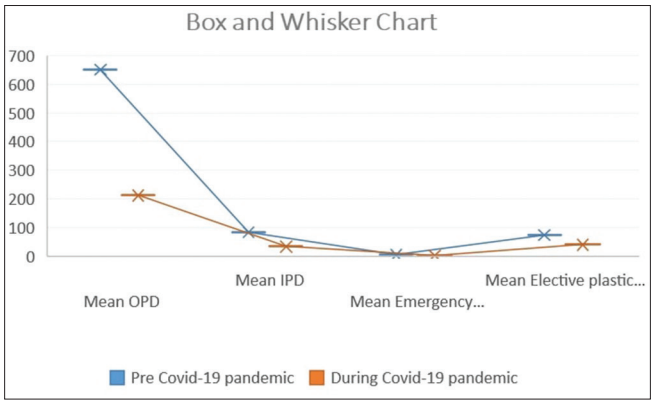

Figure 3: Box and Whisker chart of comparison of means. It depicts the significant gap of mean number of patients attended in outpatient department, admitted in inpatient department and elective surgeries performed during pre-COVID-19 and during COVID-19 pandemic. However, it shows insignificant difference in mean number of emergency surgeries performed during pre-COVID-19 and during COVID-19 pandemic

34.333 ± 53.74). The difference in means with $P < 0.0001$ is highly significant statistically [Table 3 and Figure 3]. This significant reduction in admitted patients was attributed to the fact that the strength of beds was reduced to half

Table 2: Clinical load during the COVID-19 pandemic

Month	OPD	IPD	Emergency plastic and reconstructive surgeries	Elective plastic and reconstructive
January 2020	438	77	4	87
February 2020	426	73	3	79
March 2020	388	45	8	66
April 2020	3	2	4	1
May 2020	8	1	0	6
June 2020	12	8	1	6

OPD=Outpatient department, IPD=Inpatient department

in the specialty, elective operations were restricted to patients of trauma requiring delayed reconstruction, and patients of cancer requiring reconstruction post-extirpation of tumor.

The mean ± SD of emergency surgeries performed by the specialty during pre-COVID versus COVID period is (5.167 ± 4.243 vs. 3.333 ± 4.95). The difference in means with $P = 0.1302$ is statistically insignificant [Table 3 and Figure 3]. There was a reduction in the number of emergency surgeries, but this insignificant reduction is because of the fact that emergency services were never shutdown during any period of the study. However, the use of personal protective equipment (PPE) and proper selection of cases which merit an emergency procedure were undertaken.

The mean ± SD of elective surgeries in the specialty during pre-COVID versus COVID period is (74.333 ± 28.284 vs. 40.833 ± 60.811). The difference in means with $P < 0.0001$ is highly significant statistically [Table 3 and Figure 3]. This significant reduction in number of elective surgeries was attributed to the fact that the elective operations were restricted to patients of trauma requiring delayed reconstruction and patients of cancer requiring reconstruction post-extirpation of tumor.

The common reason for the reduction in patients attended in OPD, admitted in IPD, and elective surgeries performed during the COVID-19 pandemic period is fear and hospital attending hesitancy in the patients during the contagious pandemic.

Discussion

COVID-19 started as a small-scale epidemic centered in Wuhan, China, and progressively impacted the entire world. It has placed an unprecedented burden on the health-care facilities and severely affected the working of most tertiary care centers. During the current pandemic of COVID-19, the clinical load of all surgical specialties is effected so is the plastic and reconstructive surgery. There are few editorial and review articles which describe the impact on the plastic and reconstructive practices. However, at present, there are no studies, which have

Table 3: Statistical comparison between two data groups

Period	Mean±SD			
	OPD	IPD	Emergency plastic and reconstructive surgeries	Elective plastic and reconstructive surgeries
Pre-COVID-19 pandemic	651.167±310.42	83.5±16.263	5.167±4.243	74.333±28.284
During COVID-19 pandemic	212.5±307.591	34.333±53.74	3.333±4.95	40.833±60.811
Statistics	*t*=−43.945	*t*=−18.471	*t*=−1.539	*t*=−9.711
	P<0.0001 (highly significant)	*P*<0.0001 (highly significant)	*P*=0.1302 (insignificant)	*P*<0.0001 (highly significant)

OPD=Outpatient department, IPD=Inpatient department, SD=Standard deviation, *t*=Students t-test, *P*=Probability

compared the clinical loads during the COVID-19 pandemic with the non-pandemic preceding year. This study provided the statistically correct evidence.

This is presumably the first such report which outlines the changes encountered in the Department of Plastic Surgery, especially in a COVID-19 dedicated care center.

There was a drastic reduction in our OPD consultations during the period observed in 2020 which was consistent with the reduction at other centers as well.[4] Follow-up of previously operated patients was done telephonically and those requiring any urgent intervention were asked to report to the emergency room from where they were admitted. All new patients that reported telephonically were either asked to wait for the resumption of OPD/OT services or report to the department depending on the urgency of the condition. However, the posttraumatic and malignancy patients requiring extirpation and reconstruction were called for admission.

Emergency calls received by the department were also reduced; however, statistically insignificant reduction in emergency services in the specialty which as mentioned above was due to the reductions in road traffic accidents and shutdown of physical labor factories. Only limb-threatening or life-threatening procedures were performed. In order to reduce the exposure of the doctors and paramedical staff, less time consuming and least invasive procedures were undertaken using PPE.[5]

Interestingly, in this period, we observed a reduction in number of road traffic accidents and animal encounters which formed the major chunk of emergency surgeries in the previous year.[6] This was probably because of the lockdown due to which people rarely ventured out of the homes.

The other modification that had to be adopted was to do the optimal procedure whenever the patient presented. Since there were travel restrictions, the emergency cases sometimes reached hours after the trauma. Every attempt was made for salvage surgeries in the first go, even when the golden period was over.

As reported by Giunta *et al*., most of the European centers shut down their operation capacities except for emergencies, urgent surgeries, tumor surgery, and burns along with lending their staff to the intensive care unit (ICU), showing the commitment of plastic surgeons in this crisis all over Europe.[7] A similar trend was seen in our hospital as well. This can be attributed to the shutdown of the OPD clinics and government imposed restrictions on travel due to which patients were unable to come for consultation. However, this was also necessary as most of the anesthesia specialists as well as paramedical support staff had been shifted to the care of critical COVID-19 patients.

In pre-COVID-19 period, the cases included congenital anomalies (craniofacial clefts and other abnormalities), esthetic corrections, hand surgeries, brachial plexus repairs, post-burn deformities, pressure injury reconstructions, posttraumatic defect reconstructions, and malignancy reconstructions (head and neck and breast). In the COVID-19 pandemic, the cases were limited to posttraumatic defect with exposed bones/implants, post-malignancy reconstructions, and infected pressure ulcer debridement and reconstructions. Also included were various pedicled flaps done before the lockdown which required pedicle division and inset, and raw area resurfacing with skin grafting. No major surgery or routine procedure on a critical patient which would require a postoperative ventilator care in ICU setting was undertaken.

India is a country with a huge population and restricted health-care facilities in comparison.[8] With the advent of this highly infectious virus, it was absolutely necessary to redirect all our available manpower as well as facilities in the hospital toward the care of the COVID-19 patients. As a result, 12 out of our 24 beds were allocated for COVID-19 patients, thus leading reduction in the total admissions and elective surgeries observed for this period.

The COVID-19 pandemic has disturbed the working environment in each filed all over the globe. During the current pandemic clinical load of all surgical

specialties are effected so is the plastic and reconstructive surgery. There are only a few editorials[9,10] and review articles[11] which describe the impact on the plastic and reconstructive practices. There is only one study which has studied the impact of the COVID-19 pandemic on training of plastic surgery residents.[4] However, at present, there are no studies, which have compared the clinical loads during the COVID-19 pandemic with the non-pandemic preceding year. This study is first to compare the clinical load in the specialty during the COVID-19 with the same months of preceding unaffected year and provides the statistically correct evidence.

This experience demonstrates how this pandemic has seriously affected the working of the Department of Plastic Surgery in a tertiary care center. It underlines the importance of clear protocols which need to be in place so as to manage the situation. The training and academic teaching of the residents in the department have also be adversely affected owing to the reduced exposure to plastic surgeries in the current scenario. Once this pandemic comes to a halt, newer problems can be anticipated owing to the long waiting lists of patients requiring plastic surgical interventions and exhausted health-care facilities. With this article, we expect to help our colleagues facing a similar challenge in their respective plastic surgery centers. We hope this global epidemic comes to an early end and we are able to safely continue with the reconstruction and esthetic restoration of our patients.

Limitation and recommendation

The study has been conducted at single center and it is the limitation of our study, and on the basis of this limitation, we recommend the similar studies to be done from other centers to augment and validate the evidence.

Conclusion

The COVID-19 pandemic has significantly reduced the number of patients attended in OPD, admitted in IPD, and elective surgeries performed in the department of plastic surgery. However, there is a reduction in the number of emergency surgeries but statistically insignificant. The strategy is to use telemedicine portal e-Sanjeevani services for OPD, encourage admission of patients with reverse transcription polymerase chain reaction negative for COVID-19 and perform reconstructive and esthetic plastic surgery operative procedures using COVID-19 appropriate precautions.

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Conflicts of interest

There are no conflicts of interest.

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