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Plastic surgery practices amidst global COVID-19 pandemic: Indian consensus

Rajiv Agarwal^{a,*}, Maneesh Singhal^b, Vinay Kant Shankhdhar^c,
Ravi Kumar Chittoria^d, Ranjit Kumar Sahu^e, Veena Singh^f,
Ramesh Chandra^g

^a Professor and Head, Department of Plastic Surgery and Burns, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India

^b Professor and Head, Department of Plastic Surgery, All India Institute of Medical Sciences, New Delhi, India

^c Professor and Head, Plastic and Reconstructive Surgery, Tata Memorial Centre, Mumbai, India

^d Department of Plastic Surgery, Jawaharlal Institute of Postgraduate Medical Education & Research, Pondicherry 605006, India

^e Associate Professor, Department of Burns and Plastic Surgery, AIIMS, Jodhpur 342005, India

^f Associate Professor & Head, Burns & Plastic Surgery, All India Institute of Medical Sciences, Phulwarisharif, Patna 801507, India

^g Former Professor and Head of Plastic Surgery and Former Principal, King George's Medical University, Lucknow, India

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Summary Introduction: The COVID-19 pandemic having spread globally has profound implications on medical and surgical care, which is given by the health care providers. At this time, though there are guidelines and recommendations for medical management of these patients, there is a lack of guidance on how a plastic surgeon should approach the COVID-19 suspect or infected patient who presents either in an elective or emergency setting. We aim to provide a consensus guideline based on the current recommendations of the Indian Council of Medical Research (ICMR) and the pooled experience of the major centers performing plastic and reconstructive surgery in India.

Methods: The current guidelines and recommendations on the COVID-19 pandemic were studied from both government and nongovernment sources including ICMR. The problems in the

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* Corresponding author: Department of Plastic Surgery and Burns, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India.

E-mail addresses: drrajivagarwal@gmail.com (R. Agarwal), drsveena@aaimspatna.org (V. Singh).

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specialty of plastic surgery were categorized into four groups and for each group, separate and individual guidelines have been formulated.

Guidelines: Consensus guidelines have been formulated for the specialty of Plastic and Reconstructive surgery. The patients requiring plastic surgery service have been categorized into four groups of acute, subacute, chronic, and late category. Acute cases are the ones who require intervention within 24-48 h. Subacute cases are the ones who require intervention in the next 3-10 days, while the chronic are the ones who need plastic surgery preferably within a month. The late category are the ones who need surgery within the next six months. This has been done based on the urgency and priority of surgical intervention titrated against the risks of operating and inadvertently acquiring the exposure of COVID-19-positive patients.

Conclusion: Currently, in the wake of COVID-19 pandemic, there are no clear guidelines specific to the vast majority of patients who come for a plastic surgery intervention. This puts the patients at risk due to the impending plastic surgery problem while at the same time it poses a risk of exposure to COVID-19 for the surgical team. Consensus guidelines are presented, to steer the plastic surgeon in his work, in the wake of COVID-19 crisis. The guidelines are based on firm scientific evidence from the reputed research and regulatory bodies and have been made in consonance with plastic surgery experts around the country, so that these practices best suit the needs of the patients, while being mindful of resource limitations and infection risks. The approach of “delayed conservative treatment” works best in the present case scenario.

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Introduction

The COVID-19 pandemic has shaken the world like a storm with mounting infection rates, rapid global spread of disease, social ostracization, morbidity, and mortality, besides throwing the normal day to day life completely out of gear. Although the disease control and treatment come under the domain of epidemiologists, physicians, microbiologists, and basic scientists, the effects of the disease have spilled onto the surgical sciences who are unaffected. Many of the infected or potentially infected patients often need surgical attention and procedures, some of which cannot be avoided. The conduct of surgical procedures in a Covid-19 scenario, hence becomes an issue both with the patient and the treating surgical team.

Globally, there has been a lack of clear guidance from national societies on how surgical and procedure-oriented professions should modify their practices.¹ The western world including the United States have only released recommendations on how to approach elective/nonurgent surgery, but these recommendations are not guidelines and hence not enforceable.^{2,3}

The involvement and role of plastic surgery in COVID-19 patients comes in the course of treatment of several categories including burns, trauma, malignancy reconstruction, particularly where access to the oral cavity becomes necessary. It is well known that both nasal and oral procedures are aerosol-generating, and therefore the very conduct of performing such procedures needs to be decided. Although there are general guidelines for medical professionals for the treatment of Covid-19 patients, no surgical guidelines specific to plastic surgery currently exist in the literature.

Methods

The content of this paper, has been therefore developed based on the basic guidelines of the Indian Council of Med-

ical Research, Ministry of health and family welfare, Govt. of India and various prominent international surgical associations. These guidelines have been further developed and enhanced, to suit the specific plastic surgery procedures based on brainstorming and combining experiences of the major plastic surgery training and teaching centers across the country. The purpose of this article is to provide consensus information on the best and safest practices, specifically for conducting plastic surgery procedures in COVID-19 pandemic. This includes guidance on the conduct of emergency operations, management of nonemergent operations, triage of elective procedures, endoscopic procedures, bone-drilling procedures, and general guidelines for operating room (OR) conduct and setup.

Guidelines

The detailed guidelines for plastic surgery in all the areas, are presented below. These guidelines attempt to cover the vast majority of the patients needing plastic surgery and they emphasize on the importance of patient selection and procedure selection during the corona pandemic.

Consultation in plastic surgery

Leveraging telemedicine

Plastic surgery is a field that is particularly amenable to telehealth. Visual inspection of the photographs and radiographs, provide a great resource material for diagnosis, management, and follow-up.⁴ It is important to minimize patient interaction with the plastic surgeon as far as possible. Many consultations can be managed using telemedicine. This is more effective for preconsultation advice and the follow up of patients after surgery. Another effective method of remote consultation is WhatsApp messaging. This method also allows the transmission of still and

video files of the patients and it is an invaluable method of consultation and also for the follow up of patients undergoing plastic surgery. It is also important to make note and remember that transcriptions of all digital communications are legal documents and hence should be stored properly.

For patients actually coming for in-person consultation, the use of physical barriers is recommended as also given in the guidelines by WHO. The physical barrier can be in the form of a glass or plastic window, which can screen off any aerosol coming from a potentially infected patient. Thermal screening and COVID-19 testing should be done for suspected cases. Surgeon should wear hair covers, hospital scrubs, gloves, face masks, and eye protection in the OPD. Hand hygiene is recommended using alcohol-based hand sanitizer after attending to each patient. It is also important to avoid contact with paper medical reports and radiological films, and the use of electronic records for assessment and evaluation is encouraged.

All health care workers not involved in the direct care of the patient should avoid and minimize exposure. The different patient care activities like checking vital signs, giving medications, or providing food should be preferably managed in one visit, to minimize the number of visits to the patient by health care personnel.

The incubation period of the CoV-SARS2 ranges from 3 to 14 days, hence all patients presenting for consultation should be treated as potentially infected cases.⁵ Detailed history is essential regarding fever, respiratory illness, international travel (not relevant in lockdown), and contact with confirmed COVID-19 patients. In addition to the patients, the attendants particularly those who will be in contact with the patient, should also be screened for COVID-19 before entering the emergency room. All the doctors, nurses, and other attending health care workers should wear surgical scrubs, plastic apron, special footwear, and face masks.

For treatment purposes, patients requiring plastic surgery interventions should be categorized into four categories as follows: (i) acute cases are the ones who require immediate treatment within 24-48 h, (ii) subacute cases are the ones who require treatment within a maximum of 7-10 days, (iii) chronic cases are the ones who require treatment within a month,⁶ and lastly (iv) late cases that can be taken up for surgery within 6 months to a year (Figure 1). Further planning and approach to these categories depend upon COVID-19 testing (Figure 2).

The acute cases are defined as the ones who cannot wait for a particular period of time for surgery and need immediate surgery to restore anatomy and function. These patients require rapid testing of COVID-19 and depending upon the test report, they should be put to surgery in either the COVID OT or NONCOVID OT. However, in cases warranting immediate surgery where COVID-19 report is unavailable, the surgery should proceed with all precautions without waiting for COVID-19 test results in a COVID-designated operating theater.

The subacute cases are the ones where the initial plan of approach is the same which is COVID-19 testing. If the patients are negative, they should be taken up for surgery in the NONCOVID OT. If the patients become positive, then they need to be quarantined and treated for COVID-19. Once they turn negative, they can then be taken up for surgery. The algorithm for treating patients in the chronic category

also remains the same. The patients in the “late” category need COVID-19 testing and those who test positive should be treated for COVID-19. The patients who are COVID-19 negative, should be counselled for the postponement of surgery.

Duty rostering of faculty, residents, nursing, and other staff

Duty rostering is one of the most critical steps in the working of a dedicated plastic surgery team in COVID-19-related patient care. In a tertiary care setup, ideally the whole team consisting of the plastic surgeon, anesthesiologist, nursing staff, and all the paramedical staff should be divided into three teams. The first team works for 14 days and then goes into quarantine or self-isolation. The second team then takes over for the next 14 days and then goes into quarantine, when the first team takes over again. The third team is the stand by team and this team alternates between these teams or takes over if any of these two teams fall sick.⁶ This arrangement allows for the most practical and efficient management of skilled health care worker manpower specifically based on the incubation period of the virus.

Operating room preparation for a COVID-19 patient

It is necessary to create a COVID OT for operating on all the positive cases. It is not possible to build a new OT for COVID, but it is possible to designate an already existing OT as COVID OT, provided it has extremely specific criteria with regard to air flow and ventilation, which are detailed below. Wong et al. have described a systematic set of protocols that they have taken at Singapore General Hospital to streamline their surgical cases.⁷ Their strategies that hold good in all the setups include:

1. A “team briefing” should take place just before commencing surgery, to explain each team member their specific roles in the conduct of the operation.
2. The OR with a negative pressure environment is ideal, to reduce the transmission of infection. A high frequency of air changes, which is 25 per h is also effective in this regard.
3. The air handling unit of the COVID OT should be separate along with the ventilation system with integrated high-efficiency particulate air filter.
4. There should be separate donning and doffing areas for PPE, with all the staff trained for their use.
5. Following surgery, it is important to discard the canister of soda lime to eliminate the risk of circuit contamination.
6. After the utilization of OT, all the instruments should be sent for decontamination and sterile reprocessing. The surfaces of all the medical devices should be cleaned with wipes soaked in ammonium chloride. The OR should be cleaned with sodium hypochlorite 1000 ppm or treated with hydrogen peroxide vaporization.
7. All equipments within the OR like anesthesia work stations, microscope, power drill equipment, lasers, computer monitors, cabinets, cautery machines, etc., should be covered with disposable plastic sheets.

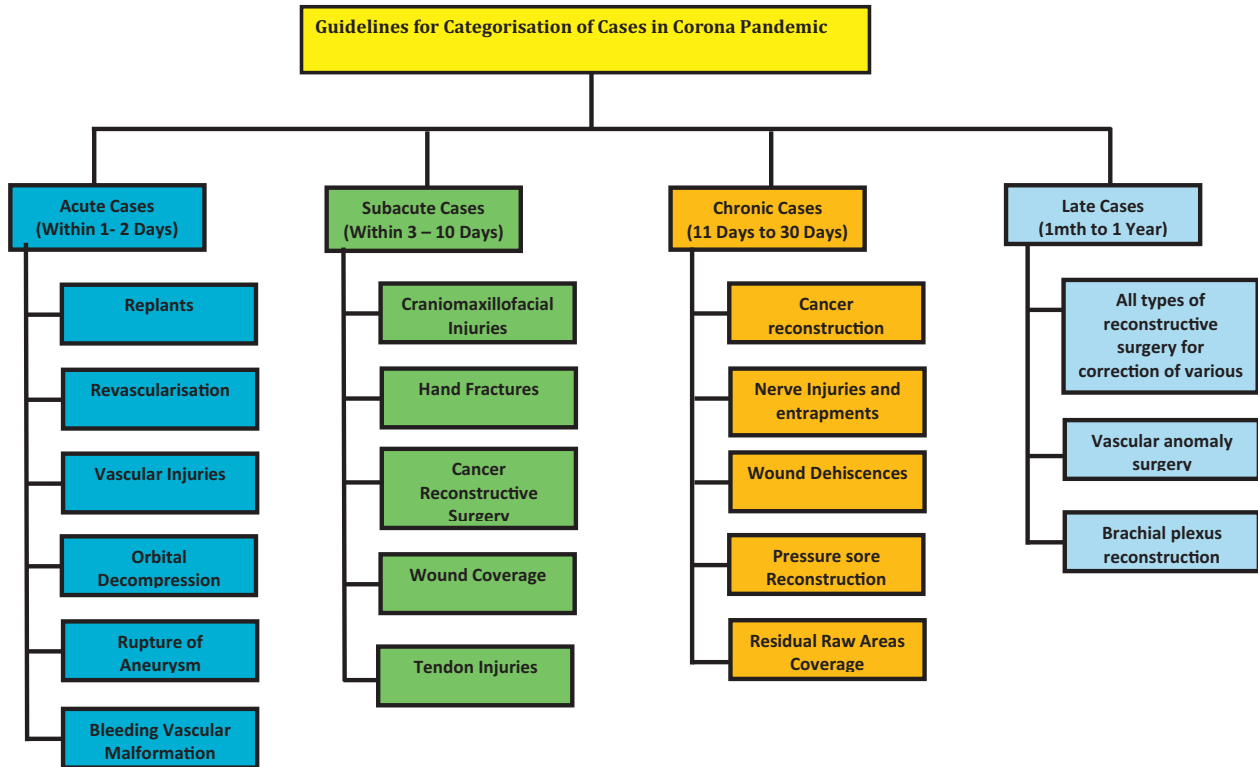


Figure 1 Guidelines on the categorization of patients needing plastic surgery during the Corona pandemic. All esthetic surgery procedures to be delayed indefinitely at the time of Corona pandemic.

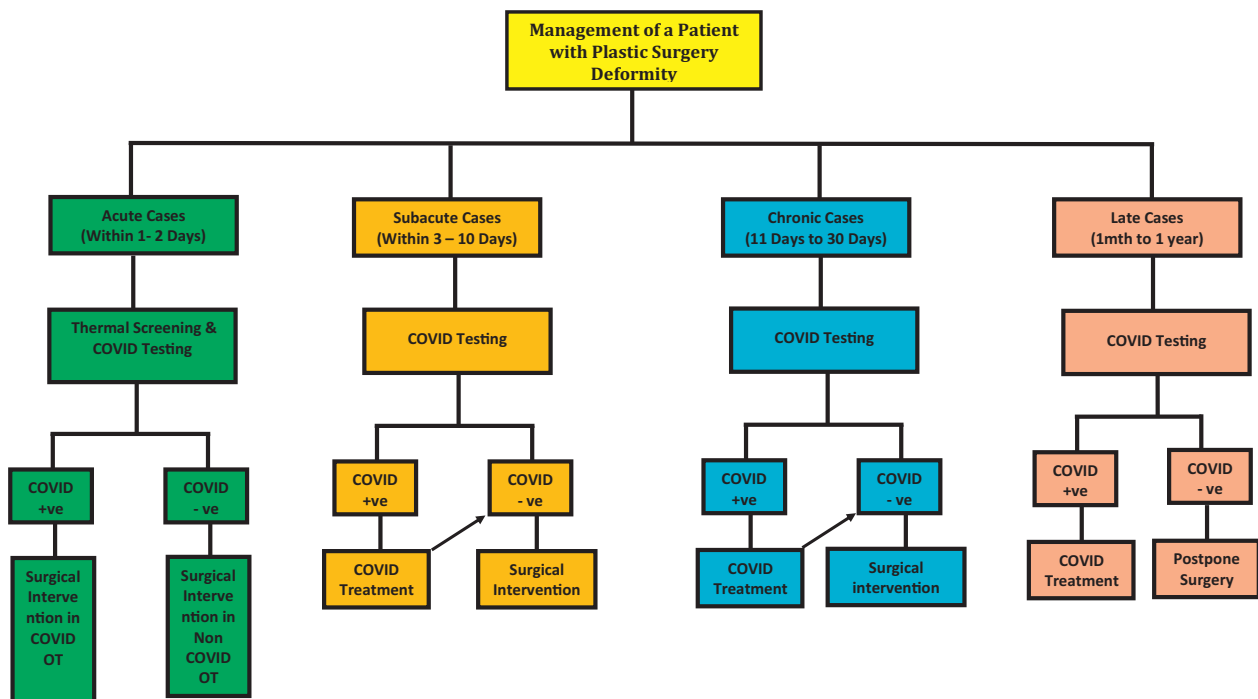


Figure 2 Flow chart of management algorithm of patients requiring plastic surgery based on the time frame of surgery.

8. Names of health care members inside OR should be recorded to facilitate contact tracing.
9. One should have minimum number of personnel in the OR, including during intubation as well as during the course of operation.
10. At the time of intubation, it is advisable that only anesthesia personnel are inside the OR, unless special conditions require the presence of the surgeon.

Surgical decision-making

The enormity of the pandemic along with the short supply of the testing kits, PPE, N-95 masks, and other protective gear along with the OR availability in the COVID hospital, makes it imperative to consider and revise the indications of surgery of patients seeking plastic surgery advice. It is also justifiable to preserve these vital resources. The high risk of aerosolization, from procedures in the oral cavity is well known, and hence we have to be mindful regarding the safety of all the health care workers in the surgical team and the hospital.⁸ It is, hence, justifiable and prudent to limit the number of plastic surgery interventions as each operation potentially involves the use and exposure of plastic surgery instruments, electrocautery units, microscope, bone drilling and cutting equipment to the OR milieu, where the COVID-19 patient is also there. All these equipments, therefore need to be sanitized and cleaned meticulously before the next use.

The following are some of the considerations, while deciding to plan the basic plastic surgery procedures, particularly in the head and neck region, which are most liable to generate aerosol from the patient's mouth.

Trauma

The current COVID-19 pandemic, because of its enormity is potentially overwhelming the capacity of the health care systems and thereby impacting the level of care being given to the critically injured patients.

The evaluation of a patient with trauma, should not be delayed to ascertain the COVID-19 status and therefore the strict use of PPE is recommended for precautions against droplet infection. All patients should be given a questionnaire to evaluate symptomatology or situations indicating a COVID-19 infection. If a patient has upper respiratory symptoms, COVID-19 exposure history, and international travel history, then a face mask should be immediately placed on the patient. The number of personnel near the patient should be minimized. All patients as well as their attendants should be screened for COVID-19, before entering the emergency room.

Facial injuries

Facial injuries constitute a major group of patients needing plastic surgery intervention and these need to be analyzed and prioritized, to get optimal outcomes in the prevailing situation. The basic philosophy of treatment is one of "Delayed conservative approach" and this takes advantage

of both conservative and operative arms of reconstructive surgery of any particular deformity. It is important to weigh the risks and benefits of a delayed conservative approach to the injury.

When treating patients with injuries that involve the mucosal surfaces of the oropharynx and nasal cavities, these procedures must be considered as aerosol-generating and full protection should be used including PPE kits, N95 masks, eye protection, gown, and gloves.⁹

Soft tissue injuries

The majority of soft tissue injuries, particularly minor lacerations can be managed by the emergency department doctors. However, the following situations demand attention and referral to the plastic surgeon:

1. Injuries to critical structures like the facial nerve and peripheral nerves
2. Eyelid injuries
3. Nasal injuries
4. Large complex injuries with avulsion

Most of the intraoral lacerations do not need to be closed. Local wound care with saline or chlorhexidine rinses, twice daily for a week will be adequate for the majority of these injuries. The secondary deformities if any, can be easily corrected later. If there are injuries to the salivary duct system, then those need to be evaluated by the plastic surgeon.

Similarly, burn injuries particularly of the facial region, should be managed conservatively by regular dressings and antibiotics. Because the face has a particularly good blood supply, these injuries are likely to epithelialize with the above management to satisfactory limits. The residual deformity and scarring can always be corrected at a later setting. Burn injuries of the rest of the body should also be managed in this way with dressings. The deep second-degree burns should be managed by collagen dressings or Integra. Infected burns should be managed with silver impregnated dressings, which give a good local antibiotic wound coverage.

Bony injuries

All facial bony injuries should be evaluated by the plastic surgeon. Majority of these injuries can be managed by the "delayed conservative approach," which minimizes the risk of exposure to the health care worker while conserving the use of consummable PPE kits and N95 masks.

In general, the use of open reduction and internal fixation should be avoided as far as possible. The steps of open reduction involve bony manipulation, burring, drilling, and cutting of the bone. This has shown to be associated with very high degrees of aerosol generation.

Zygomaxillary complex fractures

The majority of these fractures do not need to be treated in the acute setting and have minimal displacement, if any. These should be treated definitively at a later setting if required, and any cosmetic deformity should be accepted for

the time being. However, if these fractures are associated with orbital dystopia, then that should be treated by simply elevating the zygoma using Gillies approach.

Orbital fractures

Majority of the orbital fractures can also be managed using the delayed approach without any operative intervention. However, the following categories of orbital fractures will require plastic surgery intervention, such as blow out fractures, trap-door fractures, or fractures leading to superior orbital fissure syndrome.

Nasal fractures

All patients with nasal fractures are to be considered “high risk” cases as the manipulation of the nose generates aerosolization of the nasal secretions. We suggest a “delayed conservative” management approach, which seems to work best for these type of fractures. The resultant cosmetic deformity if any, should be accepted to be corrected at a later date. However, the exception to this approach would be the presence of a septal hematoma, which should be promptly drained. A topical local anesthetic with vasoconstrictor should be used and preferred in this situation.¹⁰

Maxillary fractures

Fractures of the maxilla and mandible should be treated conservatively as far as possible. The arch bar fixation is probably the best method to treat these fractures in this setting. Other methods of fixation like interdental wiring may also be used depending upon the topography of the injury. These minimal invasive interventions can be easily done in the emergency room under local anesthesia without the need to shift the patient to the plastic surgery facility.

Cancer reconstructive surgery

Head and neck reconstruction

Reconstruction of the head and neck following cancer surgery in the wake of Covid-19 crisis requires careful consideration. Cancer surgery is semi-emergency and delay results in the progress of the disease, at the same time reconstruction in the head and neck cancer has major implications in the completion of treatment i.e., radiation therapy and functional outcome. In fact, primary reconstruction is necessary in these situations. Many of the surgeries require tracheostomies and osteotomies. These areas are in close proximity to the nose and oral cavity and thus are vulnerable to generate high volume of aerosol.

The need is to ensure the best interest of the patient and the safety of the operating team. The team should learn the proper technique of donning and doffing of the PPE. The use of face shield, N95 mask while working, to protect the splashing of body fluid to eyes and face is a must. The face shields used should be deep enough to accommodate the loupes that are being used. Protective safety goggles may also be used to protect the eyes, particularly during the anastomosis.

Bone cutting, drills, and power tools are used, after covering by a transparent plastic and irrigation should be used intermittently to avoid splashing and minimizing aerosol generation.

The tracheostomy is shielded by using a plastic sheet to ensure the avoidance of air blast in accidental disconnection of the tracheostomy tube.

In current times, resources and manpower are limited and therefore all procedures should be performed by senior surgeons. This would ensure to minimize the time of surgery and the chances of flap failure and reexplorations.

Soft tissue reconstruction of any part of the face following cancer surgery should be delayed, particularly if it involves flap rotation procedures. The simplest procedure that will restore oral competency, nasal passage integrity, and coverage of any raw area should only be performed.

Bony reconstruction of the jaws may be done depending upon the specific and individual requirements of a given case.

Breast reconstruction

Reconstruction of breast following cancer surgery in the wake of Covid-19 crisis requires careful consideration. In general, the reconstruction of the breast should be delayed both in the immediate as well as in the later setting. If at all necessary, only simplest reconstructive procedures should be conducted. However, wound coverage should be ascertained and accomplished at all times. The following recommendations appear to be useful as regards breast reconstruction:

- a. Reconstruction of the breast in light of the COVID-19 pandemic should be discussed with the patient as a part of the informed consent process, and the possible risks both to the patient as well as to the health care workers should be considered.
- b. In general, the decision whether to reconstruct or not should weigh on the side of delayed reconstruction.
- c. In patients requiring immediate breast reconstruction using autologous flap, this procedure should be delayed at the risk of accepting a cosmetic deformity. Any wound closure issues should be addressed at the time of surgery, using the minimum possible and simplest procedure for wound management.
- d. In patients requiring an immediate breast implant, the decision should be based on possible complications with this procedure, the length of surgery for this procedure, and decisions must be individualized.
- e. No contralateral breast contouring procedures are recommended and only the operated breast should be dealt with.
- f. Regional blocks should be used to perform breast surgery, so that the patients can be discharged on the same day, thereby reducing hospitalization and consuming already restrained hospital resources.

In general, the reconstructive surgery should be limited to performing split skin grafts for wound coverage or the use of small local flaps only to cover vital structures. Large pedicled flaps or microvascular tissue reconstruction can be performed when considered necessary, depending upon the specific requirements and indications in a particular case.

Elective plastic surgery

All types of elective plastic surgery should be deferred in the situation of COVID-19 crisis. This includes congenital deformity reconstruction, post-traumatic reconstruction, post-burn reconstruction, or any other type of reconstruction.

All types and procedures of esthetic surgery are to be deferred in this situation, as these operations are not posing risks to the life of the patient and the risks to the health care workers are to be minimized. Performing these procedures would also waste the precious resources of personal protective equipment, which remain in short supply during this crisis.

After operation/Recovery

It is important to observe the following points, to minimize the risk of exposure. All postoperative patients should be assumed to be suspected cases and should be quarantined for at least 2 weeks. The throat swab should be done thereafter and if it is negative, only then the quarantine should be terminated and patient allowed to go home.

At the time of discharge

The health care workers have a mandatory responsibility to keep their unexposed family members at home safe. The following are the recommended activities:

1. Sanitize your vehicle/car before driving it home
2. Sanitize your hands after sanitizing the car
3. Sanitize your cell phone frequently. It is advisable to keep the cell phone in a plastic Ziploc bag, which should also be changed frequently. The phone can be used while in the bag.
4. Upon arrival at home, have someone open the door for you. First enter the bathroom, remove your clothes, take a shower and change to fresh clothes before entering your home.
5. Maintain social distancing even at home and avoid hugging or kissing family members in this time, particularly the elderly and the children.
6. Maintain a happy and tension-free atmosphere at home.

The published data on viral pandemics indicate that these viruses can come as a second wave, even after the first wave is over and the disease appears to have gone into remission. The effects of Covid-19 are expected to be long standing, and therefore the given guidelines and algorithms will need to be followed up in times to come. As a specialty that performs large numbers of both elective and emergency procedures, the long-term consequences of the COVID-19 pandemic on plastic surgery are unknown and unpredictable. The western countries, particularly the United States where the pandemic resulted in heavy casualties, the majority opinion was also of currently recommending limitations on elective procedures. Furthermore, early data from China suggest a relatively high patient mortality rate of

20.5%, when performing elective surgery during the asymptomatic incubation period of COVID-19.¹¹

The bottom line is that we must arm ourselves with the right knowledge relating to COVID-19 pandemic and its mode of spread, particularly to the health care workers.¹² We must take care of ourselves, our loved ones, and our staff¹³ and must observe the most basic tasks of hand sanitization and social distancing.

Conclusion

The current guidelines of the government and the regulatory medical research bodies are general in nature and do not give much information relevant to the plastic surgery practice. The requirements of plastic surgery do not cease at any time, and hence it is imperative for plastic surgeons to be armed with scientific evidence-based algorithms and flowcharts not only for efficient patient management, but also for the protection of themselves and their team members. The after effects of this pandemic are likely to last long, and therefore consensus guidelines are important to conserve limited resources and fine tune the risk of potential exposure and the practice of plastic and reconstructive surgery. It is important to understand that the delayed conservative approach is useful in most of the situations, although at the expense of cosmetic compromise.

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