

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

Mitchell Brown MD

Stephanie Eardley CCPA

Jamil Ahmad MD

Frank Lista MD

Scott Barr MD

Stephen Mulholland MD

Julie Khanna MD

Charles Knapp MD

Maryam Saheb-Al-Zamani MD

Ryan Austin MD

Ronald Levine MD

**Corresponding Author:**

Mitchell Brown MD MEd FRCSC

790 Bay Street, Suite 410

Toronto, Ontario, Canada

M5G 1N8

O: 416 323 6336

Email: [drbrown@torontoplasticsurgery.com](mailto:drbrown@torontoplasticsurgery.com); Instagram: @tpsmedicaaesthetics

Mitchell Brown MD MEd FRCSC is a Plastic and Reconstructive Surgeon and a Professor in the Department of Surgery, University of Toronto, Toronto, Canada

Stephanie Eardley CCPA is a Physician Assistant at Toronto Plastic Surgery, Toronto, Canada

Stephen Mulholland MD, FRCSC is a Plastic and Reconstructive Surgeon in Private Practice in Toronto, Canada

Scott Barr MD, FRCSC is a Plastic and Reconstructive Surgeon in Private Practice in Sudbury, Canada

Jamil Ahmad MD, FRCSC is a Plastic and Reconstructive Surgeon and an Assistant Professor in the Department of Surgery, University of Toronto, Toronto, Canada

Frank Lista MD, FRCSC is a Plastic and Reconstructive Surgeon and an Assistant Professor in the Department of Surgery, University of Toronto, Toronto, Canada

Julie Khanna MD, FRCSC is a Plastic and Reconstructive Surgeon in Private Practice in Oakville, Ontario

Maryam Saheb-Al-Zamani, MD FRCSC is a Plastic and Reconstructive Surgeon in Private Practice in Oakville, Ontario

Ryan Austin MD, FRCSC FRCSC is a Plastic and Reconstructive Surgeon in Private Practice in Mississauga, Ontario

Charles Knapp MD, FRCPC is an Anesthesiologist and an Assistant Professor in the Department of Anesthesiology and Pain Medicine, University of Toronto, Toronto, Canada

Ronald Levine MDCM, FRCSC is a Plastic and Reconstructive Surgeon and a Professor in the Department of Surgery, University of Toronto, Toronto, Canada

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## Abstract

**Background:** On March 11, 2020 the World Health Organization declared COVID-19 a worldwide pandemic resulting in an unprecedented shift in the Canadian health care system, where protection of an already overloaded health care 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:** To examine outcomes following elective aesthetic surgery and the impact on the Canadian health care system with the resumption of these services during the COVID-19 worldwide pandemic.

**Methods:** Data was collected in a prospective manner on consecutive patients undergoing elective plastic surgery procedures in six accredited ambulatory surgery facilities. Data included patient demographics, procedural characteristics, COVID-19 PCR test status, airway management and postoperative outcomes.

**Results:** 368 patients underwent elective surgical procedures requiring a general anesthetic. All 368 patients that 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, seven patients (1.9%) had complications, three patients (0.8%) required a hospital visit, and one patient (0.3%) required hospital admission. No patients or health care 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 health care providers and with a very low risk for accelerating virus transmission within the community.

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

In Canada, federal, provincial, territorial and local public health officials regulate and direct funding, decision making and guidelines surrounding health care 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 WHO were evolving quickly, with attempts to develop models of best practice based on early evidence.<sup>2</sup>

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.<sup>3,4,5</sup>

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.<sup>6</sup> 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 health care system, the ethics of continuing elective surgeries in a climate of potential insufficient personal

protective equipment (PPE) in the health care system, the possibility of health care 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 use 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 health care 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.<sup>2,7,8,9</sup> 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.<sup>4</sup> Simultaneously, guidelines were being published from other jurisdictions promoting the safe resumption of elective surgery.<sup>10</sup>

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 health care professionals and that this can be achieved with minimal impact on the health care system. This will be particularly important in the event of a further wave of COVID-19. This article examines the collective experience of six OHPs delivering elective plastic surgery over a seven week period following the resumption of surgical services in Ontario.

## Methods

Data was collected in a prospective manner on consecutive patients undergoing elective plastic surgery procedures in six OHPs in Ontario. Five of the facilities are located in the Greater Toronto Area and one 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 health care 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 (RCPSC) and licensed by the CPSO. The study period began on

June 1, 2020 and concluded on July 17, 2020. Data included patient demographics, procedural characteristics, COVID-19 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 Anaesthesiologists (ASA) class I or II, along with absent or well controlled comorbidities. All patients were instructed to undergo a COVID-19 PCR nasopharyngeal swab test three to four 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 in order to minimize traffic within the facility. Upon 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 to 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 that they had taken to prepare their facility for surgery upon reopening post COVID-19.

All employees and staff were trained on the new policies and procedures. Personal protective equipment (PPE) was purchased and personnel were trained on the proper use 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. Upon 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 towards the end of the shift.

All general anesthetic procedures were performed by an anesthesiologist certified by the RCPSC , and licensed by the CPSO. Management of the airway included the use 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 thirty 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 thirty 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 six-week period, three hundred sixty-eight patients underwent elective surgical procedures requiring a general anesthetic. The average age was 39 years (range 16-83); the average BMI was 24.4 kg/m<sup>2</sup>(range 16.9-39.1). Three hundred forty-one patients (92.7%) were female; twenty-five patients (6.8%) were male; 2 patients (0.5%) identified as other. Two hundred fifty-nine patients (70.4%) were ASA I; one hundred three (28.0%) were ASA II; six patients (1.6%) were ASA III. Forty-four patients (11.9%) had comorbidities. Forty patients (10.9%) had one comorbidity: three patients were diabetic, five had hypertension, eleven had asthma or another respiratory disease and twenty-one had a comorbidity that was not listed. Four patients (1.0%) had two or more comorbidities.



All 368 patients that underwent surgery were called in advance of their surgery and were negative on pre visit 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: two patients flew in from out of province, so did not have time to complete the swab and have the results back in time for surgery; two patients required secondary surgery due to complications so were not able to complete swabs in time; two patients did not undergo testing as they had been in self isolation for >14 days prior to surgery; one patient refused testing due to personal opinion on safety of swab; no documented reason was given as to why nine patients did not undergo testing. Of the three hundred fifty-two tests that were completed, results for three hundred forty-five (98.0%) of the tests were received prior to surgery; 100% of the test results were negative, including the seven that were received after the surgery date.

The breakdown of surgical procedure type is included in Figure 1. 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. Three hundred thirty-four of the procedures were performed as an outpatient; 34 (9.3%) patients were kept in the facility overnight.

In the postoperative period, seven patients (1.9%) had complications: two patients developed a hematoma requiring secondary surgery for evacuation. One of these patients was subsequently admitted into hospital three 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; two patients developed a seroma, requiring aspiration, and one patient had a minor wound dehiscence. A total of three patients (0.8%) required a hospital visit; one for ultrasound guided insertion of a drain due to a persistent seroma, one for non-aspiration, non-COVID related pneumonia, and one for investigation of a possible pulmonary embolus, which turned out to be negative. Of the 368 study patients, one patient (0.3%) required hospital admission. Overall, 361 (98.1%) patients had an unremarkable postoperative course.

All patients were monitored for a minimum of thirty 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.

With regards to the facilities questionnaire completed by the medical directors, all facilities reported that they 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, use of PPE, along with modifications to the directional flow of patients during the course of their stay.

Medical directors reported that the proportion of patients undergoing intubation as opposed to laryngeal masks, increased as compared to pre COVID-19 levels. Video assisted laryngoscopy was used 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 used surgical masks, gowns and face shields. There was some minor variance in the use of PPE between facilities, based on the medical directors interpretation of risk in a population of patients that have tested negative for COVID-19.

While in the facility, staff wore masks at all times and used eye protection when in direct contact with patients. Between the six 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 thirty days following the completion of surgery.

## **Discussion**

With the unexpected arrival of a global pandemic due to the SARS-CoV-2, immediate modifications to health care systems were implemented worldwide. North Americans observed the challenges faced in Asia and Europe and set processes in place in order to protect the infrastructure of hospitals and health care institutions. This included the cessation of all non urgent medical care along with centralization and protection of all personal protective equipment 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, health care professionals as well as the broader community. By the third week of May, daily case counts were in the range of 300-350, 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 ten times reported cases, that would result in 42,000 cases in a population of 14.57 million. Estimated prevalence would be 0.29% or one 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.<sup>11</sup> The OHPs that participated in this study reopened within a week of the announcement. Although not mandatory, the medical directors determined that patients should undergo 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 zero or close to zero. As health care 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 half of these patients developed pulmonary complications and the 30 day mortality in these patients was 38.0%.<sup>12</sup> However, Couto et al, recently published their experience operating on 300 consecutive elective surgical patients performed at the height of the outbreak in the United States.<sup>13</sup> None of the patients demonstrated symptoms of COVID-19 in the postoperative period. Similarly, our study which is the first study to specifically examine patients undergoing 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 health care 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 three patients required a visit to a public hospital. Of these, two 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 health care system. This study demonstrates that in six out of hospital surgical premises, with appropriate screening and safety precautions, elective aesthetic plastic surgery can be performed in a manner that is safe for patients and health care providers and with a very low risk for accelerating virus transmission within the community.

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**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 Anaesthetic
-Discharge Status
Post Operative Details (All within 30 day Period)
-Post Op Complication
-Complication Details
- Hospital Visit
-Hospital Admission
-COVID diagnosis

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**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 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 of smell, nausea or diarrhea? Y/N

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**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 (e.g. diabetes, heart disease, lung diseases, $\geq 60$ 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 metres (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)	

**Table 4.** Health Care Personnel

Health Care Personnel Involved in Care
Surgeons- 9
Anaesthesiologists- 16
Surgical Assist-6
Nurses -28
OR Tech- 6

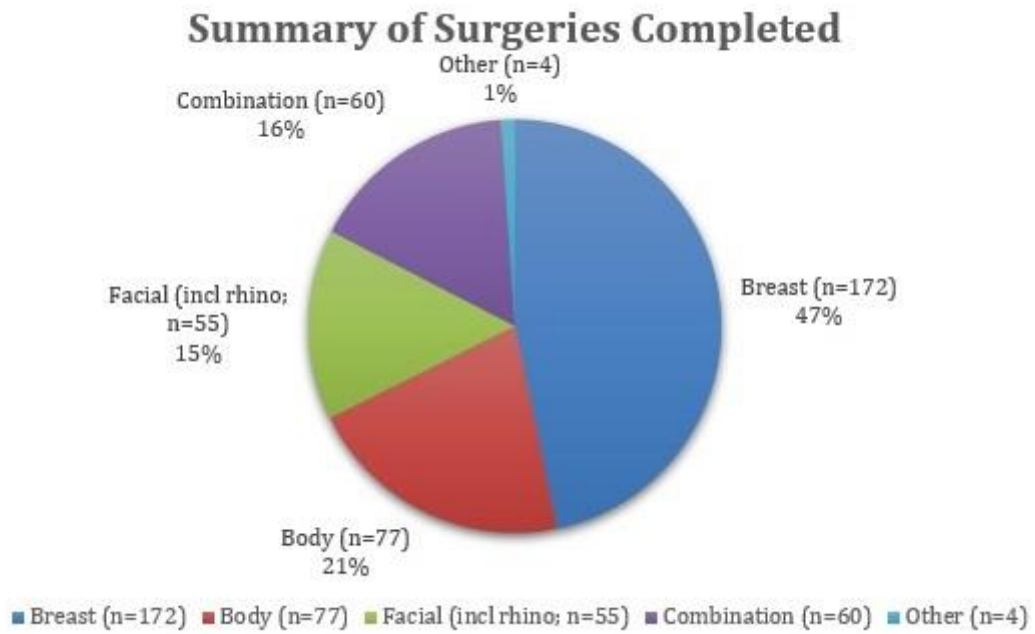
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Figure Legend

**Figure 1.** Procedure Breakdown.

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Figure 1



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