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The Safe Resumption of Elective Plastic Surgery in Accredited Ambulatory Surgery Facilities During the COVID-19 Pandemic

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Abstract

Background: On March 11, 2020, the World Health Organization declared the novel Coronavirus-19 (COVID-19) a worldwide pandemic, resulting in an unprecedented shift in the Canadian healthcare system, where protection of an already overloaded system became a priority; all elective surgeries and non-essential activities were ceased. With the impact being less than predicted, on May 26, 2020, elective surgeries and non-essential activities were permitted to resume.

Objectives: The authors sought to examine outcomes following elective aesthetic surgery and the impact on the Canadian healthcare system with the resumption of these services during the COVID-19 worldwide pandemic.

Methods: Data were collected in a prospective manner on consecutive patients who underwent elective plastic surgery procedures in 6 accredited ambulatory surgery facilities. Data included patient demographics, procedural characteristics, COVID-19 polymerase chain reaction (PCR) test status, airway management, and postoperative outcomes.

Results: A total of 368 patients underwent elective surgical procedures requiring a general anesthetic. All 368 patients who underwent surgery were negative on pre-visit screening. A COVID-19 PCR test was completed by 352 patients (95.7%) and all were negative. In the postoperative period, 7 patients (1.9%) had complications, 3 patients (0.8%) required a hospital visit, and 1 patient (0.3%) required hospital admission. No patients or healthcare providers developed COVID-19 symptoms or had a positive test for COVID-19 within 30 days of surgery.

Conclusions: With appropriate screening and safety precautions, elective aesthetic plastic surgery can be performed in a manner that is safe for patients and healthcare providers and with a very low risk for accelerating virus transmission within the community.

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On January 30, 2020, the World Health Organization declared the novel Coronavirus-19 (COVID-19) a public health emergency of international concern, and on March 11, 2020, COVID-19 was declared a worldwide pandemic. With these 2 statements, an unprecedented shift occurred in the Canadian healthcare system, where protection of an already overloaded system became a priority.[1]

In Canada, federal, provincial, territorial, and local public health officials regulate and direct funding, decision-making, and guidelines surrounding healthcare and the services that can be provided. Direction provided by provincial and local health officials in the initial phases of COVID-19 was guided by information from countries that had been facing outbreaks of COVID-19. Guidelines offered by the World Health Organization were evolving quickly, with attempts to develop models of best practice based on early evidence.[2]

Ontario declared a state of emergency on March 17, 2020. This declaration permitted the government to access extraordinary powers allowing it to act quickly in a time of crisis, including allowing the Premier to control certain aspects of administration within municipalities, overriding or re-writing existing laws and statutes without involvement of the legislature, and allowing the Cabinet to close public spaces, regulate movement, and establish emergency facilities. In Ontario, this was followed on March 19, 2020, by the issue of Directive #2 for Health Care Providers by the Chief Medical Officer of Health, which required all elective surgeries and non-essential activities to be ceased.[3-5]

Hospitals fall within provincial jurisdiction and as such are required to ensure their departments are in compliance with federal and provincial guidelines. However, many plastic surgeons perform elective procedures at accredited ambulatory surgery facilities known as Out of Hospital Premises (OHPs). These sites are regulated by the College of Physicians and Surgeons of Ontario (CPSO) and generally fall outside of direct provincial jurisdiction.[6] Nevertheless, with the placement of Directive #2, OHPs shut down across the province. Concerns raised at the time included an uncertainty surrounding COVID-19 and the extent of the impact it could have on the Canadian healthcare system, the ethics of continuing elective surgeries in a climate of potential insufficient personal protective equipment (PPE) in the healthcare system, the possibility of healthcare providers (HCPs) being redeployed to help with the COVID-19 crisis, along with the need to limit further spread of COVID-19 within the community. Of additional importance was the need to avoid the utilization of hospital facilities in the case that patients treated in an OHP developed complications.

Several months into the pandemic, it became apparent that the impact of COVID-19 on the Ontario healthcare system would be less than initially predicted and feared. Daily case counts, which peaked close to 650 per day in April, were dropping to approximately 250 per day. Initial predictions for total cases in Ontario were close to 300,000. Fortunately by the end of May 2020, total cases were near 35,000.[2,7-9] On May 26, 2020, Directive #2 was amended, allowing elective surgeries and non-essential activities to resume, with the requirement that sufficient PPE was available and that appropriate hazard controls were in place.[4] Simultaneously, guidelines were being published from other jurisdictions promoting the safe resumption of elective surgery.[10]

As OHPs and elective surgery slowly resumed, it was and continues to be very important for facilities and their medical directors to demonstrate that in the midst of a pandemic, surgery can be performed in a safe manner for patients, visitors, and HCPs and that this can be achieved with minimal impact on the healthcare system. This will be particularly important in the event of a further wave of COVID-19. This article examines the collective experience of 6 OHPs delivering elective plastic surgery over a 7-week period following the resumption of surgical services in Ontario.

METHODS

Data were collected in a prospective manner on consecutive patients who underwent elective plastic surgery procedures in 6 OHPs in Ontario. Five of the facilities are located in the greater Toronto area and 1 is in northern Ontario. All of the facilities specialize in elective aesthetic plastic surgery and are under the medical direction of a plastic surgeon. Given the nature of the Canadian healthcare system, all procedures performed in the OHPs were considered aesthetic in nature and were self-pay. All procedures were performed by plastic surgeons certified by the Royal College of Physicians and Surgeons of Canada and licensed by the CPSO. The study period began on June

Table 1. Collected Data Points for Each Surgical Patient

Data collected on patients
Location and date of surgery
Patient demographics
Age
Gender
Patient health status
BMI
ASA class
Comorbidities
Pre-visit screening
Pre-visit checklist
Outcome of pre-visit checklist
Viral swab completion
Viral swab result
Surgical details
Surgery performed
Length of surgery
Type of anesthetic
Discharge status
Postoperative details (all within 30-d period)
Postoperative complication
Complication details
Hospital visit
Hospital admission
COVID diagnosis

ASA = American Society of Anesthesiologists; BMI = body mass index.

Table 2. Pre-Visit COVID-19 Screening Questionnaire

Pre-Visit COVID-19 screen
Have you travelled out of country in the last two weeks? Y/N
Have you had contact with anyone that has travelled out of country in the last two weeks? Y/N
Have you been in contact with anyone that has tested positive for COVID in the last two weeks? Y/N
Has anyone at home been in contact with an individual who has tested positive for COVID? Y/N
Have you been experiencing any of the following symptoms: sore throat, cough, runny nose, fevers, chest pain or shortness of breath, loss of taste or smell, nausea, or diarrhea? Y/N

1, 2020, and concluded on July 17, 2020. Data included patient demographics, procedural characteristics, COVID-19 polymerase chain reaction (PCR) test status, airway management, and postoperative outcomes (Table 1).

The medical directors of the facilities agreed that patient selection for surgery would be modified to include low-risk patients, as suggested in several published guidelines (4,8). In general, this included age under 65, American Society of Anesthesiologists (ASA) class I or II, and absent from or well-controlled comorbidities. All patients were instructed to undergo a COVID-19 PCR nasopharyngeal swab test 3 to 4 days prior to surgery and were asked to self-isolate between the time of their test and the date of surgery. Twenty-four hours prior to surgery, the patients were contacted by the surgeon's office to complete a pre-visit COVID-19 screening questionnaire (Table 2). If the pre-visit questionnaire or the COVID-19 test were positive, the patient was referred for medical care and the surgical procedure was postponed.

On the day of surgery, patients were asked to attend the OHP on their own to minimize traffic within the facility. On arrival, patients underwent a second COVID-19 screening questionnaire and a temperature check. If any visitors accompanied the patient, the visitor was screened as well. All people entering the facilities were asked to wear a mask and cleanse their hands with an alcohol-based sanitizer.

Modifications to each facility had been undertaken to address the health and safety needs of patients, visitors, and staff working within the OHP. Although this varied slightly between the facilities, modifications included scheduling changes to minimize the number of people in the facility, patient flow plans to organize traffic within the clinic, regular cleaning of all surfaces and contact points, adjustments to heating and ventilation systems to address air purification and filtration, and introduction of new instrumentation to address airway management needs for anesthesia. The medical director from each facility was asked to complete a short survey summarizing the steps they had taken to prepare their facility for surgery on reopening post COVID-19.

All employees and staff were trained on the new policies and procedures. PPE was purchased and personnel were trained on the proper utilization of PPE. All staff were educated about the signs and symptoms of COVID-19 and instructed to self-monitor and report any changes in health to the nurse manager or medical director. On arrival each day, all staff, employees, and HCPs completed a health assessment along with a temperature check (Table 3). A second temperature check was completed toward the end of the shift.

Table 3. Surgical Clinic Screening Assessment for Staff

COVID-19 staff screen
I understand the novel coronavirus causes the diseases known as COVID-19. I understand the novel coronavirus virus has a long incubation period during which carriers of the virus may not show symptoms and still be contagious. _____ (Initial)
I understand that certain medical procedures create aerosolization, which is one way that the novel coronavirus can spread. The ultra-fine nature of the aerosol can linger in the air for minutes to sometimes hours, which can transmit the novel coronavirus. I understand that due to the frequency of visits of other team members and patients, the characteristics of the novel coronavirus, and the characteristics of medical procedures, that I have an elevated risk of contracting the novel coronavirus simply by being in a surgical office. _____ (Initial)
I confirm that I am not presenting any of the following symptoms of COVID-19 identified by Provincial Health Services:
• Fever Temp _____
• Cough Y/N
• Sore throat Y/N
• Shortness of breath Y/N
• Flu-like symptoms Y/N
I confirm that I have considered if I am in a high-risk category (eg, diabetes, heart disease, lung diseases, ≥60 years of age) and have chosen to work. _____ (Initial)
I confirm that I am not currently positive for the novel coronavirus. _____ (Initial)
I confirm that I am not waiting for results of a laboratory test for the novel coronavirus. _____ (Initial)
I verify that I have not returned to the province from any country outside of Canada whether by car, air, bus, or train in the past 14 days. _____ (Initial)
I understand that Provincial Health Services has asked individuals to maintain social distancing of at least 2 meters (6 feet) and it is not possible to maintain this distance and provide or assist with surgical treatment. _____ (Initial)
I verify that I have not been identified as a close contact of a confirmed case of someone who has tested positive for novel coronavirus and/or been asked to self-isolate by Provincial Health, the Communicable Disease Control, or any other governmental health agency. _____ (Initial)

All general anesthetic procedures were performed by an anesthesiologist certified by the Royal College of Physicians and Surgeons of Canada and licensed by the CPSO. Management of the airway included utilization of a laryngeal mask or an endotracheal tube. Intubation was performed either with direct laryngoscopy or video-assisted laryngoscopy. The specific approach varied between clinic, anesthesiologist, and surgical procedure.

Following discharge, all patients were monitored for 30 days. Any complications, hospital visits, or hospital admissions were recorded. Patients were also monitored for signs and symptoms of COVID-19. Any positive tests for COVID-19 within the first 30 days of surgery were recorded.

The guiding principles of the Declaration of Helsinki were strictly applied and adhered to in this study.

RESULTS

Over a 6-week period, 368 patients underwent elective surgical procedures requiring a general anesthetic. The average age was 39 years (range 16-83), and the average body mass index was 24.4 kg/m^2 (range 16.9-39.1). There were 341 (92.7%) female patients, 25 (6.8%) male patients, and 2 patients (0.5%) identified as other. Two hundred fifty-nine patients (70.4%) were ASA I, 103 (28.0%) were ASA II, and 6 patients (1.6%) were ASA III. A total 44 patients (11.9%) had comorbidities. Forty patients (10.9%) had 1 comorbidity: 3 patients were diabetic, 5 had hypertension, 11 had asthma or another respiratory disease, and 21 had a comorbidity that was not listed. Four patients (1.0%) had 2 or more comorbidities.

All 368 patients who underwent surgery were called in advance of their surgery and were negative on previsit screening. A total of 3 patients were identified between all of the clinics that failed their pre-screening and required rescheduling. A COVID-19 PCR test was completed by 352 patients (95.7%). Sixteen patients did not complete a COVID-19 PCR test: 2 patients flew in from out of province, so did not have time to complete the swab and receive the results in time for surgery; 2 patients required secondary surgery due to complications so were unable to complete swabs in time; 2 patients did not undergo testing because they had self-isolated for >14 days prior to surgery; 1 patient refused testing due to

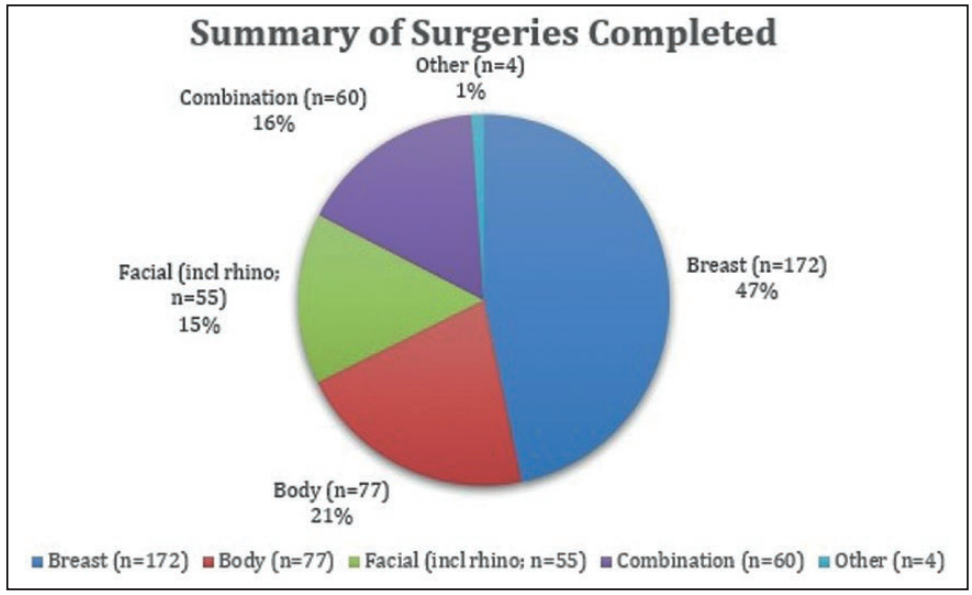

Figure 1. Procedure breakdown.

personal opinion on safety of swab; and no documented reason was given as to why 9 patients did not undergo testing. Of the 352 tests that were completed, results for 345 (98.0%) of the tests were received prior to surgery; 100% of the test results were negative, including the 7 that were received after the surgery date.

The breakdown of surgical procedure type is included in Figure 1. The average surgical time was 143 minutes, with a minimum of 50 minutes and a maximum of 342 minutes. Endotracheal intubation was performed on 220 (59.8%) patients. The choice of direct laryngoscopy or video-assisted laryngoscopy varied between clinic and anesthesiologist; however, the majority of intubations were performed using a video-assisted approach. The remaining 148 patients (40.2%) received a laryngeal mask during their anesthetic. A total 334 of the procedures were performed as an outpatient; 34 (9.3%) patients stayed in the facility overnight.

In the postoperative period, 7 patients (1.9%) had complications: 2 patients developed a hematoma requiring secondary surgery for evacuation. One of these patients was subsequently admitted into hospital 3 weeks later with non-aspiration, non-COVID-19–related pneumonia. She then developed an infection in the non-hematoma breast, requiring a third surgery to remove her breast implant. Two patients had bleeding; 2 patients developed a seroma, requiring aspiration, and 1 patient had a minor wound dehiscence. A total of 3 patients (0.8%) required a hospital visit; 1 for ultrasound-guided insertion of a drain due to a persistent seroma, 1 for non-aspiration, non-COVID-19–related pneumonia, and 1 for investigation of a possible pulmonary embolus, which turned out to be negative. Of the 368 study patients, 1 patient (0.3%) required hospital admission. Overall, 361 (98.1%) patients had an unremarkable postoperative course.

All patients were monitored for a minimum of 30 days following surgery. Patients were asked to self-report any changes to their health, including symptoms that could be related to COVID-19. No patients developed COVID-19 symptoms or had a positive test for COVID-19 within 30 days of their surgery.

Regarding the facilities questionnaire completed by the medical directors, all directors reported that their facilities included an additional surgical consent form specific to peri-operative risks associated with COVID-19. A new section related to COVID-19 assessment and risk was added to the pre-surgical checklist. In addition, all facilities developed and implemented policies for retraining of staff, enhanced cleaning, maintenance of physical distancing where possible, utilization of PPE, and modifications to the directional flow of patients during the course of their stay.

Medical directors reported that the proportion of patients who underwent intubation as opposed to laryngeal masks increased compared with pre-COVID-19 levels. Video-assisted laryngoscopy was employed in many cases of intubation, but this varied between anesthesiologists. No facilities incorporated any additional tools for intubation or extubation such as a plexiglass intubation box. During airway management, only necessary personnel remained in the operating room. Personnel wore surgical masks, gowns, and face shields. Some minor variance existed in the utilization of PPE between facilities based on the medical directors' interpretation of risk in a population of patients that tested negative for COVID-19.

Table 4. Healthcare Personnel

Healthcare personnel involved in care	No.
Surgeons	9
Anesthesiologists	16
Surgical assist	6
Nurses	28
OR tech	6

OR = operating room.

While in the facility, staff wore masks at all times and utilized eye protection when in direct contact with patients. Between the 6 OHPs, there were a total of 65 HCPs directly involved in the care of the 368 patients (Table 4). None of the HCPs developed symptoms of COVID-19 or tested positive for COVID-19 during the study period, which included the 30 days following the completion of surgery.

DISCUSSION

With the unexpected arrival of a global pandemic due to COVID-19, immediate modifications to healthcare systems were implemented worldwide. North Americans observed the challenges faced in Asia and Europe and set processes in place to protect the infrastructure of hospitals and healthcare institutions. This included the cessation of all non-urgent medical care along with centralization and protection of all PPE and ventilators.

In Ontario, all elective surgery was halted on March 19, 2020, as part of a mandatory provincial directive. Medical directors at OHPs immediately began preparing new policies and protocols to address the pandemic and plan for a process to eventually re-open services in a way that would protect patients, families, HCPs, and the broader community. By the third week of May, daily case counts were in the range of 300 to 350, down from a peak of approximately 650 in April. Ontario was performing on average 18,000 COVID-19 PCR tests per day with a 3% rate of positivity. There was a total of 27,000 cases with 76% of them resolved and approximately 2300 deaths. Active cases were calculated to be approximately 4200. If one estimates real cases to be 10 times the reported cases, that would result in 42,000 cases in a population of 14.57 million. Estimated prevalence would be 0.29%, or 1 in every 345 people.

On May 26, the provincial Chief Medical Officer of Health amended the initial directive to allow elective medical services to be gradually restarted, with careful attention to be paid to the published provincial requirements.[11] The OHPs that participated in this study reopened within a week of the announcement. Although not mandatory, the medical directors determined that patients should receive a COVID-19 PCR test prior to surgery. It is interesting that in this patient population and with pre-screening for symptoms, all patients within the study tested negative for COVID-19. Although false-negative tests are possible, the prevalence of COVID-19–positive patients undergoing elective surgery in this study was 0 or close to 0. As healthcare resources along with public tolerance for testing declines, the decision to test all patients coming for elective surgery may need to be revisited.

Concerns have been raised that surgery requiring manipulation of the airway may predispose a previously healthy patient to developing more severe symptoms of a COVID-19 infection. Additionally, a study published early in the COVID-19 pandemic on outcomes for patients who underwent surgery and had perioperative diagnosis of COVID-19 showed that one-half of these patients developed pulmonary complications, and the 30-day mortality in these patients was 38.0%.[12] However, Couto et al[13] recently published their experience operating on 300 consecutive elective surgical patients performed at the height of the outbreak in the United States. None of the patients demonstrated symptoms of COVID-19 in the postoperative period. Similarly, our study, which, to our knowledge, is the first study to specifically examine patients who underwent elective aesthetic plastic surgery, demonstrated that all 368 patients remained well, with no confirmed cases of COVID-19 in the first 30 days following surgery.

A significant concern for regulatory health agencies is the potential impact of elective procedures on the overall healthcare system. In Canada, this is particularly true when surgery is performed in an OHP. Our study has demonstrated a very low rate of surgical complications, and specifically only 3 patients required a visit to a public hospital. Of these, 2 were managed with investigations and same-day discharge. One patient (0.3%) required admission and subsequent surgery. It is also important to note that each of the facilities sourced their own supply of PPE independent of the public hospital supply chain.

If elective surgery is being performed at the time of a public health emergency such as a global pandemic, it is imperative that it be carried out with minimal risk to the HCPs involved in patient care. This is important not only for the HCPs but also for their families and for the other facilities where these HCPs may work. In our study, all HCPs underwent a daily health screen and were asked to remain at home if at any time they felt unwell or at risk for having been exposed to COVID-19. They all underwent facility-specific training regarding the new policies and procedures. HCPs were asked to maintain physical distancing in the facilities whenever possible and wore appropriate PPE throughout their entire shift. These steps, combined

with judicious patient screening, resulted in no HCPs becoming unwell or testing positive for COVID-19 during the study period.

Four of the medical directors in this study reported that they made modifications to the existing heating and ventilation systems in their facility. These modifications improved airflow and the time taken for total air recirculation within the operating room. They also addressed air filtration, including the addition of HEPA filters, activated carbon filters, and germicidal ultraviolet C+ chambers. Further research will be necessary to determine the utility of these measures as it relates to safety for the patient and the staff and personnel in the OHP.

In Ontario, as with other jurisdictions, hundreds of thousands of patients had their elective surgical procedures postponed or cancelled outright due to the COVID-19 pandemic. Although we do not know what the future holds, we are already seeing trends in certain regions of increasing numbers of daily cases. This study demonstrates that with appropriate screening and safety precautions, surgery can be performed in a manner that is safe for patients and HCPs and with a very low risk for accelerating virus transmission within the community. This may become of increasing importance should case numbers rise or in the event of a similar type of global outbreak.

CONCLUSIONS

The COVID-19 global pandemic has resulted in a need for enhanced safety policies surrounding elective surgery as well as confirmation that these procedures can be performed in a manner that promotes patient safety with minimal impact on the healthcare system. This study demonstrates that in 6 OHPs, with appropriate screening and safety precautions, elective aesthetic plastic surgery can be performed in a manner that is safe for patients and HCPs and with a very low risk for accelerating virus transmission within the community.

Disclosures

Jamil Ahmad: Editorial Board, *Aesthetic Surgery Journal*; Thieme Medical Publishing (Royalties); Viveve (KOL); Mentor Worldwide LLC (Consultant); InMode (KOL). Frank Lista: Breast Section Co-Editor, *Aesthetic Surgery Journal*; InMode (KOL). Ryan Austin: next generation editor for the *Aesthetic Surgery Journal* and a KOL for InMode.

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