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Original Research Paper

Pattern of Remdesivir use and clinical outcome among COVID-19 patients admitted in a tertiary care hospital – A cross sectional case record-based study

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ABSTRACT:
Introduction: Remdesivir is the first drug approved by FDA for the treatment of COVID-19 infections. Results of various studies on efficacy and safety of remdesivir all throughout the world were not similar. **Aims:** To assess the pattern of remdesivir use and clinical outcome among the hospitalized patients. **Settings and Design:** Cross sectional retrospective study conducted at a tertiary care COVID-19 designated hospital, Puducherry. **Methods and Material:** Case sheets of adult patients who were on remdesivir and tested positive for COVID-19 were utilised for the study (April-June 2021). Demographic details, duration of hospital stay, Inj. Remdesivir administration details, oxygen support, ICU care and outcome of admission were entered in a pre-structured proforma and analysed using suitable statistical test. **Results:** Remdesivir was administered to 6% of the patients admitted during the study period. Majority of the patients on remdesivir therapy had moderate COVID pneumonia (47.9%). Most patients were started remdesivir within 1 to 5 days of admission (86.36%). The average days between admission and start of remdesivir was 3.02 days. Majority of the patients received remdesivir for 3 to 5 days (99%). Average duration of remdesivir therapy was 4.08 days. Remdesivir had significantly reduced the symptoms and also shifting of patients to ICU (p value=0.00587). In 214 patients (74.9%) requirement of supplemental oxygen had decreased with subsequent doses of remdesivir treatment and it was statistically significant (p value=0.0075). Remdesivir had significantly reduced the death among COVID pneumonia patients (p value=0.009). **Conclusions:** The clinical improvement was 80% with remdesivir treatment. Greater improvement was seen among the younger age group than the older patients. Need of ICU care and mechanical ventilation was less in patients on remdesivir. Early administration has resulted in faster recovery and discharge from the hospital.

Keywords: Remdesivir, COVID-19, Pneumonia, Mechanical ventilation, Co-morbidities

INTRODUCTION:

Coronavirus disease (COVID-19) caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) is a global pandemic and has affected more than 67.1 crores of population with around 10 percent of mortality (Feb, 2023). [(1)] The pandemic has a devasting mortality and morbidity, wherein elderly individuals and people with co-morbidities were more prone for severe illness. [(2)] Till date, search for an effective and safe therapeutic agent for the treatment of COVID-19 is ongoing. [(3)] Many trials on drug therapy of COVID-19 have not established an efficacious antiviral agent till date. [(4)] Various drugs like hydroxychloroquine, azithromycin, ivermectin, favipiravir were utilized in clinical trials to detect its antiviral activity but there were no promising results with these trials. [(5)] Remdesivir is a viral RNA dependent RNA polymerase inhibitor. Based on the pre-clinical studies on effectiveness of remdesivir against SARS and MERS variant of corona virus, clinical trials were conducted to study the effectiveness of remdesivir against COVID-19. [(6)] The US FDA has provided emergency use authorization on May 2020 for using remdesivir in severe COVID pneumonia patients based on the results of adaptive clinical trial. [(4, 7)] Further modifications on the use of remdesivir

were issued by FDA based on the clinical outcome and trials. Now, remdesivir is the only approved drug by FDA for the treatment of COVID-19 infection. [8] Initially, WHO had not recommended the remdesivir use based on the solidarity trial report but later WHO also recommended the usage of remdesivir for mild to moderate COVID pneumonia. [9, 10] Many studies on safety, efficacy of remdesivir were conducted all throughout the world. Some had shown beneficial effect [11], others are inconclusive [12, 13]. In India, Ministry of health and family welfare had issued advisory on rational use of remdesivir in moderate and severe COVID pneumonia patients on April 2021. [14] Till date, Remdesivir is used among hospitalised patients with COVID pneumonia in India. Information on the pattern of use and outcome of remdesivir in a COVID-19 designated hospital at Union territory of Puducherry is not available. Hence the study was planned with the following Aim and objectives.

Aim: To assess the pattern of remdesivir use and clinical outcome among hospitalized patients

Objectives:

To analyse the pattern of remdesivir use in COVID-19 in-patients

To estimate the proportion of patients on remdesivir shifted for intensive care

To analyse the change in oxygen requirement of patients after initiation of remdesivir administration.

To analyse the average duration of hospitalisation of patients on remdesivir therapy

To gauge the final outcome of admission of COVID-19 pneumonia patients on remdesivir therapy

MATERIALS AND METHODS:

Study design and study setting:

The study was a cross sectional retrospective study conducted at a tertiary care COVID-19 designated hospital, Puducherry. The study was conducted after obtaining approval from the Institutional Ethics Committee and permission from the concerned for retrieving the hospital data.

Inclusion and Exclusion criteria:

Case sheets of the patient admitted during April-June 2021 was utilised for collecting the information. Adult patients who tested positive for COVID-19 infection and who were administered remdesivir during the hospital stay were included in the study. Pediatric patients, patients who were not on remdesivir therapy and patients who did not complete the course of remdesivir were not included in the study.

Data collection:

The data were collected from the patient case sheets maintained in Medical Record Division (MRD) and entered in the study proforma. Patient demographic details, duration of hospital stay, comorbidities, CT severity score, vaccination status, Inj. Remdesivir administration details, oxygen need during hospitalization, ICU care during hospitalization, outcome of admission, admission and discharge date, adverse events to remdesivir if any were recorded.

Data analysis:

Data was entered in MS Excel and statistical analysis was done using Statistical Package for Social Sciences (SPSS Inc., IBM Corp., Armonk, NY) version 20.0. Shapiro Wilk test was used to assess the normality of the data. Frequency & percentage was used to represent the categorical data. Mean & standard deviation was used to represent the quantitative data. Chi-square test was used to find the association between the categorical data. Student's unpaired t test was used to find the difference between continuous variables. p value less than 0.05 was considered as statistically significant.

RESULTS:

The total number of COVID admission during the study period was 4756 patients and 286 patients (6%) whose oxygen saturation was less than 95% and in need of any form of oxygen support were started on remdesivir during the study period. Male and female patients were 67 % and 33 % respectively. Only 28 patients were vaccinated with COVID-19 vaccine before admission among them only 2 patients had received 2 doses of vaccine. 54.9 % of the admitted patients on remdesivir therapy had co-morbidities like diabetes (36.71%), hypertension (27.97%), coronary artery disease (5.59%). Hypothyroidism (4.19%), bronchial asthma (2.09%), and tuberculosis (1.39%). Majority of the patients on remdesivir therapy had moderate COVID pneumonia (47.9%) followed by severe (36%), mild (12.2%) and suspicious (3.8%) COVID pneumonia based on Chest CT Severity Score (CT-SS). All the patients on remdesivir therapy were on oxygen support. Most patients were started remdesivir within 1 to 5 days of admission (86.36%). The average days between admission and start of remdesivir was 3.02 days. Majority of the patients received remdesivir for 3 to 5 days (99%). Average duration of remdesivir therapy was 4.08 days. 89.86% of patients received remdesivir for 5 days, 4.19% for 4 days and 5.94% for 3 days. Sixty-six patients (23.1%) on remdesivir treatment were shifted to ICU for further medical care. Among them only 3 were intubated in ICU for further management of oxygen requirement. Remdesivir had significantly reduced the symptoms and also shifting of patients to ICU (p value=0.00587). In 214 patients (74.9%) requirement of supplemental oxygen had decreased with subsequent doses of remdesivir treatment and it was statistically significant (p value=0.0075). Patients on remdesivir were

hospitalised in the range of 4 days to 110 days. The mean duration of hospital stay was 13.23 ± 9.006 (Mean ± S.D). There was no significant relationship between CT severity score and duration of hospitalization. 229 patients (80.08%) were discharged after recovery. Remdesivir had significantly reduced the death among COVID pneumonia patients (p value=0.009). Death was more among patients with severe COVID pneumonia (10.49%) followed by moderate pneumonia (7.69%) and mild pneumonia (1.74%). Subgroup analysis showed that mortality was significantly more among the older age group individuals. There was no significant association between mortality and gender, mortality and patients with co-morbidities.

DISCUSSION:

This retrospective study focussed on the pattern of remdesivir use among hospitalised patients at a tertiary care hospital during the second wave of COVID-19. Among the hospitalised patients only 6% with low oxygen saturation and on oxygen support were administered remdesivir. Most of the patients on remdesivir were males. Majority of the patients with moderate COVID pneumonia received remdesivir. The average duration of remdesivir therapy was 4.08 days and most patients received it for 5 days. It is in line with DCGI recommendation on administration of remdesivir. Remdesivir administration had reduced the need of supplemental oxygen requirement and also shifting of the patients to ICU for further medical care. Remdesivir had significantly reduced the death among COVID-19 pneumonia patients.

Remdesivir is an antiviral drug that acts by inhibiting viral replication by inhibiting RNA dependent RNA polymerase enzyme of coronavirus and it was approved by US FDA for the treatment of COVID-19. These drugs when started earlier in the course of disease will be most effective. [15] In our study most of the patients were started remdesivir therapy earlier in the course of the disease and hence the clinical improvement among the patients was better. Also, there was a less likely need of mechanical ventilation for patients on remdesivir. It was similar to the study done by Paranjape et al and Mehta RM et al. [16, 17] Nearly 80.08% patients were discharged after clinical improvement and it was similar to the other studies done in various parts of the world. [17,18,19, 20]

It was inferred, mortality among elderly was significantly high in our study. Other studies also inferred similar results. [21,22,23] There was no significant association between gender, co-morbidities with mortality. But other studies have shown significant association between co-morbidities and mortality. [21,22,23]

Limitations:

Our study is a retrospective study and the data available in the case sheets alone were recorded and matching with the control group can't be done. There may be many confounders that could bias our results. Information on co-administration of other drugs were not collected that may influence the results.

CONCLUSION:

The clinical improvement was 80% with remdesivir treatment. Greater improvement was seen among the younger age group than the older patients. Need of ICU care and mechanical ventilation was less in patients on remdesivir. Early administration has resulted in faster recovery and discharge from the hospital.

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REFERENCES:

1. COVID - Coronavirus Statistics - Worldometer [Internet]. [cited 2023 Feb 3]. Available from: https://www.worldometers.info/coronavirus/
2. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. JAMA. 2020 May 26;323(20):2052–9.
3. Mahajan L, Singh AP, Gifty. Clinical outcomes of using remdesivir in patients with moderate to severe COVID-19: A prospective randomised study. Indian J Anaesth. 2021 Mar;65(Suppl 1): S41–6.
4. Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, et al. Remdesivir for the Treatment of Covid-19 — Final Report. New England Journal of Medicine. 2020 Nov 5;383(19):1813–26.
5. COVID-19 Treatment: Investigational Drugs and Other Therapies: Introduction, Antiviral Agents, Immunomodulators and Other Investigational Therapies. 2021 Jun 29 [cited 2021 Jul 13]; Available from: https://emedicine.medscape.com/article/2500116-overview
6. Wang M, Cao R, Zhang L, Yang X, Liu J, Xu M, et al. Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) in vitro. Cell Res. 2020 Mar;30(3):269–71.

7. Commissioner O of the. Coronavirus (COVID-19) Update: FDA Issues Emergency Use Authorization for Potential COVID-19 Treatment [Internet]. FDA. FDA; 2020 [cited 2021 Jul 13]. Available from: https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-issues-emergency-use-authorization-potential-covid-19-treatment
8. Antiviral and Antibody Products Summary Recommendations [Internet]. COVID-19 Treatment Guidelines. [cited 2023 Feb 3]. Available from: https://www.covid19treatmentguidelines.nih.gov/therapies/antivirals-including-antibody-products/summary-recommendations/
9. WHO recommends against the use of remdesivir in COVID-19 patients [Internet]. [cited 2021 Jul 13]. Available from: https://www.who.int/news-room/feature-stories/detail/who-recommends-against-the-use-of-remdesivir-in-covid-19-patients
10. WHO recommends highly successful COVID-19 therapy and calls for wide geographical distribution and transparency from originator [Internet]. [cited 2023 Feb 3]. Available from: https://www.who.int/news/item/22-04-2022-who-recommends-highly-successful-covid-19-therapy-and-calls-for-wide-geographical-distribution-and-transparency-from-originator
11. Aiswarya D, Arumugam V, Dineshkumar T, Gopalakrishnan N, Lamech TM, Nithya G, et al. Use of Remdesivir in Patients With COVID-19 on Hemodialysis: A Study of Safety and Tolerance. Kidney International Reports. 2021 Mar 1;6(3):586–93.
12. Goldman JD, Lye DCB, Hui DS, Marks KM, Bruno R, Montejano R, et al. Remdesivir for 5 or 10 Days in Patients with Severe Covid-19. New England Journal of Medicine. 2020 Nov 5;383(19):1827–37.
13. Piscoya A, Ng-Sueng LF, Riego AP del, Cerna-Viacava R, Pasupuleti V, Roman YM, et al. Efficacy and harms of remdesivir for the treatment of COVID-19: A systematic review and meta-analysis. PLOS ONE. 2020 Dec 10;15(12):e0243705.
14. https://www.mohfw.gov.in/pdf/COVID19ManagementAlgorithm22042021v1.pdf.
15. Lega S, Naviglio S, Volpi S, et al. Recent insight into SARS-CoV2 immunopathology and rationale for potential treatment and preventive strategies in COVID-19. *Vaccines (Basel)*. 2020;8(2):224.
16. Paranjape N, Husain M, Priestley J, Koonjah Y, Watts C, Havlik J. Early Use of Remdesivir in Patients Hospitalized With COVID-19 Improves Clinical Outcomes: A Retrospective Observational Study. Infectious Diseases in Clinical Practice. 2021 Sep;29(5):e282.
17. Mehta RM, Bansal S, Bysani S, Kalpakam H. A shorter symptom-onset to remdesivir treatment (SORT) interval is associated with a lower mortality in moderate-to-severe COVID-19: a real-world analysis. medRxiv. 2020.
18. Gupte V, Hegde R, Sawant S, Kalathingal K, Jadhav S, Malabade R, et al. Safety and clinical outcomes of remdesivir in hospitalised COVID-19 patients: a retrospective analysis of active surveillance database. BMC Infectious Diseases. 2022 Jan 4;22(1):1.
19. Spinner CD, Gottlieb RL, Criner GJ, Arribas López JR, Cattelan AM, Soriano Viladomiu A, et al. Effect of remdesivir vs standard care on clinical status at 11 days in patients with moderate COVID-19: a randomized clinical trial. JAMA. 2020;324(11):1048–57.
20. Beigel JH, Tomashek KM, Dodd LE, Mehta AK, Zingman BS, Kalil AC, et al. Remdesivir for the treatment of Covid-19—preliminary report. N Engl J Med. 2020;383(19):1813–26.
21. Wolff D, Nee S, Hickey NS, et al. Risk factors for Covid-19 severity and fatality: a structured literature review. Infection. 2021;49:15–28.
22. Zheng Z, Peng F, Xu B, Zhao J, et al. Risk factors of critical and mortal COVID-19 cases: a systematic literature review and meta-analysis. J Infect. 2020;81:16–25.
23. Jakob CEM, Borgmann S, Duygu F, et al. First results of the "Lean European Open Survey on SARS-CoV-2-Infected Patients (LEOSS)." Infection. 2021;49:63–73.

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