



COVID-19 AND ITS IMPACT ON RADIATION ONCOLOGY PRACTICE IN INDIA.

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ABSTRACT Patients with cancer are known to be at an increased risk for community-acquired respiratory viruses, because of their frequently observed systemic immunosuppressive state caused by the malignancy and anticancer treatments, such as chemotherapy, targeted therapy and immunotherapy. In this study different challenges of radiation oncology department and their infection control practices are given such as Pt screening, temperature monitoring and pt staff education, hygiene and departmental cleaning, zoning, work load management etc. There must be national and departmental measures to be taken in response to covid 19 pandemic. Some of risk adapted triage strategies for radiotherapy patients during covid 19 is discussed further. Comparison between covishield, covaxin and sputnik V covid 19 vaccines and lack of vaccine prioritisation for cancer patients in India have been elaborated.

KEYWORDS : Radiation oncology, Covishield, Covaxin, Sputnik V.

INTRODUCTION

On 30 January 2020, India reported its first imported case of the novel coronavirus infection, officially named COVID-19, which was later declared a global pandemic by the World Health Organization (WHO). The causative virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was thought to have originated from a seafood market selling wildlife in Wuhan, Hubei Province, China. Since its emergence in December 2019, it has infected 32.7 million people across 208 countries, with about 993 thousand deaths.

The family of Coronaviridae consists of a group of large, single, plus-stranded RNA-viruses which have been isolated from several species; common symptoms in humans include common cold and diarrheal illness.¹

Table 1: Characteristics Of The SARS-COV Virus Responsible For COVID-19 Disease.

Virus name	SARS COV -2
Virus family	Corona viridae
Virus type	Positive sense single stranded RNA
Disease name	COVID-19
Transmission method	Respiratory droplet
Viral incubation period	Median 5 (1-14) days
Duration of infectiousness	=1 day postexposure to= 10 day after symptom resolution

The spread of SARS-CoV-2 is of particular concern in cancer patients, given the higher case fatality rate seen in Wuhan and the potentially increased severity of the disease course with COVID-19. Patient with profound immunosuppression shed viable SARS- COV for atleast 2 months.

Radiation Oncology (RO) is a key discipline in oncology and currently more than 50–60% of all cancer patients are treated with radiotherapy at some point of their disease .

Preparing our radiation oncology departments should therefore follow a series of regulations and measures, to ensure high-end oncological treatment as long as possible.

CHALLENGES OF RADIATION ONCOLOGY DEPARTMENT:

• Time Sensitive Nature Of Oncology Visits

Radiotherapy patients typically require a multi-fraction course of treatment entailing daily visits to the department. Treatments cannot be postponed like elective surgeries without the risk of adverse clinical consequences.²

• Radiation oncology S/E mimicking covid 19 symptoms

The typical presentation of COVID-19 is nonspecific .Early symptoms may include low grade fever, cough, sore throat, running nose. Many

cancer patients on chemotherapy have low grade fever. A sore throat may be due to mucositis from head and neck radiotherapy. Many lung cancer patients may have respiratory symptoms of varying degrees.

- Patients with fever should be isolated in a separate room. However it is not practical to designate a dedicated linear accelerator, CT simulation room for patients at risk.
- Many patients are seen in the department daily and can be grouped into outpatient follow-ups, on treatment reviews and hospital inpatient referrals. Considerations must be made to minimize contact between different patient groups.
- Careful manpower planning of doctors, allied health and nurses is required for continued provision of the service, to keep them safe from the disease, and to prevent burn out. Additional staff are also required to help with additional duties, such as temperature screening, triage and contact tracing.
- Human behaviour and compliance to protocol: Adequate training and frequent monitoring for different infection control protocols by doctors and staff can limit transmission of infection

Infection Control Practices:

From an organizational point of view, oncology is considered critical service in a tertiary hospital and is expected to continue operations even in an infectious disease outbreak. This is also true from the perspective of the individual patient, who expects his or her oncological treatment not to be disrupted. To ensure such continuity of services, the following measures were implemented.

• Pt screening

To minimize risks of infection, a strict visitor policy was implemented .Patients coming for outpatient radiation oncology appointments were limited to one accompanying person at any one time..Patients were triaged in a dedicated area and had to fill up a screening questionnaire .A negative RT PCR Covid 19 report is must before any radiotherapy session. Test need to be repeated before every follow up.

• Temp monitoring

As part of the staff illness surveillance system, mandatory twice daily monitoring for all staff working in the department was implemented.

• Patient And Staff Education

Education materials and information are placed in patient care areas such as the nurses stations and clinic rooms to educate and remind patients and staff on good personal hygiene, importance of hand washing and the correct way to wear masks.

• Ensuring Adequate Medical Supplies

As frontline workers, we must ensure adequate medical supplies for patients coming for treatment, and for healthcare workers in the

department. Weekly checks of medical supplies including disinfectants and personal protective equipment such as masks (surgical, N95), gowns, goggles and gloves was implemented.

Hygiene And Departmental Cleaning

Patient Hygiene:

Increase encouragement and enforcement of hand-washing guidelines.

Remove nonessential items from waiting rooms, such as magazines .

Device hygiene:

Implement increased sanitation precautions for simulation/therapy equipment with multiple patient exposure.³

Cleaning:

High touch areas like the visitor toilets, lifts, escalators, front counter desks, doctors and nurses tables and chairs are cleaned and wiped down several times a day with alcohol based sanitizers.

Patient changing rooms are cleaned and the patient linen basket is emptied every hour. The whole area is mopped twice a day with chlorine.Used surgical masks, N95, gowns and gloves and other clinical waste are carefully put into biohazard bags and disposed in a proper manner. Regular safety check is implemented to ensure adherence.

Zoning:

The radiation therapy center is zoned into different contamination levels (Clean Zone, Semi-soiled/Semi-contaminated Zone, and Soiled/ Contaminated Zone) and is periodically disinfected following corresponding frequencies and protocols. The protection level needed for each zone level is clearly defined.

Special modification for immobilisation devices during the outbreak. For example, surgical masks are used under the thermoplastic mask for cranial or head and neck patients single-use clear wrap is applied to immobilization devices.⁵

Work Load Management:

The focus would be on reducing elective new cases starting radiotherapy. A review of current radiotherapy treatment protocols was undertaken with a view to hypofractionate treatment where possible to reduce treatment time. A review of all outpatient clinic appointments was done, and follow-up appointments were postponed or delayed if deemed appropriate **Table 3** New cases referred to the radiation oncology department were screened, and all non-urgent cases were postponed.

Man Power Consideration:

50 % on duty and 50% off duty .Cancellation of conference leaves and reimbursement.

Physical segregation of care teams at the workplace.

Staff marking the sites for patients undergoing radiation therapy

shall comply with the following procedure: Markers (e.g., Sharpee) may be used for multiple patients unless the marker comes in contact with nonintact skin (e.g., rash), or mucous membranes.Markers used for multiple patients should be disinfected daily and when visibly soiled with an alcohol pledget.

Patients Whose Sites Warrant Tattooing

A new, sterile lancet will be used for each patient and will be managed in an aseptic manner during the procedure. Skin should first be prepped using an alcohol pledget.

Head Casts and Mouth Guards

The water bath used to heat water for softening head casts and mouth guards should be emptied, cleaned, and dried at the end of each work day. They should remain dry overnight and be refilled the next morning. Mouth guards and head casts are dedicated to an individual patient. The mouth guard should be cleaned with an alcohol swab after each use.

Spl radiation therapy treatment work flow to avoid pt –pt contact and minimise pt staff interaction. A special radiation therapy treatment workflow is designed to avoid patientpatient contact and minimize patiente staff interaction time.

Table 2: National And Departmental Measures In Response To Covid 19 Pandemic.

National	Departmental	
	Healthcare workers	Patients
Restrict travel in and out of India	All staff to undergo refresher course for PPE	Only one accompanying person allowed (exceptions include paediatric patients)
Detailed contact tracing	All staff to wear surgical mask	Complete declaration form at hospital entrance.
Quarantine of close contacts of covid -19 pts	Full PPE for aerosol generating procedure e.g. naso endoscopy	Thermal scanning at hospital entrance.
Social distancing	Reduce number of patients in outpatient clinic and spaceout appointment timings.	All patients and attendants to wear surgical mask while in hospital
Stay home notice for travellers	Conduct multidisciplinary meeting via email or tele- conferencing	Postpone non-essential appointments.

Table 3 Example Risk-adapted Triage Strategy For Radiotherapy Patients During COVID-19.

Risk Level	Example Diseases	Possible Strategy
High	Symptomatic CNS, intact Head & Neck tumors, locally advanced NSCLC or SCLC, cervical, high risk pediatric, palliative (cord, CNS, SVC, bleeding, dyspnea)	Prioritize treatments promptly, with maximal precautions
Medium	Definitive esophagus, pancreas, rectal, node positive breast, sarcoma, unfavorable intermediate or high risk prostate cancer, bladder cancer, vulvar or higher risk uterine, palliative pain	Delay start no more than 2–3 weeks, pursue normal treatment paradigms
Low	Early stage NSCLC, post-op CNS, low risk breast cancer, indolent lymphoma, low or favorable intermediate risk prostate, very high infectious risk patients (e.g. TBI, pediatric with low urgency)	Consider longer delay for start or do not treat; more liberal use of newer/ evolving hypofractionation paradigms, more "neoadjuvant" systemic or hormonal therapy

Covid-19 Vaccine:

Covid 19 vaccine under trial in India includes COVAXIN (Bharat Biotech), Covishield (Serum Institute of India), ZvCoV- D (Zydus cadila) , Sputnik (Dr. Reddys Lab), Biological E's novel covid -19 vaccine.⁶ Some accurate information about these vaccine is critical:

Important Differences Between Covishield And Covaxin



Covishield vaccine is developed by AstraZeneca and the University of Oxford. It is the Indian variant of AZD1222. Covishield vaccine is developed and manufactured by the Pune-based Serum Institute of India (SII) through a license from AstraZeneca and Oxford. That is it is a Recombinant Chimpanzee Adenovirus vector vaccine (Covishield), encoding the SARS-CoV-2 Spike (S) glycoprotein with technology transfer from AstraZeneca/Oxford University.

The vaccine is a "non-replicating viral vector" that it makes use of another weakened and genetically modified virus. It carries the code to make the spike protein that is the spike on the surface of the virus. It is supposed that the immune system of the body will recognise this protein as a threat and work on building antibodies against it.

Covaxin vaccine, developed by Hyderabad-based Bharat Biotech in collaboration with the National Institute of Virology and uses a different platform.

Covaxin is an "inactivated" vaccine that uses the killed SARS-CoV-2 virus and has no potential to infect or replicate once injected and just serves to uplift an immune response. It is expected to target more than just the spike protein. It aims to develop an immune response to the nucleocapsid protein which is the cell of the virus that encloses its genetic material.

Sputnik V:

Sputnik V is an adenovirus viral vector vaccine for COVID-19 developed by the Gamaleya Research Institute of Epidemiology and Microbiology. It was registered on 11 August 2020 by the Russian Ministry of Health as **Gam-COVID-Vac**. The 'V' in its name is the letter and not the Roman numeral. The Gam-COVID-Vac is a two-vector vaccine. The active component for both vectors is a modified (recombinant) replication-defective adenovirus of a different serotype (Serotype 26 containing $(1.0 \pm 0.5) \times 10^{11}$ particles of gene for the first vaccination and serotype 5 containing $(1.0 \pm 0.5) \times 10^{11}$ particles of gene for the second vaccination), which has been modified to include the spike protein-expressing gene of SARS-CoV-2.

As most individuals infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are asymptomatic or develop only mild symptoms and coronavirus disease 2019 (COVID-19) vaccines are being developed towards an ultimate goal of global mass immunization, vaccine safety is of paramount importance. Any indication of a lack of safety consideration could also fuel the antivaccination movement and vaccine hesitancy, which would jeopardize the desired effect of achieving herd immunity.

One thing that Infection preventionist must remember: Vaccination is not the end of this pandemic. Most likely the vaccination rate needed to provide sufficient population immunity to control spread is around 80%. So, the vigilance of basic infection control measures will need to be maintained in some fashion until such a point.

Cancer And Covid-19 Vaccine:

In particular, the Indian national strategic plan lists the following priority categories: The health ministry targeted to vaccinate four priority groups in its first phase: healthcare workers, frontline workers, people over 60 yrs, those under 60 yrs with comorbidities and people above 18 years.

It is unacceptable that cancer patients are not being prioritised at all. Oncologic patients represent one of the most fragile categories. For those patients with cancer receiving a vaccine, a shorter duration between both doses (ie, 21 days between initial vaccination and booster) is required to ensure an adequate immune response.¹⁰

According to the available therapeutic strategies, we believe that the following subsets of cancer patients should be vaccinated first:

1. Subjects undergoing radical surgery who are candidates for adjuvant systemic treatments starting within 1-2 months after surgery aimed to improve both relapse-free survival and overall survival; in these cases, the first dose of the vaccine should be administered within 7-10 days from surgery and the second after another 3 weeks, taking into account the timing of the adjuvant treatments.

2. Patients with advanced disease (especially lung cancer patients) whose tumor burden and biological assessment allows for a one-month postponement of the beginning of systemic treatments.

CONCLUSION:

SARS: Safety, Avoidance, Rescheduling, Shortening⁸.

S: Safety, meaning use of PPE for healthcare professionals and patients, triage for screening of patients, no visitors in RO departments,

telemedicine for follow-up visits and clinical multidisciplinary evaluations;

A: Avoidance, meaning omission of radiation therapy when the risk of severe complication from COVID-19 (for elderly patients and/or with serious underlying health conditions) outweighs the benefit of radiation therapy;

R: Rescheduling, meaning deferring/delaying of RT when there is no or little expected adverse effect on outcome from the delay;

S: Shortening, meaning more extensive use of hypofractionated schedules with the aim of maintaining high tumor control probability rates without undue toxicity

REFERENCES:

1. R Amanda et al. The Impact of COVID-19 on Radiation Oncology Clinics and Patients With Cancer in the United States. *Advances in Radiation Oncology* 2020; 5, :538-543.
2. T Jeremy et al. Navigating the challenges of the COVID-19 outbreak: Perspectives from the radiation oncology service in Singapore. *Radiotherapy and Oncology* 2020;148:189-193
3. T Jeremy et al. Navigating the challenges of the COVID-19 outbreak: Perspectives from the radiation oncology service in Singapore. *Radiotherapy and Oncology* 2020;148:189-193
4. W Shen et al. Radiation Therapy Care During a Major Outbreak of COVID-19 in . *Advances in Radiation Oncology* 2020;5: 531-533
5. Combs S et al. First statement on preparation for the COVID-19 pandemic in large GermanSpeaking University-based radiation oncology departments. *Radiation Oncology* 2020;15:74
6. ICMR Vaccine portal. <https://vaccine.icmr.org.in/covid-19-vaccine>
7. S Berend et al. Effect of COVID-19 pandemic on practice in European radiation oncology centers. *Radiotherapy and Oncology* 2020; 150:40-42
8. Nicola S, Oronzo B, Renato B, Saverio C. COVID Vaccination in Cancer Patients: What Vaccination Priority Strategies Should There Be? *Frontiers in Oncology* 2021;11:168-170
9. Cancer and COVID-19 vaccines: a complex global picture. *Lancet*. [https://doi.org/10.1016/S1470-2045\(21\)00244-8](https://doi.org/10.1016/S1470-2045(21)00244-8).