

ROAD MAP TO START ELECTIVE SURGERIES IN COVID-19 PANDEMIC

Surgery

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ABSTRACT

We are living under the clutches of 2019 novel corona virus and its spreading tentacles evoking public health pandemic and impacting on every walks of life from manual to white collared job. The Medical profession is not immune, and the delivery of health care and its outlooks are profoundly modified. Countries in different continents responded with strict imposition of lockdown with quarantine but few others opened their doors for getting herd immunity as their response to the spreading infection. One of the challenge faced by the countries both in the western and Asian countries were to enhance the infrastructure facilities and equip them with adequate man power and other paraphernalia to cater to the raising demands for hospital beds, oxygen and ICU care.

This forced the government to prioritise and put aside all the elective medical services including surgical care and opening the beds only for emergency surgical care. As more and more cases were mounting and allotment of manpower to tackle them demanded the countries to impose ban on elective surgeries both on private and public health hospitals across the globe.

It is pretty hard to define and determine or forecast the time line of this pandemic and it is hard to remain suspended of the elective surgeries lest it pend up beyond the remedial level. Until we get a hope for the appropriate and potent vaccine for prevention or quick and cheap wonder drugs to compete the menaces this will remain a speculation to set repeated time lines for this pandemic.

In addition as the elective cases are denied services or not accessible with the imposed lockdown and financial prudence people tend to ignore early warning symptoms and land up in the emergency department with high grade diseases resulting in increased mortality and morbidity even with high-tech offered health care. Thus the restrictions imposed leads to a disastrous preposition to render the public more liable for escalated complications.

This potential hazard of this extreme measures of restrictions invoke, look for alternative plans and approaches to halt this progressive menace and ensure comprehensive surgical strategy shall be rolled out to make a viable balance between demand versus supply. The calibrated, differential approach is postulated and recommended for consideration and implementation subjected to the current realities in the respective areas.

KEYWORDS

COVID-19, SARS-CoV-2, Pandemic, Elective surgery

INTRODUCTION:

As of Aug 11 2020, India has 2268675 confirmed cases of COVID-19. Of these cases, 45257 people have succumbed to the infection while 1583489 have recovered. Globally, there are 2,00,74,280 confirmed COVID-19 cases across 188 counties, which has led to 7,35,674 deaths, reports the World Health Organization (WHO).⁽¹⁾

WHO declared the virus a global pandemic on March 11, expressing their concern on the alarming levels of spread and severity of the outbreak. The coronavirus family circulates in animals and some can be transmitted between animals and humans. Several coronaviruses are circulating in animals that have not yet infected humans, according to WHO.⁽²⁾

Coronavirus causes illnesses ranging from the common cold to more severe diseases such as severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS). The novel coronavirus affects humans, has been named COVID-19 and is known to have originated in Wuhan, China in late 2019.⁽³⁾

Common symptoms of COVID-19 include fever, coughing and difficulty in breathing, while in severe cases, it can cause pneumonia, multiple organ failure and death. The development period of COVID-19 is thought to be between one to 14 days however, the virus is highly contagious before symptoms appear. As per the WHO, some infected patients may not display any symptoms despite having the virus in their systems⁽⁴⁾. Death is an exception than norm, but still due to acute respiratory syndrome (ARDS) and hyperimmune inflammatory syndrome due to cytokine storms around 2.6% of people died in India and it was reported high in western countries like USA, Brazil and Italy.⁽⁵⁾

The American College of Surgeons (ACS) called for triaging elective cases, ensure that appropriate and timely surgical care are offered, Consider nonoperative management whenever it is clinically appropriate, COVID-19 testing in patients who may be infected and to prioritize appropriate resource allocation as it relates to elective invasive procedures and minimize the use of essential items required to care for patients⁽⁶⁾

In general Globally, the pandemic had forced the government to prioritise and put aside all the elective medical services including surgical care and opening the beds only for emergency surgical care. As more and more cases were mounting and allotment of manpower to tackle them demanded the countries to impose ban on elective surgeries both on private and public health hospitals across the globe. In anticipation of the possible need of the man power, hospital beds and resources for emergency care, the priority is set on only the people accessing the emergency casualties.

It is pretty hard to define and determine or forecast the time line of this pandemic and it is hard to remain suspended of the elective surgeries lest it pend up beyond the remedial level. Until we get a hope for the appropriate and potent vaccine for prevention or quick and cheap wonder drugs to compete the menaces this will remain a speculation to set repeated time lines for this pandemic.⁽⁷⁾

In addition as the elective cases are denied services or not accessible with the imposed lockdown and financial prudence people tend to ignore early warning symptoms and land up in the emergency department with high grade diseases resulting in increased mortality and morbidity even with high-tech offered health care. Thus the restrictions imposed leads to a disastrous preposition to render the public more liable for escalated complications⁽⁸⁾

The purpose of this article is to highlight this potential hazard of this extreme measures of restrictions and to invoke and look for alternative plans and approaches to halt this progressive menace and ensure comprehensive surgical strategy shall be rolled out to make a viable balance between demand versus supply. The calibrated, differential approach is postulated and recommended for consideration and implementation subjected to the current realities in the respective areas.

IMMEDIATE RESPONSE TO THE CRISIS:

The Centres for Disease Control and Prevention (CDC) recommendations to health care organizations included delaying both inpatient and outpatient nonemergent surgical and procedural cases, as well as prioritizing urgent and emergency visits and procedures to keep staff

and patients safe, preserve personal protective equipment (PPE) resources and other supplies, and ensure that hospitals could keep up with the anticipated demands in capacity.⁽⁹⁾

Recommendations for Management of Elective Surgical Procedures by American college of surgeons were released on 13th March 2020 and suggested⁽¹⁰⁾

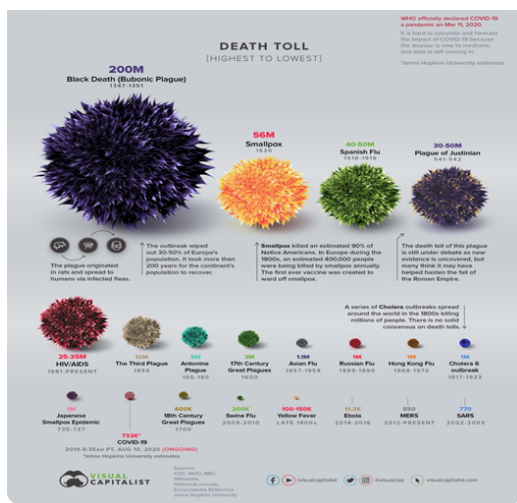
- Reschedule elective surgeries as necessary.
- Shift elective urgent inpatient diagnostic and surgical procedures to outpatient settings, when feasible.
- Limit visitors to COVID-19 patients.
- Plan for a surge of critically ill patients and identify additional space to care for these patients. Include options for:
- Using alternate and separate spaces in the ER, ICUs, and other patient care areas to manage known or suspected COVID-19 patients.
- Separating known or suspected COVID-19 patients from other patients ("cohorting").
- Identifying dedicated staff to care for COVID-19 patients.

PROPOSED COMPREHENSIVE STRATEGY FOR STARTING ELECTIVE SURGERIES IN INDIA

As the management protocol are well established and adequate infrastructure and COVID care centres are available for emergency management for, it is time for India to initiate comprehensive strategic plans to open the surgical centres both in public and private set up for elective surgeries

Historical Perspective Time Line Of Pandemic Of Yester Years:

Pandemic are happening for many centuries in succession percolating across the continents of the globe. Tracing through these pandemic ,it is evidence each pandemic had multiple peak waves and devastated millions of people in its spells.⁽¹¹⁾ The Spanish flu which engulfed the countries in 1918 and caused mortality to the tune of 50 million people in its first. However the second and third waves of the same spanning through 1918 and 1919 brought in death sentence for nearly 500 million people.⁽¹²⁾ The pandemic of 1889 also had three waves.⁽¹³⁾



Infographic: The History of Pandemics, by Death Toll

In line with the bygone pandemics ,in the absence of the effective vaccination and fully affordable treatment option , it is the fact that the SARS COV-2 viral infection will also have multiple peak and persists . Based on the interaction with various experts and also the guidelines proposed by the Association of surgeons of India, American college of surgeons, Royal college of surgeons and Society of American Gastrointestinal endoscopic surgeon , we proposed the five tier approach strategic plan to resume elective surgeries in public and private hospital . As the focus of Government is on mitigation and flattening the disease potential of the virus ,unless we ease out and open the hospitals for the elective surgical care emergency departments will be crowded with advanced diseased patients resulting in higher mortality and morbidity.

1. Triaging the surgical cases and prioritising the cases tailoring to local setup as emergent, urgent, urgent elective, essential elective discretionary elective.

2. Dedicated COVID -19 surgical facility with appropriate isolation protocols
3. Screening for COVID -19 in all surgical patients
4. Maintaining and upkeeping safe and clean hospital environment with proper engineering built up.
5. Empowering designated Health care professionals with adequate PPE and pegylated safety protocols

Triaging And Prioritizing Surgical Cases

Based on the physical conditions ,grade of the disease and associated comorbidities all the surgical cases can be broadly classified as Emergency and elective .Though the urgency of surgical procedures exists along a continuum, all procedures are considered as time critical. Therefore, surgeries could be stratified according to indication and degree of urgency bearing in mind that many elective surgical procedures could upgrade in terms of priority at any time and become urgent or emergent. The former implies that delaying surgical management for an undetermined period is potentially associated with an increased risk of adverse outcomes. While the latter alludes to purely elective procedures that are not time-sensitive from a surgical and/or medical perspective. Based on the indication and urgency ,the surgeries are stratified and tabulated in Table 1.

Table 1: Stratification of surgical cases (Modified from the work of Stahel PF⁽¹⁴⁾)

No	Indication	Time frame for action	Example
	Emergency	<1 h	• Acute vascular injury or occlusion • Damage control surgery • Aortic dissection • Emergency caesarean section • Compartment syndrome • Necrotizing fasciitis
	Urgent	<24 h	• Septic arthritis • Open fractures • Bleeding pelvic fractures • Femur shaft fractures
	Urgent elective	<2 weeks	• Closed fractures • Scheduled caesarean section • Wound closure/skin grafts or flaps
	Essential elective	1–3 months	• Hernia repair • Hysterectomy • Cancer surgery or biopsies
	Discretionary elective	>3 months	• Sports surgery • Joint replacement • Infertility procedures

ISOLATING COVID-19 TREATMENT FACILITIES:

Epidemiologically pandemic normally flow through a mathematical model and it is predictable. There are many calculations are available and to certain extent of truth the vitality, propagation ,curves ,resources needed and combating model can be predicted. However some time due to the resultant mutations in the viral genes ,the predictions can go astray too. Flu 2.0 and Flu surge 2.0, introduced by Dr. Martin Meltzer from the centre of disease control and prevention (CDC).⁽¹⁵⁾⁽¹⁶⁾ , the potential effects of a pandemic on a region can be estimate based on factors of population and available resources⁽¹⁷⁾ . The data on the potential sequelae of a pandemic on a particular region will enable resource planning and handling including various remedial measures, required man power, infrastructure needed, personal protection equipment (PPE), and intensive care resources.

It was estimated the 10 percentage of people need high dependency care in this pandemic and rest of the people may need hospital isolation or home quarantine . Thus the needed infrastructure and man power can be planned . Provided such places are recognised ,earmarked and put in to use as a dedicated COVID care centres ,other institutions can be made available for effective medical and elective surgical care centre. As on now we could predict the hospital beds required and hence other places can be opened up for the elective surgical cases.

When specific facilities are isolated for the exclusive treatment of COVID-19 patients will keep other facilities untainted, thereby decreasing the risk of viral transmission. Isolation should also include healthcare providers and personnel.

However as there are regional and zonal variations in the number and density of the people infected and needing in hospital care ,in regions, where the numbers of patients requiring hospital care exceed capabilities and resources, careful consideration of postponing elective surgeries should be undertaken.

Pinto et al. recommend that the operative complex be divided into 5 zones as shown in Table 2. This will ensure and enable an orderly process reducing dissemination.

Table 2: Different Zones In Operation Complex

Zone	Works assigned
Zone : 1	Entry dressing room, where the basic PPE is donned
Zone : 2	Entry dressing room, where the basic PPE is donned
Zone : 3	OR (COVID-19 room)
Zone : 4	Exit room, where the PPE is removed
Zone: 5	Exit dressing room, where the staff showers

SCREENING SURGICAL PATIENTS FOR COVID-19

SARS-COV-2 infection induces hypercoagulable state with compromise in lungs, hearts and renal injury⁽¹⁸⁾. Surgery itself is a hypercoagulable inducer. Hence naturally when surgery is done in covid-19 infected patients the post-operative mortality and morbidity will be high. Equally surgery generate and invoke increased aerosol production and enhance the spread of the disease to health care workers involved in the surgery. Hence it is mandatory to have well designed protocols for screening all patients taken up for elective surgery to undergo the RT-PCR screening before surgery for the safety of both patients and health care workers. The American society of Anaesthesiology(ASA) ,Anaesthesia patient safety foundation(APSf) ,Indian society of anaesthesiology(ISA) , CDC ,ICMR have released various guidelines of screening for the elective surgeries.⁽¹⁹⁾

Based on these protocols we can postulate two sets of protocol differently for regions where high prevalence of the disease is present and regions where there is low or no prevalence of the disease. Prevalence is classified as either high or low based on calculations comparing the prevalence of influenza-like illnesses to that of previous seasons of flu⁽²⁰⁾.

a. Regions With High Positive Prevalence :

- I. Prior to present with symptoms in the hospital all should be screened.
- II. In patients who are symptomatic their surgery postponed and have RT-PCR testing.
- III. Asymptomatic patients shall do the RT-PCR testing at the surgical centre and if found positive, surgery should be postponed until they become non-infectious.
- IV. If the RT-PCR test is negative ,they can undergo surgery

b. Regions With No Or Less Positive Prevalence:

- I. Prior to present with symptoms in the hospital all should be screened.
- II. In patients who are symptomatic their surgery postponed and have RT-PCR testing.
- III. Asymptomatic patients shall do the RT-PCR testing at the surgical centre and if found positive, surgery should be postponed until they become non-infectious.
- IV. If the RT-PCR test is negative ,they can undergo surgery
- V. Asymptomatic patients in areas of low or no prevalence should be able to undergo surgery with no further testing.

MAINTAINING A SAFE AND CLEAN HOSPITAL ENVIRONMENT:

As the asymptomatic patients can potentially infect others and spread the virus , all patients visiting health care premise should be considered as a COVID-19 Positive cases . More so even if RT-PCR testing is done it is positive in only 70% of patients, there is a high degree of false negative. Hence only adopting the universal precaution and implanting the maximum safety precautions are the only way of curtailing the viral spread.

- Both doctors ,nurses and other paramedic staff involved in the surgical care must wear the proper ,adequate and standardised PPE KITS.
- Operating room staff should wear appropriate surgical face masks and eye coverings (droplet precautions) for standard operative cases. The various new face masks with absolute prevention of infections are available,

- Air exchange cycles should be increased whenever possible to ≥ 25 exchanges/h between surgeries
- Minimum personnel should be placed in the operating room
- Aerosolized procedures should be performed using maximum PPE's (N95 masks, eye protection, gloves, and gowns) .Aerosol enhancing steps like usage of cautery, laparoscopy shall adopt newer flumes scavenging techniques.
- Cleaning and disinfection protocols should be updated and reviewed continuously, especially when disinfecting after infected patients
- Engineering modifications like differential pressure atmosphere with calculated air exchange programmes , high tech infrared or UV light disinfecting machines
- A smoke evacuator should be used when electrocautery is to be used.
- Visitors should be kept to a minimum and alternative communication platform could be set up to help patients keep in touch with loved ones during their stay.
- Visitors, if allowed, should also be screened for any flu like symptoms before being granted visiting permission and be restricted to certain areas and should wear masks, gloves, and gowns.
- In-hospital chaperones accompanying patients should be screened like any admitted patient, by clinical history and nucleic acid amplification testing.
- Positive chaperones should be prevented from accompanying patients until they are non-infectious according to CDC transmission guidelines

Ensuring a safe and clean hospital environment is mandatory for resuming elective surgical procedures.

POSTOPERATIVE MANAGEMENT

In operating theatre, laminar air flow ,negative pressure ventilation, fumes trapping modules are used, and air supply should be closed after operation.

The operating theatre should be cleaned and disinfected and high-efficiency filter changed. Cleansing should be done using detergent and water followed by use of with 1000 ppm bleach solution for all hard surfaces in the operating theatre.

The disinfection time should be longer than 30 min. The operating theatre should be closed for at least 2 h, and the next operation should be performed after laminar flow and ventilation being turned on .For high-risk patients who develop cough with fever after surgery, a chest CT scan and RT PCR test should be performed.

For suspected or confirmed patients, adequate oxygen therapy and nebulization should be given after surgery anti coagulation prophylaxis should be continued. In COVID-19 patients, the symptoms are resolved for more than three days , the isolation can be released when the RT PCR and antibody test is negative on two consecutive occasions (sampling interval ≥ 24 h) and can transfer them to the general ward for treatment or discharge.

CONCLUSION:

The transmission and spread of infection is a major concern for starting and implementing elective surgical procedures. However, in some instances the consequences resulting from a delay in delivering surgical care may outweigh those of the viral infection itself. As many acute surgical patients are not able to reach the hospital in time and as they come with the advanced deceased status in the emergency, the mortality and morbidity are becoming high. Hence we presume predicting the pandemic time table and based on that using strategic planning in steps the elective surgeries can be reopened in non COVID -19 dedicated hospital following strict enforceable guidelines

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