Original Research Article

Remdesivir versus standard care therapy in hospitalized pregnant women with moderate and severe COVID-19 illness in a tertiary care center in Dubai: a quasi-experimental study

Abstract

Background

Pregnant women with COVID-19 are more likely to be admitted to the hospital and receive respiratory support than non-pregnant women. There is little published data on Remdesivir use in pregnant women with COVID-19 illness. This study aims to investigate the clinical course and obstetric outcomes for pregnant women with COVID-19 illness administered Remdesivir and those receiving standard therapy in a tertiary care center in Dubai.

Methods

A non-randomized quasi experimental study design was conducted in 100 pregnant women with moderate or severe COVID-19 illness who were admitted to a tertiary care hospital in Dubai between 18th January and 31st March 2021. The study was initiated to compare the clinical course and outcome in 50 pregnant women receiving Remdesivir (treatment arm) and 50 pregnant women on standard therapy (control arm).

Results

Pregnant women with COVID-19 illness on Remdesivir showed an overall better clinical course and outcome than those on standard therapy.

Remdesivir was started irrespective of oxygen (O2) saturation in hospitalized pregnant women with moderate (defined as clinical/or radiological evidence of lower respiratory tract infections) and severe COVID-19 illness . In the Remdesivir group more patients had normal vaginal delivery 17 (39.5%) than on standard therapy 9 (20.5%) (p=0.043). New-born Apgar scores at 1 and 5 minutes were similar in both groups. The mean (standard deviation) time to recovery and discharge was less for patients receiving Remdesivir 8.43 (3.3) days as compared to 13.6 (9.2) days in the standard therapy (p <0.001). Patients transferred to the intensive care unit (ICU) were less for Remdesivir 10 (20.0%) as compared to standard therapy 23 (46.0%) (p=0.002). At the end of 60 days study period follow up all women on Remdesivir were well and alive whereas 6 (12.0%) deaths occurred in the standard therapy arm (p=0.013). No significant adverse drug reactions were reported in those administered Remdesivir.

Conclusions

Pregnant women with moderate and severe COVID-19 illness treated with Remdesivir early in their course of illness achieved a favorable clinical course, shortened hospital stay and better survival outcomes in comparison to those on standard therapy.

KEY WORDS

SARS-Cov-2, COVID-19 illness, Pregnancy, Remdesivir, Dubai

INTRODUCTION

Background

The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes the disease COVID-19 was declared a pandemic by the World Health Organization in March 2020. (1) Patients infected with COVID-19 show a wide range of clinical features. (2) The knowledge gained from previous human coronavirus outbreaks suggests that in specific situations such as pregnancy, women infected with the virus are prone to a higher risk for infection-related respiratory complications compared with non-pregnant women. (3) This increased risk in overall worse maternal outcomes has also been reported in pregnant women with symptomatic COVID-19 requiring hospitalization. (4, 5) This includes the requirement of oxygen supplementation, mechanical ventilation, intensive care unit (ICU) admission, and increased risk of death from COVID-19. (6)

Remdesivir is an inhibitor of the SARS-CoV-2 RNA-dependent RNA polymerase, which is essential for viral replication. The available international data suggest COVID-19 clinical improvement in terms of a significant reduction in morbidity, shortening the length of hospital stay, recovery, and mortality in patients with severe COVID-19 illness treated with Remdesivir. (7) Remdesivir is the first drug that has been approved by the United States Food and Drug Administration for the treatment of COVID-19 in adults and for compassionate use in pregnant women. (8) United States data suggest that pregnant women infected with COVID-19 treated with Remdesivir under compassionate use is safe and well-tolerated. (9) Recommendations state that it is recommended that Remdesivir not to be withheld because of theoretical risk in pregnancy if medically indicated. (10)

Although, it was found that breastfeeding does spread SARS-CoV-2 from mother to infant however, the newborns are not likely to absorb a significant amount of Remdesivir (11) .The revised United Arab Emirate (UAE) National Guidelines for Clinical Management and Treatment of COVID-19 was approved

in February 2021 for the compassionate use of Remdesivir in pregnant women hospitalized with COVID-19 illness (12). In recently published data in Dubai the results showed that pregnant women with COVID-19 were more likely to be admitted to the hospital and receive respiratory support than non-pregnant women.(14)

There are limited studies on COVID-19 infection in pregnant women with little published data on the use of Remdesivir in COVID-19 illness in pregnant women and their maternal outcomes. (14) The aim of this study was to investigate the clinical course and obstetric outcomes for pregnant women with COVID-19 illness administered Remdesivir and those on standard therapy in the United Arab Emirates (UAE).

METHODS

We conducted a non-randomized quasi-experimental study design to compare the maternal morbidities and obstetrical outcomes between pregnant women with COVID-19 illness treated with Remdesivir (treatment arm) and those on standard therapy (control arm). We followed The Strobe Guidelines for reporting our observations .(15)

This study was conducted in a tertiary care hospital in Dubai, UAE, between 18th January and 31st March 2021. The Latifa Women and Children Hospital (LWCH) is a 440-bed public tertiary care centre that specializes in maternal, neonatal and pediatrics services. During the second wave of COVID-19, on 18th February 2021, LWCH initiated the use of Remdesivir in pregnant women with COVID-19 illness. All hospitalized pregnant women in both the groups were daily monitored by both the internal medicine and the obstetric teams. Patients were followed up to day 60 from day of admission. Data was collected from the Electronic Medical records from 01.06.21 to 31.08.21 .

Patient consent

All fifty pregnant patients with moderate or severe COVID-19 pneumonia on Remdesevir were counselled. Written informed consent was obtained for the treatment with intravenous Remdesivir. Patients on Remdesivir were allowed to discontinue trial medication at any time of the study. As this was a quasi-experimental study design, no informed consent was required from the patients on standard care as they were given the best available treatment as per the hospital protocol pre-Remdesivir approval.

Ethical Approval

Ethical approval for the study was obtained on 20.05.2021, by the Institutional Review Board of DHA (D

SREC-05/2021)

COVID-19 was confirmed in all patients by reverse transcription PCR RT-PCR (Allplex kits) using nasopharyngeal swab for respiratory tract infection by SARS-CoV-2.

We adopted the clinical spectrum criteria of moderate and severe covid pneumonia as per the NIH COVID 19 treatment guidelines. (16)

Patient eligibility

Regardless of the oxygen saturation , pregnant women in their second and third trimesters hospitalized in LWCH with moderate or severe COVID-19 illness were considered eligible candidates. Excluded from this study were COVID-19 pregnant women who had any of the following medical conditions: creatinine clearance (by Cockcroft-Gault) of <30 mL/minute, serum liver levels of alanine transaminases (ALT & AST) >5 times the upper limit of normal, or evidence of multiorgan failure.

The study arm (Remdesivir therapy)

This study was performed during the second wave of COVID-19 , where this tertiary hospital initiated the compassionate use of Remdesivir in pregnant women with COVID-19 illness according to the revised United Arab Emirate (UAE) National Guidelines for Clinical Management and Treatment of COVID-19 that was approved on 17 February 2021 (12).

These 50 pregnant women were selected from 250 pregnant women hospitalized to the isolation ward with moderate and severe COVID-19 illness from 17th February to 31st March 2021. They were administered intravenous Remdesivir 200 mg loading dose on day 1 followed with 100 mg daily for 4 more doses (total duration of treatment 5 days).

The study arm conventional therapy (control)

We selected 50 pregnant women admitted from 18th January 2021 to 16.02 .2021 as the control arm who received standard therapy as per the local protocol with one or combination of the following medications: azithromycin, antimalarials (hydroxychloroquine .), antiretroviral (Lopinavir / ritonavir). These 50 patients were matched with 50 patients on standard therapy according to the severity of WHO clinical progression scale .

Both the Remdesivir and the standard therapy arms received one or combination of the following drugs: low molecular weight heparin, systemic steroids, antibiotics, immunosuppressant (tocilizumab) or interferon as per the clinical indication. (Appendix 1)

Data collection

The study data span was from 18th January to 31st March 2021 for hospitalized pregnant women with moderate and severe COVID-19 pneumonia admitted to LWCH. Data was collected for both study arms from the Dubai Health Authority's (DHA) unified electronic medical records system (Salama). Prior to data analysis, all gathered data were approved by the hospital administration and anonymized to insure patient privacy and confidentiality. Data integrity was achieved as per the regulations and guidelines of DHA.

The standardized collected data included demographics, obesity (defined as BMI≥30), co-existing medical conditions (Hypertension, Asthma, Chronic lung disease, Type 2 diabetes with chronic kidney disease, Hypothyroidism) ,maternal age at delivery, Pre- and post-treatment Liver enzymes, radiological findings, concurrent therapy, length of hospitalization, ICU admission, readmission, and maternal death.

Maternal and neonatal outcomes included gestational age at delivery, mode of delivery (natural vaginal or lower uterine segment caesarean section), condition of the fetus at birth and presence of gross anomalies. Both the Remdesivir and standard therapy arms were monitored for the maternal COVID-19 clinical outcome as documented and defined according to the WHO clinical progression 10-point ordinal scale (Appendix 2) at admission and at predefined time intervals at days 5, 10, 28, and 60 .Data on vital signs, Saturation (SaO2) on room air, oxygen requirement, and Laboratory COVID-19 severity markers was performed every 48-72 hours, along with foetal non-stress tests (NSTs) whenever indicated. After hospital discharge, all patients had a telemedicine follow-up on days 14 and 28. An extended follow-up was done for the severe and critical COVID-19 pneumonia cases up to day 60.

Chest X-ray scoring

Chest radiograph scoring system (on a scale of 1-6) was used where each lung was divided into 6 zones 3 on each side (upper, middle, and lower). Opacities were classified into reticular, ground glass, patchy, and dense consolidation patterns. (17)

9. Statistical methods : Data analysis

Data were analysed using IBM-SPSS for Windows version 28.0 (SPSS Inc., Chicago, IL). Categorical variables were described using proportions. Continuous variables were described by measures of tendency and dispersion. Continuous data was tested for normality by using the Shiparo-Wilk test. The Mann-Whitney test and t-test were used when appropriate to compare means between continuous variables. Categorical variables were cross tabulated to examine the independence between variables; for these variables, the chi-square test or Fisher's exact test were used as appropriate. Survival curve was generated using the Kaplan-Meier method. A p-value of less than 0.05 was considered significant for all analyses.

Results

Between 18th January and 31st March 2021, a sample of 100 hospitalized pregnant women with moderate or severe COVID-19 pneumonia who were admitted to a tertiary care hospital in Dubai were included in this quasi-experimental study design. Fifty patients were administered Remdesivir and 50 were given standard therapy at baseline.

The mean (standard deviation) maternal age (years) in the Remdesivir arm was comparable to that of the standard therapy arm: 33.9 (4.6) for those receiving Remdesivir and 33.1 (5.6) on standard therapy. The distribution of UAE nationals and non-nationals were comparable in both groups; UAE nationals were 15 (30%) in the Remdesivir arm and 17 (34%) in standard arm, and non-nationals 35 (70%) in Remdesivir and 33 (66%) in the control arm (Table 1).

Risk factors at admission for complications of COVID-19 disease was comparable in both arms (Table 1). The BMI for both groups was similar for the overweight as well as for the obese; 29 (58%) were overweight in the Remdesivir arm compared to 29 (58%) in the standard of care, and 17 (34%) were obese in the Remdesivir arm compared to 19 (38%) in standard of care. Only one patient had asthma in the Remdesivir group. One patient in each group had Type 2 diabetes mellitus with chronic kidney disease (CKD). There were 8 (16%) patients who had gestational diabetes in the Remdesivir arm compared to 11 (22%) in those receiving standard of care. There were 3 (6%) patients in the Remdesivir group with chronic hypertension compared with 1 (2%) patient in the control arm (Table 1).

Figure 1 shows the delay in starting Remdesivir from symptom onset and from date of admission. Remdesivir was initiated in all 50 cases in the first week of admission. Most cases 24 (48%) started treatment on the date of admission (day 0), followed by 13 (26%) on day 1; 4 (8%) on day 2; 3(6%) on day 3; 4 (8%) on day 4; and 1 (2%) on each days 6 and 8. However, only 6 (12%) started Remdesivir from days 2 to 4 from symptom onset, 23 (56%) from days 5-7 from symptom onset, 9 (18%) from days 8-10, and 7 (14%) started Remdesivir from days 11-16 from symptoms onset.

Table 2 shows that pre-treatment 17 (34%) patients in the Remdesivir arm had less than 3 zones involved and 33 (66%) had 3 or more zones involved, while in the control arm 15 (30%) of the patients had less than 3 zones involved and 35 (70%) had 3 or more zones involved, making both groups comparable in terms of zonal involvement in the X-rays. Post-treatment 26 (52%) patients in the Remdesivir arm and 11 (22%) patients in the control arm had 3 or less zones involved. While 24 (48%) in the treatment arm and 36 (72%) in the control arm had 3 or more zones involved. In terms of X-ray patterns, 22 (44%) in the treatment arm had patchy opacities as compared to 28 (56%) in the control arm, while 6 (12%) had consolidations in the Remdesivir arm versus 4 (8%) in the control arm. Post-treatment both arms showed improvement with 20 (40%) each having patchy opacities. However, 4 (8%) patients had consolidation pattern post- treatment in the Remdesivir arm as compared to 7 (14%) in the control arm.

Both treatment arms had similar pre- and post- aspartate aminotransferase (AST) levels. (Table 2). AST levels pre-treatment in the Remdesivir arm 16 (34.8) was comparable with standard of care 23 (48.9). Post-treatment AST levels was abnormal in both arms: with Remdesivir 23 (51.1) and control 16 (50.0) .However, abnormal alanine transaminases (ALT) prior to starting treatment were more pronounced in Remdesivir 20 (46.5) as compared to standard care 13 (25.5). Abnormal ALT post-treatment was comparable in both groups, 24 (51.1) in the Remdesivir and 18 (62.1) in those receiving standard of care. There was a 1.85 rise of ALT post vs pre-treatment in the Remdesivir arm (Table 2).

For the Remdesivir arm, more patients 31 (62%) were administered Bioferon as compared to control arm: 23 (46%) (p=0.08) (Table 3). However, Intravenous (IV) Dexamethasone was administered less in the Remdesivir arm 41 (82%) as compared to the control arm 49 (98%) (p=0.008). Tocilizumab was equally administered in both the groups. (Table 3).

Among the Remdesivir arm, all patients 50 (100%) recovered and were discharged home as compared to 42 (84%) in the control arm (p=0.013). The mean (standard deviation) time to recovery and discharge was less for patients receiving Remdesivir 8.43 (3.3) days as compared to 13.6 (9.2) days in the standard arm ($p < 0.001$). Also, number of patients transferred to the intensive care unit (ICU) was less for Remdesivir 10 (20%) as compared to the control arm: 23 (46%) (p=0.002) (Table 3).

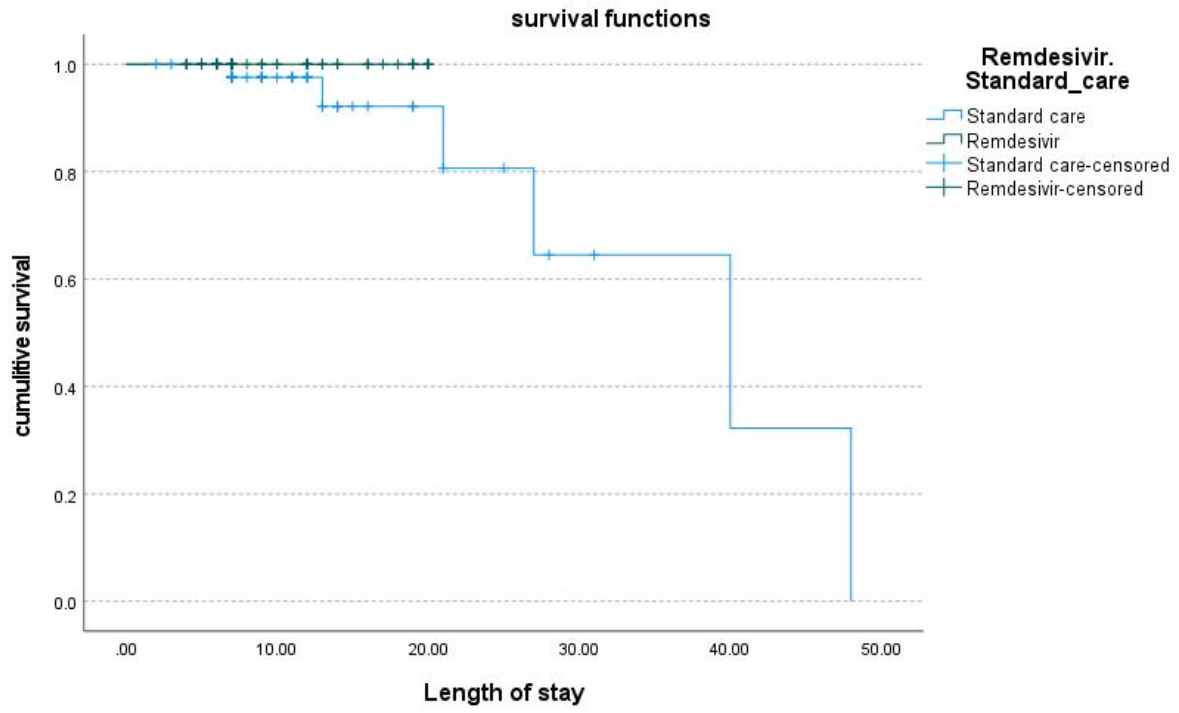
The re-admission rate was comparable in both treatment groups, 2 (4%) patients in the Remdesivir arm were readmitted versus 6 (12%) in the control arm.On admission, 20 (40%) of the Remdesivir group were hospitalized with no oxygen therapy (WHO scale 4), 21 (42%) were hospitalized with oxygen via nasal mask (WHO scale 5), 9 (18%) were on non-invasive ventilation with high flow oxygen (WHO scale 6). While among controls, 20 (40%) were hospitalized with no oxygen therapy (WHO scale 4), 27 (54%)

were on oxygen by mask (WHO scale 5), 2 (4%) were on non-invasive ventilation with high flow (WHO scale 6), and 1 (2%) (WHO scale 7) was ventilated.

At day 5 of admission 26 (52%) in the Remdesivir arm were asymptomatic and discharged (WHO scale 1), 5 (10%) were hospitalized but on no oxygen support (WHO scale 4), 9 (18%) on oxygen by mask or nasal prongs (WHO scale 5) and 10 (20%) were on high flow oxygen (WHO scale 6) . While among the standard of care, 4 (8%) were discharged (WHO scale 0,1 and 2), 10 (20%) were hospitalized without any oxygen therapy (WHO scale 4), 14 (28%) were on oxygen by nasal mask or prongs (WHO scale 5), 11 (22%) were on non-invasive ventilation (NIV; WHO scale 6) , 6 (12 %) were on mechanical ventilation (WHO scale 7), and 5 (10%) were intubated and on vasopressors (WHO scale 8). Table 5

At day 10, in the Remdesivir arm 46 (92%) were discharged (WHO scale 1), 3 (6 %) were hospitalized with low flow oxygen by nasal prongs (WHO scale 5) and 1 (2%) were on high flow oxygen (WHO scale 6), while in the control arm 25 (50%) were asymptomatic and discharged (WHO scale 1,2 and 3), 7 (14%) were on no oxygen (WHO scale 4), 4 (8%) were on oxygen by nasal mask (WHO scale 5), 5 (10%) were on NIV (WHO scale 6), and 6 (1%) were on mechanical ventilation (WHO scale 7) and 3(6%) patients were ventilated and on inotrope support . At day 28, all 50 (100%) patients in the Remdesivir arm were discharged as compared to 42 (84%) in the control arm ,whereas 6 (12%) patients in the control arm were still intubated and ventilated, and 2 died and eventually 4 more died. At day 60 all patients in the Remdesivir arm were alive compared to 44 (88%) in the standard of care arm. Table 5

Figure 2: Kaplan-Meier survival curve for patients treated by Remdesivir or by Standard care



Legend: Kaplan-Meier survival curve (Figure 2) show that at day 60 all patients receiving Remdesivir were alive whereas 6 deaths occurred in the standard of care group. The median time to death in the control arm was 24 [7 – 48] days.

Out of the 100 women who had COVID-19 pneumonia, data for the perinatal outcome was available for 87 (43 on Remdesivir and 44 on standard of care) (Table 4). The mean (standard deviation) gestational age in weeks at presentation between both groups was lower in the Remdesivir group 25.6 (7.8) as compared with standard care 31.1 (4.2) weeks ($p<0.001$). In the Remdesivir group more patients had normal vaginal delivery 17 (39.5%) than those on standard of care 9 (20.5%) ($p=0.043$). Less patients on Remdesivir had caesarean section 26 (60.5%) compared with standard of care 35 (79.5%) ($p=0.043$). It is important to note that 10 (23.3%) of the deliveries for the Remdesivir group occurred due to iatrogenic intervention from worsening COVID-19 (Table 4). However, almost half of the control arm deliveries: 21 (47.7%) were due to worsening maternal COVID-19 conditions ($p=0.015$). Pre-term delivery (<37 weeks) was less pronounced in the Remdesivir group 11 (26.5%) whereas more than three-quarters were delivered prematurely in the control arm 31 (70.5%) ($p<0.001$) (Table 4). This is in line with the mean birth weight (kg) for the Remdesivir group 2.92 (0.6) which was significantly higher than the control arm: 2.56 (0.8) ($p=0.016$) (Table 4). New-born conditions at birth were similar in both groups (Table 4). The Apgar scores at 1 and 5 minutes were similar in both arms ($p=0.661$). There were no major anomalies reported with either those receiving Remdesivir or control arm. All new-borns of mothers who were

COVID-19 positive at delivery were tested using RT PCR within 48 hours of birth, and none tested positive.

DISCUSSION

Published data demonstrated that the standard of care medications including Hydroxychloroquine and Lopinavir-ritonavir did not show a significant reduction in hospitalisation rate nor in improving the clinical outcome in covid 19 infected patients even when used early in disease course. (18,19) Data on Remdesivir in pregnant women are limited and include only few case reports or case series involving severe or critical COVID-19 illness . This study is among the first few studies that compared pregnant women with moderate to severe COVID-19 pneumonia infection who were treated with Remdesivir, irrespective of their oxygen saturation status compared to standard of care therapy. Since pregnant women with moderate COVID-19 illness tend to deteriorate fast, we opted at starting Remdesivir to pregnant patients who show evidence of lower respiratory disease during clinical assessment or by chest imaging. Treatment was initiated as early as possible from admission time and preferably from early onset of symptoms of moderate illness, irrespective of the respiratory rate or oxygen status.

All 50 patients in the second and third trimester of pregnancy with moderate and severe COVID-19 illness were treated with a 5-day course of Remdesivir. Remdesivir was started in 20 patients with WHO scale of 4, and in 21 with WHO scale of 5. All 41 patients showed a significant clinical response within 5 days from initiation of Remdesivir. The 9 patients with WHO scale of 6 on admission and severe COVID-19 illness with late presentation also survived. These results are comparable with other studies on the favourable maternal outcome with Remdesivir therapy in pregnant women. (20)

In this study, pregnant women with moderate to severe COVID-19 pneumonia who received Remdesivir as early as within 5 days from the onset of symptoms, or within the first 72 hours from admission, irrespective of the oxygen saturation, achieved better favourable clinical course, and shortened hospital stay in comparison to those on standard care who did not receive Remdesivir. The 6 patients who received Remdesivir after 72 hours from admission had delayed clinical recovery and prolonged hospital stay (9-15 days). The delay in starting Remdesivir was attributed to two main reasons, unavailability of Remdesivir for a few days and maternal hesitancy in taking the medication due to concerns regarding foetus safety.

In the Remdesivir group, 10 cases were shifted to the ICU, 9 of which presented on the day of admission with severe COVID-19 pneumonia and a WHO scale of 6, and 1 case presented on the admission day with WHO scale of 5. All ICU cases presented late to the hospital with an average delay from the onset of symptoms of 6.6 days, while 1 case deferred Remdesivir therapy for more than 72 hours after admission.

No deaths occurred in the Remdesivir group. Although both groups had similar age and BMI distribution, the gestational age at presentation was higher in the control arm. Out of the 6 patients who died in the control arm, 4 were in the third trimester and 2 in the late second trimester ; 2 had GDM , 2 of them had GDM with morbid obesity (BMI of 40 and 41kg/m^2) , & the remaining 2 had no co-morbidities .

Their WHO scale on admission were 4 and 5 (4 patients had scale 4 and 2 had scale 5). All 6 patients were shifted to the ICU within 48-72 hours due to worsening respiratory status and were intubated and ventilated. The 2 obese patients also had gestational diabetes mellitus. All 6 deaths were attributed to severe acute respiratory distress syndrome (ARDS), 3 had septic shock, 2 had disseminated intravascular coagulation (DIC) and 1 had pulmonary embolism.

Both groups received steroids for two main indications- for foetal lung maturity where intravenous dexamethasone was used from weeks 24 to 36 of gestation, and for extended course for 5 to 7 days for progressive COVID-19 pneumonia with desaturation. The course was extended to 10 days or more for the ICU and critical patients. (21)

No significant adverse effects were reported in the group receiving Remdesivir. At baseline, there were abnormal liver enzymes in both groups. However, post-treatment, there was no significant rise of liver enzymes in the Remdesivir group, and none had grade 3 or 4 elevations post-treatment.

One of our study's significant observations was the high number of preterm births, increased caesarean section rates, and less favourable perinatal outcome in the control arm compared to the Remdesivir arm due to the worsening maternal condition from COVID-19 infection. The preterm caesareans were decided due to the worsening maternal condition from COVID-19 infection and these results are comparable to other studies in the early months of the pandemic (22) .A systematic study reviewing 36 articles showed that COVID-19 status alone became a common indication for caesarean delivery early in the pandemic, despite lack of evidence for vertical transmission. The increase in caesarean rate in this data may reflect obstetricians attempting to serve their patients while guidelines where constantly evolving. (23)

In our sample of 100 cases, there was no evidence of vertical transmission of COVID-19 from mothers to foetus. This is a significant observation, but more data is required to validate this finding. From the limited number of studies available, no assessment can yet be made regarding the rates of vertical transmission in early pregnancy and potential risk for foetal morbidity and mortality. (24)

We have taken the challenge to initiate antiviral therapy in pregnant women with moderate covid illness with or without desaturation and to severe COVID-19 illness, with significant favourable maternal and foetal outcomes. Pregnant women on Remdesivir appear to do better than the standard of care arm in terms of ICU admissions, need for intubation and mechanical ventilation, length of hospital stay, and mortality. This study in pregnant women with COVID-19 illness will be followed with ongoing research

including longer follow-up time to investigate the effects of disease severity, concurrent medications, and long-term effects on the mother and foetus.

STRENGHTS AND LIMITATIONS

In order to assure that both groups were comparable at baseline, in this quasi-experimental study the Unified WHO score for both the Remdesivir, and standard of care arm were matched for age and BMI. However, the relatively small sample size, and non-availability of data on long term effects are limitations to this study.

Our findings provide support for initiating antiviral therapy in pregnant women hospitalized with COVID-19 illness earlier in the course of illness aiming at preventing disease complications and mortality. There is a risk of elevated transaminases in patients treated with Remdesivir, however, our study did not show significant elevation of liver enzymes. Counselling of pregnant women admitted with COVID-19 illness must include the potential benefits of rapid recovery with Remdesivir and the favourable perinatal outcome for both mother and fetus when treatment is initiated early. Pregnant women with moderate and severe COVID-19 illness would benefit from early treatment with a 5-day course of Remdesivir ideally started within 48 hours of onset of symptoms. There is a need in the medical system to create more community awareness regarding the seriousness of COVID-19 illness during pregnancy and the importance of early presentation to the hospital to be able to prevent clinical deterioration and maternal and fetal morbidity and mortality. Since benefits clearly outweighs the risks, pregnancy should not be a contraindication for Remdesivir.

Conclusion

However, until more studies confirm the safety and efficacy of Remdesivir in pregnant women with COVID-19 pneumonia, the decision to administer Remdesivir should be individualized and agreed upon by a multidisciplinary team with a confirmed patient consent.

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Table 1: Baseline Demographics and Clinical characteristics of the hospitalized pregnant patients with COVID-19 Illness.

Characteristics	Remdesivir (N = 50)	Standard care (N = 50)	Total (N =100)	P-value
Mean age (SD) – years	33.9 (4.6)	33.1 (5.6)	33.48 (5.12)	0.437
Nationality – no. (%)				
UAE nationals	15 (30)	17 (34)	32 (32)	0.415
Non-UAE nationals	35 (70)	33 (66)	68 (68)	
Risk factors – no (%)	18 (36)	18 (36)	36 (36)	1
Overweight (BMI 25.0 to 29.9)	29 (58)	29 (58)	58 (58)	0.48
Obesity (BMI ≥30)	17 (34)	19 (38)	36 (36)	
Asthma	1 (2)	0	1 (1)	0.215
Gestational diabetes	8 (16)	11 (22)	19 (19)	0.447
Type 2 diabetes with CKD	1 (2)	1 (2)	2 (1)	1
Chronic Hypertension	3 (6)	1 (2)	4 (4)	0.305

UAE: United Arab Emirates; SD: Standard deviation; CKD: Chronic kidney disease; BMI, Body mass Index.

Table 2: Chest X-ray findings and Liver enzyme values pre- and post-treatment of hospitalized pregnant patients with COVID-19 Illness.

	Pre-treatment			Post-treatment		
	Remdesivir (N=50)	Standard Care (N=50)	P value	Remdesivir (N=50)	Standard Care (N=50)	P-value
X ray Pattern :						
Reticular pattern	17 (34)	7 (14)	0.057	13 (26%)	17 (34)	0.163
Ground glass opacities	5 (10)	11 (22)		13 (26%)	6 (12)	
Patchy opacities	22 (44)	28 (56)		20 (40%)	20 (40)	
Consolidation	6 (12)	4 (8)		4 (8%)	7 (14)	
X ray Zones no. (%)						
Mild (<3)	17 (34)	15 (30)		26 (52)	11 (22%)	
Severe (≥3)	33 (66)	35 (70)	0.415	24 (48)	36 (72%)	0.003
Mean increase in serum liver levels (SD)						
AST	16 (34.8)	23 (48.9)	0.120	23 (51.1)	16 (50)	0.554
ALT	20 (46.5)	13 (25.5)	0.028	24 (51.1)	18 (62.1)	0.243

Table 3: Co-medications and outcomes of the hospitalized patients with COVID-19 illness.

Characteristics	Remdesivir (N=50)	Standard Care (N=50)	Total (N=100)	P-value
Co-medications – no. (%)				
Bioferon	31 (62)	23 (46)	54 (54)	0.08
Tocilizumab	2 (4)	2 (4)	4 (4)	0.691
Dexamethasone (IV)	41 (82)	49 (98)	90 (90)	0.008
Outcomes:				
Mean Length of hospital stay (SD)-days	8.43 (3.3)	13.6 (9.2)		<0.001
ICU admission – no. (%)	10 (20)	23 (46)	33 (33)	0.002
Discharged home	50 (100)	42 (84)	92 (92)	0.934
Discharge outcome at 28 days – no. (%)				
Death	0	6 (12)	6 (6)	0.015
Re-admission – no. (%)	2 (4)	6 (12)	8 (8)	0.134
Maternal outcome at 60 days – no. (%)				
Survival	50 (100)	44 (88)	94(94)	0.013
Deaths	0	6 (12)	6 (6)	0.013

UAE, United Arab Emirates; IV, intravenous; ICU, intensive care unit.

Table 4: Pregnancy and fetal outcomes of the hospitalized patients with COVID-19 illness

Characteristics	Remdesivir (N = 43)	Standard care (N = 44)	P-value
Mode of delivery – no. (%)			
NVD	17 (39.5)	9 (20.5)	0.043
LSCS	26 (60.5)	35 (79.5)	
Indication of delivery – no (%)			
COVID-19 related	10 (23.3)	21 (47.7)	0.015
Obstetric factor	33 (76.7)	23 (52.3)	
Gestational age at delivery – weeks			
Mean gestational age (SD)	25.6 (7.8)	31.1 (4.2)	< 0.001
Preterm (< 37 weeks) - no (%)	11 (26.5)	31 (70.5)	<0.001
Term- no (%)	30 (73.2)	13 (29.5)	
Mean fetal weight (SD)-kg	2.92 (0.6)	2.56 (0.8)	0.016
Apgar score (1 minute)– no			
≤ 7	8	6	0.15
>7	11	20	
Apgar score (5 minute)– no			
≤ 7	1	1	0.661
>7	26	18	

UAE, United Arab Emirates; SD, standard deviation; kg, kilogram; NVD : Normal vaginal delivery; LSCS, lower (uterine) segment caesarean section; no: number

Table 5: WHO clinical progression scale for cases and controls from admission to 28 days

WHO-CPS	On admission		5 days		10 days		28 days	
	control	Case	control	case	control	case	control	case
0			1	0				
1			2	26	17	46	42	50
2			1	0	7	0		
3	0	0			1	0		
4	20	20	10	5	7	0		
5	27	21	14	9	4	3		
6	2	9	11	10	5	1		
7	1	0	6	0	6	0	6	0
8			5	0	3	0		
9								
10							2	0

WHO-CPS : WHO clinical progression scale