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IMPACT OF COVID-19 PANDEMIC ON THE RADIOTHERAPY AND CANCER PATIENTS IN A TERTIARY HEALTH CARE CENTER OF ASSAM, NORTHEAST INDIA: A RETROSPECTIVE SINGLE INSTITUTION STUDY

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Background. *The COVID-19 pandemic has affected every sector of health care system including the cancer care.*

Objective. *The purpose of the study is to analyse the impact of the current COVID-19 pandemic on routine radiotherapy practice at a tertiary hospital of Northeast India.*

Methods. *This is a retrospective study of all patients planned for radiotherapy at Assam Medical College, a tertiary care centre, in Assam, India from January 1, 2020 to May 31, 2020. The study samples are divided into two groups: group A – patients treated from January 1, 2020, to March 20, 2020 (pre-lockdown,) and group B – patients treated from March 21, 2020, to May 31, 2020 (lockdown). The department registration numbers of all the patients were collected from the entry register, and the respective paper files were then accessed to obtain the required data.*

Results. *A total of 153 patients were planned for radiotherapy during the study period, of these 113 patients receiving radiotherapy in the pre-lockdown period and 40 patients receiving it in the lockdown period. The number of female patients decreased from 66 (58.40%) in the pre-lockdown period to 20 (50%) during the lockdown. The number of male patients also decreased from 47 to 20 but the proportion increased from 41.5% to 50%. The proportion of patients who completed radiotherapy was 90.8% in group B compare to 88.3% in group A.*

Conclusion. *There was a decrease in number of cancer patients, especially female during the lockdown. The pandemic has severely disrupted every aspect of cancer care.*

KEYWORDS: **COVID-19; radiotherapy; pandemic; lockdown; oncology.**

Introduction

The Coronavirus outbreak caused by the severe acute respiratory syndrome started in Wuhan in December 2019. Since then it has spread across every corner of the world [1]. With the spread of COVID-19 disease in 2019, countries have instituted lockdowns for the benefit of public health at the expense of national economy. During the lockdown, in the fear of getting infected with the virus in the public health care, people avoid screening, diagnosis and treatment of other non-COVID diseases like cancer, which have impacted proper treatment of the cancer patients. The prognosis of cancer like complex set of diseases depends largely on the timing of diagnosis and immediate interventions [2].

The government of India witnessed a sudden and complete lockdown, in phased wise manner to combat the COVID-19 pandemic in late March 2020. This lockdown affected the entire country [3]. Due to the restrictions during the lockdown every sector of health care delivery system has been affected along with the cancer care system. Cancer patients remain very much susceptible to different kind of infections due their immunosuppressed status. They are also at risk of severe complications if they get infected with the coronavirus compare to the general populations [4].

Radiation therapy is one of the primary and useful modality of cancer treatment and it remained a valid treatment option during coronavirus pandemic as well. Radiation therapy in generally does not need any intensive care unit bed or respirators which are in demand resources during the pandemic. Moreover, majority of radiotherapy regimens are comparatively less immunosuppressive than to chemotherapy regimens. Lasting by following proper personal protection equipment and practicing social distancing proper cancer care and treatment can be given to the patients through radiation

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therapy according to the schedule of the respective patient [5].

Although, in the treatment of cancer patients, radiotherapy is one of the primary options but the high cost of machines and associated infrastructure along with the requirement of trained personnel have restricted its availability to only a few urban centres of India. Therefore, the travel restrictions imposed during the lockdown are likely to have affected the access to this treatment for patients coming from the distant places to radiotherapy centres [6].

Considering this, we have planned this study to assess the impact of the current COVID-19 pandemic on the patients receiving radiotherapy at a tertiary care hospital of upper Assam region of Northeast India.

Methods

This is a retrospective study completed in the Department of Radiation Oncology at Assam Medical College, a tertiary cancer centre in Assam, India, from January 1, 2020, to May 31, 2020. The inclusion criterion was all the patients who were planned for and who received radiotherapy at the centre during the study period, and the patients who have defaulted after planning radiotherapy were excluded from the study sample. In our analysis, the patients were divided into two groups: group A included the patients treated from January 1, 2020, to March 20, 2020, the period before the lockdown; and group B included all the patients treated from March 21, 2020, to May 31, 2020, the period of the lockdown. The study is planned with a primary objective to assess whether the impact of the COVID-19 pandemic varied in patients with cancer depending on their age, gender, site of disease, and intent of radiotherapy. The department registration numbers of all the patients receiving radiation therapy during the study period were collected from the entry register, and the respective paper files were then accessed to obtain the required data. The patients' characteristics and results between the two groups are compared by the Pearson Chi-Square test. Results are considered to be of significant difference if p-value is ≤0.05.

Screening for COVID-19 was done for every patient before starting the radiation therapy and thereafter weekly during radiation therapy. Patients who were asymptomatic were not tested prior to starting radiotherapy. There was no patient tested positive for COVID-19 while on radiotherapy during the study period in the hospital.

Results

In the study a total of 153 patients were planned for radiotherapy during the study period from January 1, 2020, to May 31, 2020. Out of these 153 patients, 113 patients are placed in group A (pre-lockdown period); and 40 patients – in Group B (lockdown period). None of patients has defaulted from treatment in both groups. There is decrease in number of new patients receiving radiotherapy during the lockdown compare to the pre-lockdown period but it is not statistically significant. Age distribution is almost similar in both groups; about 95% of the patients were aged between 30 and 70 years old in both groups. The gender-wise analysis showed that there were 66 (58.40%) female patients in the pre-lockdown period and the number decreased to 20 (50%) in the lockdown period. Likewise, the number of male patients decreased from 47 to 20 but the proportion increased from 41.5% to 50%. In our study in both groups, three the most common sites of occurrence of cancer were the head and neck cancers, gynaecological cancers and breast cancers. The number of patients with head and neck, gynaecological, and breast cancers were 43 (38.05%), 21 (18.58%), and 17 (15.04%), respectively, in the pre-lockdown period, and 17 (42.50%), 8 (20%), and 7 (17.5%), respectively, in the lockdown period. This indicates there was an increase in the proportion of patients with head and neck cancer and a decrease in the proportion of patients with gynaecological and breast cancers from the pre-lockdown to lockdown period.

Our study shows that 102 (90.3%) patients were treated with a radical intent in the group A, and 11 (9.7%) patients were treated with palliative intent. While in the group B 34 (85%) patients were treated with radical intent and 6 (15%) patients were treated with palliative intent. The patients treated with a palliative intent increased from 11 (9.7%) in the group A to 6 (15%) in the group B. There was no modification in the radiation fractionation used for the patients treated with a curative intent or palliative intent in both groups. The compliance to the planned treatment protocol was similar in both groups. The proportion of patients who completed radiotherapy was 90% in the group B as compared to 87.61% in the group A.

The changes in data reported, either increase or decrease in the lockdown period compared

to the pre-lockdown period, with respect to any variable is found to be statistically insignificant.

Discussion

Our study showed a decrease in the number of patients planned for radiotherapy and the number of new patients starting radiotherapy at their scheduled time during the lockdown period compared to the pre-lockdown period. However, once the treatment was started, almost the same number of patients completed the planned radiation therapy in the pre-lockdown and lockdown periods. The age distribution of patients was similar in both groups. There was a decrease of female patients coming for radiotherapy during the lockdown period. Both during the pre-lockdown and the lockdown periods three the most common sites for occurrence of cancer were head and neck followed by gynaecological and breast cancers. Curative intent radiotherapy was delivered to 90.3% of patients in the pre lockdown period as compared to only 85% during the lockdown period. The proportion of patients receiving palliative intent radiotherapy have increased during the lockdown.

Table 1. Distribution of patients in the lockdown and pre-lockdown periods

	Group A Pre-lockdown	Group B Lockdown
Time period	Jan 1, 2020 to Mar 22, 2020 (n=113)	Mar 23, 2020 to May 31, 2020: (n=40)
Number of patients defaulted	0	0
Number of patients, who completed radiotherapy as per schedule	113	40
Number of patients, who completed radiotherapy as per schedule	99 (87.61%)	36 (90%)
Total number of patients	113	40

Table 2. Distribution of gender, intent of treatment, age and radiotherapy completion in the cohort of patients receiving radiotherapy during the study period

	Group A Pre-lockdown period (n=113), n (%)	Group B Lockdown period (n=40), n (%)	Absolute difference (%)	P
Gender				
Male	47 (41.6%)	20 (50%)	8.4	0.459
Female	66 (58.4%)	20 (50%)	8.4	0.459
Intent of treatment				
Radical	102 (90.3%)	34 (85%)	5.3	0.386
Palliative	11 (9.7%)	6 (15%)	5.3	0.386
Age				
Below 30 years	1 (1%)	1 (2.5%)	1.5	1
30-70 year	108 (95.5%)	38 (95%)	0.5	1
Above 70 years	4 (3.5%)	1 (2.5%)	1	1
Concurrent chemotherapy	38 (33.62%)	13 (32.5%)	1.12	1

Table 3. Site-wise distribution of patients receiving radiotherapy during the study period

Site	Group A Pre-lockdown period (n=113), n (%)	Group B Lockdown period (n=40), n (%)	Absolute difference (%)	P
Head and neck	43 (38.05)	17 (42.5)	4.45	0.707
Gynaecological	21 (18.58)	8 (20)	1.42	1
Breast	17 (15.04)	7 (17.5)	2.46	0.801
Gastrointestinal	13 (11.50)	6 (15)	3.50	0.582
Others	19 (16.81)	2 (5)	11.81	0.105

There was no modification in the radiation fractionation or the use of concurrent chemotherapy in the patients treated with radical intent or palliative intent in either of the two groups. A study done by Chauhan et al. [6], in a charitable hospital of Eastern India have also reported decrease in number of patients during the lockdown period compared to the pre-lockdown period. They also showed a significant decrease in the number of female patients in the lockdown period.

The decrease in the number of cancer patients in the lockdown was more drastic during the first week of lockdown, then the numbers improved gradually but were still low compared to the pre-lockdown period. Restriction on public transport was the main reason for the increase of patients. The study was conducted at a government medical hospital of Northeast India. Here the most of the patients came from the distant rural areas for their treatment and most of them also belonged to the low socioeconomic stratum. They came from remote villages and were mainly depended on the public transport for their arrival to the hospital. Moreover, many patients as well as the attendants feared of getting infected with coronavirus on exposure to the health care setup. Therefore, many asymptomatic patients requiring post-operative adjuvant radiotherapy delayed their treatment.

The COVID-19 pandemic has affected every sector of health care system along with the cancer care. Due to the restrictions during the lockdown there is a halt in national cancer screening program [7]. In developing countries like India there is no easy access to affordable screening and diagnosing setup for cancer along with a lack of awareness among people about the suspected signs and symptoms of cancer that leads to delayed diagnosis of cancer.

The strict lockdown also leads to closing of hotels and guest houses nearby the hospital, local people also avoid renting theirs houses to any patients in fear of coronavirus pandemic; thus, there is hardly any place for accommodation near the cancer treatment centre for the patients. Another reason for the increase of patients during the lockdown is the continuously affected poor financial status of the patients and their family. As majority of the patients belong to lower socioeconomic status, many of them are daily wedge earner or run small business. Restrictions imposed on their workplaces due to the lockdown have affected their financial condition badly.

Our study also shows a decrease of female patients during the lockdown compared to the pre-lockdown period. A similar decrease in number of female patients in lockdown is also reported by Chauhan et al. [6]. Financial and social dependency on male is one of the reasons for this decrease of female patients in the lockdown. Moreover, the female patients might be reluctant to spend the limited resources of the family on themselves during the pandemic.

In our study we have reported that there is an increased number of patients coming for palliative intent radiotherapy during the lockdown period compared to the pre-lockdown period. The studies by Chauhan et al. [6] and Ghosh et al. [8] have also reported similar increase of number of patients coming for palliative intent radiotherapy in lockdown period. In most of the parts of India including the Northeast India there is a lack of social and personal awareness in between the people regarding the cancer related early sign and symptoms, lack of communication and knowledge regarding importance of screening for common cancers, eligible age groups for screening and different risk factors for different cancers. There is also a lack of affordable cancer care centres easily accessible for the public [9]. All of this leads to diagnosis of cancer in an advance stage in many people for whom palliative radiation therapy would be an effective option. These patients suffer unbearable pain and other symptoms which can be relieved by palliative therapy.

Our study shows that the majority of the patients in both the lockdown and pre-lockdown periods are in between 30-70 years of age. Similar findings were seen in the study by Chauhan et al [6]. Our study also shows that the most common type of cancer in both the lockdown and pre-lockdown periods is head and neck cancer followed by gynaecological cancer and breast cancer. The major cause of the head and neck cancers primarily of the gingivobuccal complex in the developing countries like India are smokeless tobacco by men [10]. Although smoking of bidis, chewing tobacco, betel nut quid and areca nut as well as alcohol consumption are main risk factors for head and neck squamous cell carcinoma; nevertheless a strong association of human papillomavirus (HPV) with head and neck squamous cell carcinoma in non-smoking cases is also reported [11].

Head and neck cancer are followed by cervical and other gynaecological cancer and

breast cancer. In Northeast India and many other rural areas of India the cases of cervical cancer are reported more than breast cancer although breast cancer is more common overall. This can be explained by the lack of knowledge and awareness regarding the screening age group, sign and symptoms of cervical cancer, in practicular no vaccination and risk factors like low socioeconomic status, early marriage, multiparty etc. [9,12].

Our study was performed in the Department of Radiation Oncology, Assam Medical College and Hospital, Dibrugarh. Assam Medical College and Hospital, Dibrugarh is a tertiary cancer care centre in the state of Assam of Northeast India. The Department of Radiation Oncology is equipped with one cobalt teletherapy machine. More than 30 patients are treated in the Department of Radiation Oncology daily. The Institute caters are mainly the patients from districts of upper Assam and Arunachal Pradesh. During the COVID-19 pandemic some changes were taken in treatment protocol following various guidelines published in high impact journals, government advisories, and hospital policies [13]. Regular OPD work was minimized to bare minimum and follow up and non-emergency visits are, avoided if possible, by giving telephone consultation during the pandemic for the safety of patients and health care workers [14].

This is the analysis of the few studies regarding the impact of COVID-19 pandemic in radiation therapy practice and cancer patients as a whole in upper Assam area of the north east India. As our study is a retrospective and observational in design, the study has many limitations. The generalised stage data of the cancer patients for the study during the study period could not be assessed. Another main limitation of our study is that no follow up is included in the study for analysis.

Conclusion

A decrease in number of cancer patients planned for radiation therapy during the lockdown compared to the pre-lockdown period has been established in our study. COVID-19 pandemic is one of the deadly natural disaster of modern era. The COVID-19 pandemic has disrupted every aspect of health care system, including screening, diagnosis and management of the cancer patients. Being a deadly immunosuppressive disease, cancer patients suffer a lot during the pandemic that affects them physically, financially as well as psychologically.

Conflict of Interests

Authors declare no conflict of interest.

Author's Contributions

Chiranjiv Baruah – conceptualization, methodology, formal analysis, writing – original draft, writing – reviewing and editing, *Kankan Jyoti Deka* – writing – reviewing and editing, *Trishan Paul* – writing – reviewing and editing, *Biswajit Sarmak* – writing – reviewing and editing, *Partha Pratim Patowary* – writing – reviewing and editing, *Sharath Sreeni* – writing – reviewing and editing, *Badurjya Mahanta* – formal analysis.

ВПЛИВ ПАНДЕМІЇ COVID-19 НА ДОСТУП ДО ПРОМЕНЕВОЇ ТЕРАПІЇ ТА ОНКОЛОГІЧНИХ ПАЦІЄНТІВ У ЦЕНТРІ ТРЕТИННОЇ МЕДИЧНОЇ ДОПОМОГИ В АССАМІ, ПІВНІЧНО-СХІДНА ІНДІЯ: РЕТРОСПЕКТИВНЕ ДОСЛІДЖЕННЯ

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Вступ. *Пандемія COVID-19 вплинула на всі сектори системи надання медичної допомоги, включаючи систему надання онкологічної допомоги.*

Мета. *Метою нашого дослідження був аналіз впливу поточної пандемії COVID-19 на рутинну практику променевої терапії у закладі третинної медичної допомоги на північному сході Індії.*

Методи. *Проводилося ретроспективне дослідження із залученням пацієнтів, яким запланована променева терапія, в медичному коледжі Ассама, центрі третинної медичної допомоги, в Ассамі, Індія, з 1 січня 2020 р. по 31 травня 2020 р. Вибірку дослідження поділено на дві групи, група А включає пацієнтів, які лікувалися з 1 січня 2020 р. по 20 березня 2020 р. (прелокдаун), а група Б включає пацієнтів, які проходили лікування з 21 березня 2020 р. по 31 травня 2020 р. (локдаун).*

Результати. *Загалом 153 пацієнтам було заплановано проведення променевої терапії протягом періоду дослідження, з них 113 пацієнтів отримували променеву терапію в період до локдауну, а 40 пацієнтів отримували її у період карантину. Кількість пацієнток різко зменшилася з 66 (58,40%) у прелокдауні до 20 (50%) під час локдауну. Пацієнтів чоловічої статі також зменшилося з 47 до 20, але частка зросла з 41,5% до 50%. Частка пацієнтів, які завершили променеву терапію, становила 90,8% у групі Б порівняно з 88,3% у групі А.*

Висновки. *Під час карантину кількість онкологічних пацієнтів, яким надавалася медична допомога, особливо жінок, зменшилася. Пандемія серйозно порушила всі аспекти системи надання медичної допомоги онкологічним захворюванням.*

КЛЮЧОВІ СЛОВА: **COVID-19; радіотерапія; пандемія; локдаун; онкологія**

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References

1. Singh AK, Misra A. Impact of COVID-19 and comorbidities on health and economics: Focus on developing countries and India. Diabetes Metab Syndr Clin Res Rev. 2020 Nov 1;14(6):1625-30.
https://doi.org/10.1016/j.dsx.2020.08.032

2. Sharpless NE. COVID-19 and cancer. Science (80-). 2020;368(6497):1290.
https://doi.org/10.1126/science.abd3377

3. Jiwnani S, Ranganathan P, Tiwari V, Ashok A, Niyogi D, Karimundackal G, et al. COVID-19 Pandemic and Its Gendered Impact on Indian Physicians. JCO Glob Oncol. 2021;(7):1093-100.
https://doi.org/10.1200/GO.21.00020

4. Al-Quteimat OM, Amer AM. The Impact of the COVID-19 Pandemic on Cancer Patients. 2020; Available from: www.amjclinicaloncology.com
https://doi.org/10.1097/COC.0000000000000712

5. Nagar H, Formenti SC. Cancer and COVID-19 – potentially deleterious effects of delaying radiotherapy. Nat Rev Clin Oncol [Internet]. 2020;17(6):332-4. Available from: http://dx.doi.org/10.1038/s41571-020-0375-1
https://doi.org/10.1038/s41571-020-0375-1

6. Chauhan R, Trivedi V, Rani R, Singh U, Singh V, Shubham S, et al. The impact of COVID-19 pandemic on the practice of radiotherapy: A retrospective single-institution study. Cancer Res Stat Treat. 2020;3(3):467-74.
https://doi.org/10.4103/CRST.CRST_255_20

7. Chandra KA, S BS, Pratim MP, Shashank B, J KK. Covid-19 and Cancer. Int J Heal Res Med Leg Pract. 2020;6(2):63-6.
https://doi.org/10.31741/ijhrmlp.v6.i2.2020.14

8. Ghosh J, Ganguly S, Mondal D, Pandey P, Dabkara D, Biswas B. Perspective of oncology patients during COVID-19 pandemic: A prospective observational study from India JCO Glob Oncol. 2020;6:844-51
https://doi.org/10.1200/GO.20.00172

9. Oswal K, Kanodia R, Pradhan A, Nadkar U, Avhad M, Venkataramanan R, et al. Assessment of Knowledge and Screening in Oral, Breast, and Cervical Cancer in the Population of the Northeast Region of India. JCO Glob Oncol. 2020;(6):601-9.
https://doi.org/10.1200/JGO.19.00257
10. Sinha S, Laskar SG, Mummudi N, Budrukkar A, Swain M, Agarwal JP. Head-and-neck cancer radiotherapy recommendations during the COVID-19 pandemic: Adaptations from the Indian subcontinent. Cancer Res Stat Treat. 2020;3(3):424-6.
https://doi.org/10.4103/CRST.CRST_277_20
11. Mahanta BN, Goswami B, Mahanta TG, Gogoi P, Rasailey R, Mahanta J. Risk factors for head and neck squamous cell carcinomas amongst patients attending a tertiary care centre of Assam. Clin Epidemiol Glob Heal [Internet]. 2016;4(3):103-8. Available from: http://dx.doi.org/10.1016/j.cegh.2015.06.002
https://doi.org/10.1016/j.cegh.2015.06.002
12. Saranath D, Khanna A. Current Status of Cancer Burden: Global and Indian Scenario. Biomed Res J. 2014;1(1):1.
https://doi.org/10.4103/2349-3666.240996
13. Nath J, Sarma G, Medhi PP, Bhattacharyya M, Kumar Kalita A. Radiotherapy Practice in the Time of COVID-19 Pandemic and Nationwide Lockdown: Experience from a Resource-Constrained Center of Northeast India Review Article. 2020 [cited 2022 Jun 16]; Available from: www.jrmt.org
https://doi.org/10.4103/JRMT.JRMT_5_20
14. Munshi A, Rastogi K. Management of cancer during the COVID-19 pandemic: Practical suggestions for the radiation oncology departments. Cancer Res Stat Treat. 2020;3(5):115-8.
https://doi.org/10.4103/CRST.CRST_111_20

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