



**Research Article**

## **COVID -19 PANDEMIC AND CARCINOMA SURGERIES-CHALLENGES TO THE ANAESTHESIOLOGIST**

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### **ABSTRACT**

Worldwide increase in incidence of cancer has led to increase in interventional cancer surgeries. Onco-anaesthesia is a bit different from anaesthesia for routine surgeries as it requires additional knowledge of the effects of ongoing chemotherapy and radiotherapy on various organ systems of the body. Onco-anaesthesia is an emerging branch and various researches are going on to see the effect of various anaesthetic and analgesic drugs on promotion or inhibition of growth of carcinoma cells. It has also been studied if change in anaesthetic techniques or drugs can affect cancer specific survival and overall survival of cancer patients. Covid-19 pandemic further added to challenges faced by anaesthesiologist and surgeons. It not only puts anaesthesiologist and health-care workers at potential risk of acquiring the covid-19 infection but it also leads to increased postoperative morbidity and mortality in covid-19 survived patients. As most of the healthcare workers are engaged in covid management, the scarcity of doctors and other healthcare providers is also cause of concern as it compromises patient care and management.

This review summarizes the major challenges that cancer patients present to the anaesthesiologists especially during times of ongoing covid-19 pandemic.

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### **INTRODUCTION**

Since the start of covid-19 pandemic, elective surgeries including onco-surgeries have been postponed worldwide. There was such acute shortage of beds and ventilators that even operating rooms were turned into critical care units to accommodate the huge influx of COVID-19 patients. However, onco-surgeries cannot be delayed till the end of the pandemic due to risk of tumour progression. Onco-surgery and Onco-anaesthesia are very challenging in view of altered physiological and anatomical profile of cancer patients. Effect of chemotherapy and radiotherapy is detrimental on already immunocompromised patients. Postoperative recovery after anaesthesia as well as outcome is not as good as in normal patients.

Furthermore, in the current situation, any surgical procedure in already immunocompromised patients may lead to an increased risk of getting covid-19 and other secondary infections. Despite all safety precautions health care workers are also at risk of getting infected with covid-19. In a retrospective study from Wuhan, China, 34 patients who were operated during the incubation period developed COVID-19 after surgery, and 7 patients died suggesting that asymptomatic carriers and preclinical COVID-19 onco-surgical patients have higher mortality rate[1].

However Desai *et.al.*[2] were of the opinion that cancer surgeries should not be delayed even during pandemic. Various guidelines have been published for care of cancer patients during covid-19 pandemic. [3-6]

In this review we have tried to highlight overall management of cancer patients in view of their unique anatomical and pathophysiological changes and added precautions to be taken due to the covid-19 pandemic. This review summarizes the major challenges that cancer patients present to the anaesthesiologists.

#### **Anaesthetic challenges in carcinoma patients**

1. Airway management / Difficult airway
2. Radiotherapy
3. Chemotherapy
4. Pain management
5. Psychological management

**Complications of ongoing radiotherapy[7]:** Respiratory system-Interstitial pneumonitis, Pulmonary fibrosis, Fibrosis of airway, tracheal stenosis

Cardiovascular system- Arrhythmias, Pericarditis and pericardial fibrosis, Pericardialeffusion

Renal system-Glomerulonephritis, Glomerulosclerosis.

Gastrointestinal system-nausea and vomiting, Malabsorption

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Atleast six weeks are needed for recovery of a symptomatic patient (e.g., cough, dyspnea) who did not require hospitalization.

Endocrine system-Hypothyroidism and Panhypopituitarism  
Hematological system-Suppression of bone marrow, Coagulation, necrosis Skin-Erythema, rash, fibrosis, sclerosis.

#### **Complications of ongoing chemotherapy[8]:**

Most anticancer drugs target on nucleic acid and their precursors and thus they have more profound effect on rapidly multiplying cells. Thus, most of the drugs have similar effects on various organs of the body in dose dependent manner which one must be aware of.

General toxicity of cytotoxic drugs-

Bone Marrow Suppression- Aplastic Anaemia, Thrombocytopenia, Agranulocytosis, Granulocytopenia leading to bleeding and infections.

Lymphoreticulate tissue- Lymphocytopenia which causes low immunity and therefore increased chances of infections.

Oral mucosa- ulceration, stomatitis, xerostomia, bleeding gums.

Skin- Alopecia and dermatitis

Reproductive system- Impotence and oligozoospermia in males and inhibition of ovulation, amenorrhoea and infertility in females. In pregnancy there are chances of teratogenicity in foetus as many drugs cross the placental barrier.

Renal system- Damage to kidney and hyperuricaemia.

Respiratory system- Fibrosis of lung leading to decreased lung capacities and volume. Secondary tumours like leukaemia, lymphoma and histiocytic tumours may develop.

Specific toxicity of Cytotoxic Drugs-

Ifosfamide-Haemorrhagic Cystitis

Busulfan-Pulmonary fibrosis and skin pigmentation

Procarbazine-can interact with foods and drugs, Alcohol causes hot flushing and a disulfiram-like reaction can occur with the drug.

Cisplatin-Tinnitus, deafness, sensory neuropathy, shock-like state with rapid IV infusion.

Carboplatin-Sensory paresthesia involving arms, legs, mouth and throat.

Methotrexate-Megaloblastic anaemia in low doses and Pancytopenia at high doses, desquamation and bleeding in GI tract.

Pemetrexed-"HAND-FOOT" syndrome

Vincristine, Vinblastine-Syndrome of inappropriate secretion of ADH (SIADH)

Taxanes-Stocking and gloves neuropathy

Estramustine-Gynaecomastia, impotence, fluid retention, glucose intolerance, Angioedema

Doxorubicin, Doxorubicin-Reversible Arrhythmias, CCF

Epirubicin-Dose related cardiotoxicity, Red urine

Mitoxantrone-Cardiomyopathy, Discoloration of nail and eye  
Mitomycin C-Haemolytic-uremic syndrome

Immunosuppression-Carcinoma patient is immunocompromised due to chemotherapy. Recent studies

also suggest that various anaesthetic agents and analgesic medication can also cause immunosuppression and therefore should be used cautiously. Some studies suggested that volatile agents may suppress natural killer cell activity and therefore may help in growth of cancer cells. Propofol and regional anaesthetics on the other hand have beneficial effect in suppressing metastasis.[9-15]. Opioids tend to promote tumour cell growth as suggested by few studies[16,17].

**Psychological challenges:** Cancer patients are mostly psychologically depressed and therefore need counselling and psychotherapy perioperatively. Drugs like duloxetine have promising effects on cancer patients. They also reduce requirement of analgesics postoperatively.

#### **Covid -19 pandemic and cancer surgeries**

Covid-19 came as a shock for patients and health-care facilities. Initial focus was to control the pandemic so all healthcare system were engaged in management of corona patients. Elective surgeries went on backfoot. But soon it was realized that carcinoma patients cannot wait till end of pandemic so institutions started developing their own protocols and cancer surgeries started once again keeping in mind risk-benefit ratio. At our institution after negative RT-PCR[reverse transcriptase-polymerase chain reaction]report for covid-19, patients were operated and discharged as soon as possible, keeping patients' safety in mind so that patients do not acquire covid-19 infection during hospitalization. Operation was done after donning PPE kits and linens were disposed cautiously. Only one RT-PCR negative attendant was allowed with the patients. Patients with positive RT-PCR reports were admitted in the hospital, treated for covid infections and discharged with instructions to come back after recovery. It is better to delay elective surgery in patients who had previous covid-19 infection to avoid pulmonary complications.[18]

According to joint statement published by ASA and APSF on december 2020 [19], surgery for asymptomatic or patients with mild non-respiratory complications can be done after four weeks.

Atleast six weeks are needed for recovery of a symptomatic patient (e.g., cough, dyspnea) who did not require hospitalization.

Eight to ten weeks is recommended for a symptomatic patient who is diabetic, immunocompromised, or hospitalized.

It is better to wait for twelve weeks for the patient who was admitted to an intensive care unit due to COVID-19 infection. Pulmonary function continues to recover up to three months after ARDS as suggested by the studies conducted during the influenza A H1N1 pandemic. [20] Residual symptoms pertaining to cardiorespiratory system such as fatigue, dyspnoea, and chest pain can be present more than 60 days after diagnosis. In addition, myocarditis and therefore cardiovascular sequelae are not uncommon after COVID-19 infections. [21-23]

Society of Onco-Anaesthesia and Perioperative Care (SOAPC) prepared a guideline about carcinoma surgeries during covid pandemic on basis of available data.

They advised online consultation for patients aged more than 65 years and in patients with co-morbidities. Pulmonary function test should be avoided. Instead, 6-minute walk test is recommended. They further suggested that emergency

surgeries should be done with all protective equipment. Minimal staff should be present in the operation theatres. Elective surgeries should be delayed.[24]

However for each patient individual preoperative risk assessment with special attention given to the cardiopulmonary systems should be done.

### **Anaesthesia for cancer surgery-Preanaesthesia check-up**

#### **Investigations**

1. Chest X-Ray
2. PFT and Flow-volume loops [6 minute walk test during covid 19 pandemic is recommended]
3. Chest CT [In selected cases]
4. ECG
5. Echocardiography
6. Lab investigations- Complete hemogram, Liver and Kidney function tests, Serum electrolytes
7. Coagulation profile
8. Uric acid level
9. Serum proteins
10. RT-PCR [during covid-19 pandemic]

#### **Physical examination**

1. Airway Examination especially for carcinoma involving head and neck. Look for oral submucosal fibrosis, ulceration. It is advisable that during pandemic, examination of airway should be done with 1 meter distance with full PPE.
2. Neurological examination-Cranial nerve examination, any sensory-motor deficit, signs of raised intracranial pressure.
3. Signs of paraneoplastic syndromes like Myasthenia gravis, SIADH
4. Examination of Cardiovascular system- murmurs, arrhythmias etc.
5. Examination of spine.

#### **Preoperative optimization of patients-**

1. Anaemia should be corrected.
2. Nutritional deficiency and electrolyte imbalance must be corrected.
3. Good antibiotic coverage should be given in case of neutropenia and pancytopenia.
4. If patient is taking Bevacizumab, surgery should be deferred for 4-6 weeks to avoid increased bleeding.
5. Doxorubicin is known for its cardiotoxic effect so Echocardiography is must.
6. Bleomycin causes pulmonary toxicity and preoperative baseline ABG is advised.
7. Thrombo-embolic prophylaxis should be considered.
8. Preoperative anxiolytics should be given.

#### **Intraoperative management**

##### **1. Airway Management**

In oral carcinoma surgeries chances of getting difficult intubation is high. The reason for difficult airway is carcinoma itself leading to deranged anatomy. Tumour may bleed profusely while instrumentation leading to difficult visualization of glottis and increased chances of aspiration. A part of the fragile tumour may dislodge leading to aspiration pneumonia. Postoperatively many times emergency tracheostomy is needed. One should anticipate difficult

intubation in oral carcinoma surgery. Prior assessment and preparation of airway is must. Difficult intubation cart should be kept ready. Fiberoptic intubation is gold standard and for successful intubation through fiberoptic laryngoscope one must prepare airway thoroughly by nasal decongestant drops, nasal lignocaine jelly and adrenaline nebulization. Use of disposable fiberscopes is advisable during Covid-19 pandemic. Most common cause of unsuccessful intubation through fiberoptic laryngoscope is poor patient preparation leading to unnecessary bleeding and difficulty in visualizing the glottic opening. Other options are Ultrasound guided intubation, Retrograde intubation, Submental intubation and Tracheostomy. Blind intubation is not advisable these days. During covid-19 pandemic use of video laryngoscope is highly recommended. If tracheostomy is required the opening should be covered with 3-ply mask and one must take full precaution while suctioning.

2. Dose of anaesthetic and analgesic drugs should be titrated in patients with impaired renal functions. Careful hydration of the patients should be considered to avoid further compromise in renal functions. Non-steroidal anti-inflammatory drugs should not be given.
3. If patient is on Bleomycin or other pulmonary toxic drug therapy, judicious fluid administration should be done to avoid pulmonary oedema. Higher concentration of oxygen is also dangerous in the patients who have been treated previously with bleomycin. Therefore, anaesthesia should be maintained with minimal oxygen concentration.
4. Nitrous oxide should be avoided with Methotrexate.
5. Long term steroid can cause adreno-cortical suppression and these patients might need intraoperative steroid supplementation.
6. Pseudo cholinesterase deficiency may develop with prolonged use of Cyclophosphamide so it is better to avoid succinylcholine in these patients.
7. In case of impaired liver functions doses of drugs should be reduced. Regional anaesthesia to be avoided with impaired coagulopathy.
8. Regional and peripheral analgesia can be combined with general anaesthesia. It is associated with reduced cancer recurrence and metastasis as suggested by recent studies. However nerve blocks and regional analgesia and anaesthesia should be given cautiously in patients with neurological involvement.

#### **Postoperative management**

Postoperative management of carcinoma patients include vital monitoring like in other surgeries. However pain management is very important as surgeries are usually extensive. Postoperative pain management can be achieved by Peripheral nerve blocks, pharmacological therapy with PCA pump, epidural analgesia. Opioid use should be avoided or minimised till further studies confirm its safety in carcinoma patients. For extensive head and neck surgeries it is better to keep patients on elective ventilation overnight. Decision for extubation to be taken next morning by joint consensus between surgeons and anaesthesiologists. If patient is tracheostomized, the opening should be properly covered.

In times of pandemic if epidural catheter is used, disposable epidural pumps and minimal handling of catheters is recommended. These patients should be kept separately to avoid cross-infection from other patients. Healthcare workers should wear mask and gloves before handling the patients.

## CONCLUSION

Onco-surgeries cannot be postponed for a long time due to concerns about cancer progression which can make the surgery more difficult and at times the tumour may become inoperable. Elective surgeries should be undertaken, with all necessary precautions. Anaesthesiologists are well aware of anatomical and physiological variations of the cancer patients from normal patients so proper preoperative assessment, psychological counselling of patients both pre and postoperatively, anxiolytic medication to curtail anxiety and good pain control are the keys to success. In addition, covid protocols of the institution must be followed simultaneously. If patients develop covid during hospital stay it is advisable to involve physician at early stage to ensure quick and better outcome.

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