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Sustained Virologic Response to a Dual Peginterferon alfa-2a and Ribavirin in Treating Chronic hepatitis C Infection

A Retrospective Cohort Study

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Abstract: In Myanmar, hepatitis C virus (HCV) infection prevalence is 2%. A combination therapy of pegylated interferon alfa-2a and ribavirin (PEG-IFNa/RBV) is a standard treatment, but the effect of this antiviral therapy needs evaluation as to determine the efficacy and safety of dual PEG-IFNa/RBV therapy in treating patients infected with HCV in Myanmar.

This was a retrospective analysis of data from a single clinic exclusively for gastrointestinal diseases in Yangon, Myanmar. We assessed treatment responses at the defined time points and stratified by genotypes of HCV. We also determined incidences of adverse events (AEs). We investigated independent predictors of sustained virologic response (SVR) in the participants.

A total of 362 HCV-infected cases were included in this study. The majority were females (51.7%) with mean age of 47.12 years (± 11.6) and noncirrhosis patients (82%). Rapid virologic response (RVR), early virologic response (EVR), end of treatment response (ETR), and SVR 24 weeks after completion of the dual treatment were 50.3% (178/362), 88% (314/357), 80.1% (286/357), and 85.6% (167/195), respectively. The most frequently reported AEs were nausea/anorexia (72.8%) and flu-like symptoms (62.4%). In multivariate analysis, 4 factors were independently associated with SVR; SVR to genotype 3 (odds ratio [OR] 2.4, 95% CI: 1.24–4.62), EVR (OR 0.54, 95% CI: 0.3–0.95), and duration of treatment (OR 1.52, 95% CI: 1.18–1.98). Study limitations were acknowledged.

The efficacy and safety of the dual therapy in treating HCV-infected patient in Myanmar was acceptable. We recommend a prospective randomized control trial looking at duration of therapy and rates of achieving SVR, which could significantly impact the care of HCV-infected patients in Myanmar and perhaps other countries as well.

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Abbreviations: AE = adverse events, DAA = direct-acting antiviral agents, ETR = end of treatment response, EVR = early virologic response, GT1 = genotype 1, GT2 = genotype 2, GT3 = genotype 3,

GT6 = genotype 6, HCC = hepatocellular carcinoma, HCV = hepatitis C virus, HOMA = homeostatic model assessment, IFNa = interferon alfa-2a, IR = insulin resistance, OEC = Option Endoscopy Centre, OR = odds ratio, PEG = pegylated, RBV = ribavirin, RVR = rapid virologic response, SVR = sustained virologic response, TNF = tumor necrosis factor.

INTRODUCTION

Hepatitis C is caused by the hepatitis C virus (HCV), a spherical, enveloped, and positive-strand ribonucleic acid (RNA) virus. By estimation, 2% to 3% (130–170 million) of the world's population are infected with HCV,^{1,2} and the higher prevalence (>2%) is reported in several countries including some countries in the Southeast Asia (2%, 1.7%–2.3%).³ Infection with HCV could end up with both acute and chronic hepatitis, leading to health consequences. Although acute infection rarely causes hepatic failure, it can develop into a chronic infection in 75% to 85% of cases.^{1,4} Among HCV-infected individuals, 20% to 30% eventually develop cirrhosis or hepatocellular carcinoma (HCC).⁵

The recommended treatment for patients with chronic hepatitis C has historically been a combination therapy of pegylated interferon (PEG-IFN) and ribavirin (RBV).⁶ The aim of this combination treatment is to achieve a sustained virologic response (SVR), defined as the absence of detectable HCV-RNA in the serum at 6 months after completion of therapy.^{7,8} Direct-acting antiviral agents (DAA) have been recently developed for HCV infection and are known to increase the response rate substantially.⁹ In many countries (including Myanmar in this case) a dual PEG interferon alfa-2a (PEG-IFNa) and RBV remain the standard of care for the years⁸ before newer DAA-containing regimens are approved and/or distributed at an affordable price. The dual therapy is also effective against all the genotypes of hepatitis viruses (pan-genotypic).²

Myanmar is a developing country situated in the Southeast Asia region and has recently emerged as a nation pursuing peaceful transition to democracy. In Myanmar, prevalence of HCV is 2%, and 24% of patients with HCC were infected with HCV.¹⁰ Therefore, a successful antiviral treatment would be important for the prevention of HCC and other health sequelae. There had been reports of achieving SVR by the combination therapy of PEG-IFNa/RBV in treating patients infected with HCV from other settings such as Japan,¹¹ Iran,¹² among others. The cure rate depends on several factors including the strain of virus (i.e., genotypes), type of treatment given,² patient-related factors (i.e., treatment naive, noncirrhosis), and drug administration factors (i.e., dosing, regimen either PEG-IFNa/RBV or PEG-IFNb/RBV). Hence, country specific information on the efficacy of a combined PEG-IFNa/RBV would be a valuable contribution. Taken together, the objective of the present study was to determine the efficacy and safety of a dual

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PEG-IFNa/RBV therapy in treating patients infected with HCV in Myanmar.

MATERIALS AND METHODS

This was a single-center cohort study conducted in accordance with the ethical principles of the Declaration of Helsinki and of Good Clinical Practice. The combination of PEG-IFNa (Pegasys, Roche) 135 to 180 μ g weekly plus RBV (Copegus, Roche) 800 to 1200 mg daily reflected the clinical practice in Myanmar at the time of this study. The protocol of this non-interventional study was approved by the institutional review committee of the Option Endoscopy Centre (OEC).

We retrospectively reviewed the medical records of HCV-infected patients in the OEC, a private clinic exclusively for gastrointestinal diseases in Yangon, Myanmar. Information for the current analysis was retrieved from the databank of OEC, which was obtained via a semistructured questionnaire conducted by healthcare staff; the collected information included socio-demographic characteristics, medical history, and clinical characteristics at the first visit to the clinic. Also, laboratory findings of the patients were recorded. The inclusion criteria in the present study were patients of any age and gender who attended the OEC having serologic evidence of chronic hepatitis C (anti-HCV antibody test and/or detectable HCV-RNA in plasma). Patients were not included in the present study if they were coinfecting with HIV, pregnant women/lactating mothers, in the presence of decompensated cirrhosis or liver disease (i.e., autoimmune or drug-induced hepatitis), or with serious concurrent medical illnesses (e.g., severe cardiopulmonary disease, uncontrolled diabetes mellitus, or malignancy).

Ascertainment of HCV

For each patient, ascertainment of HCV was done by virological and serological tests. These included anti-HCV (ELISA), HCV-RNA (quantitative PCR) at each time point, HCV genotype (type-specific PCR), HBsAg, anti-HBs, anti-HBc, and anti-HIV (ELISA). For baseline information complete blood count, liver function test, renal function test, cardiopulmonary status, thyroid function test, immunological test for connective tissue diseases, and serum iron status were assessed. The study period was from January 2008 to December 31, 2012.

Treatment Given

Drug Combination

Subcutaneous injection of PEG-IFNa 180 μ g once weekly plus oral RBV 800 to 1200 mg daily (weight-based dosage) in divided dose (e.g., 400 mg twice a day for 800 mg).

Duration

Twenty four weeks treatment for patients with genotype GT2, GT3, or indeterminate GT (i.e., standard therapy) or 48 weeks for GT1 or GT6.

An escalating low-dose regimen, starting from PEG-IFNa 135 to 180 μ g once weekly was given to those patients with compensated cirrhosis.

Follow-Up

All patients were followed for a further 24 weeks without additional treatment.

For those patients with anemia at baseline or during treatment, the dose of RBV was reduced to 200 mg. For those who had mild thrombocytopenia, the dose of PEG-IFNa was

reduced to 135 mg. To those with severe form PEG-IFNa, dosing was further lowered to 90 mg.

Assessments for Efficacy

Treatment response at the defined time points was measured and categorized as:

- (1) Rapid virologic response (RVR): undetectable HCV-RNA (<50 IU/mL) at week 4.
- (2) Early virologic response (EVR): a decrease in viral titer of $>2\text{-log}_{10}$ compared with base line (partial EVR) or negative results of HCV-RNA (<50 IU/mL) at week 12 of therapy (complete EVR).
- (3) End of treatment response (ETR): undetectable HCV-RNA (<50 IU/mL) at the end of treatment (i.e., 24 or 48 weeks).
- (4) SVR: undetectable HCV-RNA (<50 IU/mL) 24 weeks after completion of therapy.
- (5) Nonresponders: failing to clear HCV from serum at any time point during treatment.
- (6) Relapses: relapse either while on therapy (i.e., breakthrough) or after completion of the treatment.¹³

For safety assessments, incidences of adverse events (AEs) and serious AEs were recorded at each visit at the Out-Patient Department (OPD). In the present analysis, the primary outcome was SVR and the secondary outcome was treatment related AEs.

Statistical Analysis

Descriptive statistics were performed on all important variables. Continuous variables in this study were arranged into categorical variables, using the cut-off points. For the comparisons of those patients with and without SVR, Pearson Chi-square test or Fisher exact test was done as appropriate. To investigate the independent factor related to SVR, a multivariate analysis was performed through a stepwise logistic regression analysis. The final model was selected at $P \leq 0.05$. Data analysis was done with STATA 12 (StataCorp, TX).

RESULTS

Study Population

A total of 362 patients attended the OEC clinic met the inclusion criteria of the current study. The characteristics of participants are presented in Table 1. The majority were females (51.7%) with mean age of 47.12 years (± 11.6) and noncirrhosis patients (82.04%). The most frequent participants were adults aged 40 to 60 years (145/362; 40.1%). The majority suffered from at least 1 comorbid disease (61.3%) and had viral load in HCV-RNA assay $>800,000$ IU/mL (62.1%). Of 222 patients with comorbid diseases, the common presentations were diabetes, hypertension, gall stones, and chronic hepatitis B. The most frequent HCV genotype among this cohort was HCV GT3 (178/362; 48.9%), followed by GT1 (28.2%). By age stratification, GT3 was also the highest proportion in all age groups and this was more pronounced in the 46–60 years age group (31.6%) (Supporting Table S1, <http://links.lww.com/MD/A349>).

Efficacy Measured as Responses to Treatment

Figure 1 shows a flow diagram of disposition of patients treated with the dual therapy.

TABLE 1. Selected Baseline Characteristics of Participants (N = 362)

Description	Frequency, %
Age, mean (\pm SD), years	47.1 (\pm 11.6)
Females, n, %	187 (51.7)
ALT level, mean (\pm SD) U/L	59.4 (\pm 43.7)
Presence of comorbid disease	
Yes	222 (61.3)
No	140 (38.7)
Cirrhosis	
Presence	65 (18)
Absence	297 (82.04)
HCV-RNA, IU/mL	
$\leq 8 \times 10^5$ IU/mL	137 (37.9)
$> 8 \times 10^5$ IU/mL	225 (62.1)
Molecular parameter, n, %	
Genotype 1	102 (28.2)
Genotype 2	4 (1.1)
Genotype 3	178 (49.2)
Genotype 6	66 (18.2)
Indeterminate genotype	12 (3.3)

ALT = alanine aminotransferase, HCV = hepatitis C virus, RNA = ribonucleic acid.

A total of 354 patients were tested for quantitative viral titer at week 4. RVR was attained in 178 (50.3%); there was, however, no significant difference between those who attained RVR and non-RVR (178/354 vs 176/354, $P = 0.93$). In stratified analysis, the RVR rates were highest among patients with HCV-GT2 (3/4, 75%), followed by HCV-GT3 (99/178, 55.6%) (Supporting Table S2, <http://links.lww.com/MD/A349>).

The vast majority of patients who had tested qualitative HCV-RNA assay achieved EVR at 12 week (314/357, 88%). Most of them (286/357, 80.1%) were further assessed and all but 1 achieved ETR (285/286, 99.7%); this was more pronounced in HCV-GT3 (156/286, 54.5%). Based on the patients who attended the follow-up assessment, the majority achieved SVR (167/195, 85.6%) and a few patients got relapses (28/195, 14.4%). The remaining 91 patients (91/286, 31.8%) were unknown in their response state as they did not attend the follow-up assessment at the time of analysis; this was 8.4% (24) in GT1, 0.3% (1) in GT2, 16.1% (46) in GT3, 6.3% (18) in GT6, and 0.7% (2) in indeterminate GT.

By stratification, among 195 tested, GT2 (2/2, 100%) and indeterminate GT (4/4, 100%) GT6 (28/31, 90.3%) had the highest attainment of SVR in response to dual treatment, while GT1 (39/48, 81.2%) and GT3 (94/110, 85.5%) were with the substantial response rates. For GT2 and GT6, it is to be noted that there were relatively very few cases included. Of 195 tested, relapse rate was highest in GT1 (18.8%, 9/195), followed by GT3 (14.6%, 16/195) (Table 2). By stratification, RVR, EVR, ETR, and SVR in GT6 were 54.5% (36/66), 84.8% (56/66), 97.9% (48/66), and 90.3% (28/66), respectively. Of 65 HCV patients with cirrhosis, 32 patients were tested 24 weeks after completion of the treatment. Of them, 21 (67.7%) achieved SVR.

Predictors of Viral Responses

Univariate analysis showed HCV-GT3 ($P = 0.008$), HCV-GT1 ($P = 0.003$), EVR ($P = 0.003$), and duration of therapy

($P < 0.001$) were significant variables associated with SVR. In multivariate analysis, duration of therapy (odds ratio [OR] 1.52, 95%CI: 1.18–1.98), EVR (OR 0.53, 95%CI: 0.3–0.95), and patients infected with HCV-GT3 were independent predictor of SVR. Those infected with HCV-GT3 had 2 times increased likelihood of attaining an SVR than with other HCV genotypes (OR 2.4, 95%CI: 1.24–4.62) (Table 3).

Adverse Events

Table 4 shows the incidence of AE among 354 HCV-infected patients seeking the dual treatment at the OEC. Of them, the most frequently reported AEs were nausea and anorexia (72.8%), followed by flu-like symptoms (62.4%). Some of these patients reported irritability and insomnia (41.9%) and a few got injection reactions (15.2%). In 74 (20.9%) and 69 patients (19.5%), dose reduction for PEG-IFN α and RBV were required, respectively.

DISCUSSION

In clinical practice, any decision about a choice of therapy should weigh the balance between benefits and harms of the treatment. The present study has attempted to document the efficacy and safety profile of PEG-IFN α /RBV for the treatment of HCV-infected patients at a private specialist clinic in Myanmar.

Overall Efficacy

About 15% to 45% of infected persons spontaneously cleared the virus within 6 months of infection without treatment.¹ Nevertheless, the majority of HCV-infected patients need effective antiviral treatment. The current study showed overall SVR > 80%. Comparable rates of SVR were found in 75% of patients in Pakistan.¹⁴ This was higher than the response rate in a Canadian study (54%).¹⁵ Host genetics,¹⁵ geographic variations,¹⁶ difference of body weight in race,¹⁷ and pretreatment conditions among study groups may account for the difference in response status. Our findings indicated that RVR was not a significant predictor of SVR, suggesting SVR was achieved without RVR in many cases. This was agreed with a study in Japan.⁵ Independent factors significantly associated with SVR levels in this study were similar to other studies such as GT3¹⁸ and EVR.^{5,18}

EVR was significantly associated with SVR. The week 12 “decision point” became widely adopted in clinical practice in the United States and Europe.¹¹ A practical guide is to observe EVR nonresponses as a reliably predictor of when to discontinue in patients unlikely to respond.¹⁹

Genotype Specific Efficacy

Testing for HCV genotype is recommended to guide the selection of the most appropriate antiviral regimen.²⁰ Genotyping is useful in epidemiological studies and in clinical management for predicting the likelihood of response and determining the optimal duration of therapy.²¹ The current study reported that the dual therapy gave a significantly better SVR rate in HCV-GT3. Comparable rate of SVR such as $\geq 80\%$ in patients infected with GT3 were reported in other settings.^{16,22} In a serological study on HCV-infected patients in Myanmar, 75% (18/24) were with GT3.¹⁰ A concern was that there was a comparable SVR between GT1 (81.2%) and GT3 (85.5%). Relatively fewer samples in GT1 might be a possible reason why GT3 alone was a significant predictor in the current analysis.

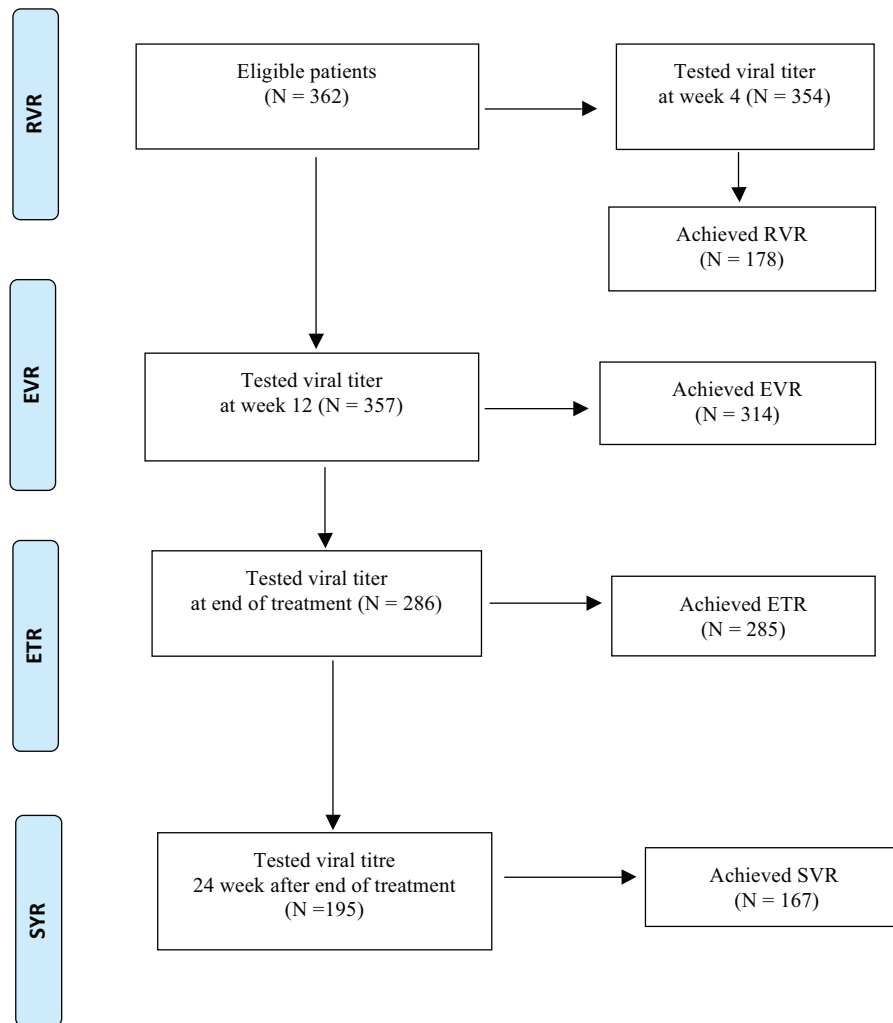


FIGURE 1. Flow diagram of the study, indicating virologic response rates during the treatment and follow-up periods.

GT6 is common in some Asian countries, including Southern China, Hong Kong and Myanmar. Studies have reported that GT6 was prevalent in Southern China and Hong Kong related to intravenous drug users (IVDU) that subsequently spread to the general population via blood transfusion.^{23,24} As the higher rate of SVR found in the current analysis highlighted that effective treatment to this special group (IVDU) and strict screening of HCV would further reduce the spread of HCV to the general population.

A faster progression of liver fibrosis in HCV-GT3 patients was reported in empirical studies;²⁵ the better rate of SVR to the dual treatment in HCV-GT3 patients in the present study has therefore further clinical benefits from reduction of liver-related morbidity and mortality. For instance, 2 distant mechanisms of steatosis are postulated. In HCV-GT3-infected patients, steatosis is likely to be viral induced and associated with a direct cytopathic effect of HCV²⁶ and have stronger negative effect on beta lipoprotein formation in hepatocyte. Thus, it is able to inhibit VLDL secretion from liver and to induce steatosis.²⁷ Another explanation is that HCV-GT3 had significantly lower homeostatic model assessment (HOMA)-insulin resistance (IR) than other genotypes, and HOMA-IR was an independent

predictor for the degree of fibrosis and the rate of fibrosis progression.²⁸

Our findings could be confounded with the host factors such as interleukin 28 B (IL28B) and IR, albeit lack of these data in the patients profile. A cohort study on 75 HCV patients in Taiwan²⁹ and a study on 264 HCV patients in Thailand³⁰ as well as a meta-analysis of 46 individual studies³¹ assessed an impact of IL28B polymorphisms on the effect of PEG-IFNa/RBV treatment; single nucleotide polymorphisms (SNPs) of near IL28B (rs12979860 and rs8099917) were useful baseline predictors for virologic response in patients infected with GT1^{29–31} and GT4 HCV.³¹ This implied that, for those non-responses to treatment, identification of IL28B genotypes is necessary³¹ even before the treatment has begun.³⁰ The impact of IL28 B on the dual treatment of HCV could be explained by the fact that HCV primarily induces IFN-Ks, which are a crucial driver of interferon-stimulated gene (ISG) induction and this cascade of events eventually result subsequent HCV eradication.^{32,33} The relationship between HCV and IR is complex and bidirectional, as described elsewhere.³⁴ A cohort of 330 Taiwanese patients undertaken PEG-IFNa/RBV showed that those who had high HOMA-IR achieved significantly lower rate of

TABLE 2. Sustained Virologic Responses by Genotypes

HCV Genotype	Total Tested	Sustained Virologic Responses, n, %	Relapse, n, %
1	48	39 (81.3)	9 (18.7)
2	2	2 (100)	0
3	110	94 (85.5)	16 (14.5)
6	31	28 (90.3)	3 (9.7)
Indeterminate	4	4 (100)	0
Total	195	167 (85.6)	28 (14.4)

HCV = hepatitis C virus.

SVR than those who had low IR (68.8% vs 82.1%, $P = 0.008$).³⁵ A meta-analysis has documented that normal insulin sensitivity was about 3 times higher rate of SVR (OR 2.86, 95%CI: 1.97–4.16) than in patients with IR.³⁶

Achieving SVR was diminished in HCV-infected patients with cirrhosis shown in our study, was also documented in a published review.⁷ Yet, this still has potential benefits to those patients who achieved SVR by preventing the development of oesophageal varices through a reduction of portal pressure.⁷

Adverse Events

The side effects of the dual therapy reported in the current study such as influenza-like symptoms, irritability, and injection

site reactions were commonly observed in published studies.^{11,37} Interferons are signaling protein/cytokines in human immune systems and acting as modulator of immune function. Biosynthetic interferon-based drug (PEG-IFN α in this case) also shared the same biological properties. Hence, patients felt flu-like symptoms after initiation of the dual treatment including PEG-IFN α . The neuropsychiatric side effects of IFN such as depression/irritability were also reported. Depression and IFN relationship was hypothesized that IFN may induce proinflammatory cytokines (tumor necrosis factor [TNF], interleukin 1, and interleukin 6) to promote “sickness behavior” and may also have effects on the hypothalamic-pituitary-adrenal axis.³⁸ Anemia less than 10 g/dL was reported in 18% of the patients who attained SVR to the dual therapy. RBV is taken up into erythrocytes and activated to RBV triphosphate, which is not hydrolyzed by erythrocytes. Therefore, the “trapped” drug within the erythrocyte could increase the levels greater than plasma concentrations. The associated depletion of red blood cell (RBC) adenosine triphosphate impairs antioxidant defence³⁹ and induces a cascade of RBC damage.

In daily practice, patients’ understanding of the risks of AEs remains an important safeguard for the use of these drugs. As such, patients should be explained, before the beginning of therapy, about the expectations from experiencing AEs that could affect transiently on their quality of life.⁴⁰

TABLE 3. Factors Independently Associated With Sustained Virologic Responses in the Multivariable Analysis

Variables	Odds Ratio	95% CI	P value
Gender			
Male	1		
Female	1.18	0.75–1.86	0.45
Age			
Group 1	1		
Group 2	0.83	0.55–1.23	0.35
Comorbid disease			
Yes	1		
No	1.09	0.77–1.54	0.61
ALT level, U/L			
Normal	1		
Raised	0.89	0.57–1.4	0.63
Viral load, IU/mL			
$>8 \times 10^5$	1		
$<8 \times 10^5$	0.92	0.58–1.4	0.73
Rapid virologic response			
Not achieved	1		
Achieved	1.12	0.73–1.7	0.53
Early virologic response			
Not achieved	1		
Achieved	0.53	0.3–0.95	0.03
Duration			
≤ 24 week	1		
>24 week	1.5	1.18–1.98	0.001
Non-genotype 1	1		
Genotype 1	0.66	0.34–1.3	0.22
Non-genotype 3	1		
Genotype 3	2.62	1.24–4.6	0.009

ALT = alanine aminotransferase, CI = confidence interval.

Study Limitations

Some limitations need to be acknowledged. Common to any retrospective and database study, accuracy of data is a concern. Potential confounding factors such as body weight,¹⁴ genetic polymorphism (e.g., IL 28B), and underlying clinical condition of the patients such as cirrhosis or IR could account for the SVR to the dual therapy. As some patients failed to attend the follow-up assessment 24 weeks after completion of the treatment, information bias is a concern. Such patients are the non-SVR worst case scenario or the SVR best case scenario. It is currently not clear as to which endpoint matters most. Hence, an interpretation of our results should lie in view of this bias. Age of patients in this study varied. But, this might not be an issue; an empirical study showed that response rates and safety profiles were comparable between adults and children.³⁷ This was a single-private center study, involving a moderate to high socioeconomic status group. Their compliance to treatment and subsequent SVR rate were likely higher than in lower socioeconomic groups. Therefore, our findings are limited in generalizability. However, most of the HCV-infected patients preferred treatment at the specialist clinics in Myanmar, and this could reinforce our confidence in the efficacy estimation. The cost of treatment is a limitation to some patients. This indicates

TABLE 4. Selected Adverse Events Among Patients Treated With the Combination Therapy (N = 354)

Description	Frequency, %
Nausea and anorexia	258 (72.8)
Flu-like symptoms	221 (62.4)
Depression (impaired concentration, irritability, and insomnia)	159 (44.9)
Injection reactions	54 (15.2)
Pruritus	70 (19.8)
Rash	55 (15.5)
Anemia <10 g/dL	64 (18)

the needs for a cost effectiveness study. Nevertheless, findings of the present study suggest a routine clinical practice for HCV-infected patients in a country with limited resources.

Merits of the Outcome Measurement

The 24-week posttherapy determination of SVR as the primary end point in the current study is relevant because it is durable as well as clinically meaningful endpoint of successful therapy for HCV infection. Published meta-analyses reported that SVR achieving patients had 87% lower risk of developing liver decompensation (relative risk, 0.13; 95%CI 0.06–0.27)⁷ and 5-year survival among patients attaining SVR was comparable to that of the general population (standard mortality ratio, 1.4; 95% CI 0.3–2.5).⁴¹ Moreover, this combination antiviral treatment had lower risks of extra-hepatic outcomes pertinent to end-stage renal diseases (hazard ratio: 0.15; 95% CI: 0.07–0.31).⁴²

The scientific basis of SVR applied in the present study as an outcome measure of the dual therapy may lie in the pathological process. The proinflammatory and homeostatic cytokines lymphotoxin a and b are members of the TNF superfamily. In mice models, it was found that activated, infiltrating immune cells secrete cytotoxic cytokines including TNF α , interferon gamma, and lymphotoxin a and b that cause tissue destruction, hepatocyte proliferation, cell death, and tissue remodeling. In such an environment, hepatocytes are susceptible to chromosomal aberrations leading to the development of HCC.⁴³ Although exact mechanism is poorly understood, it has been suggested that if the inflammatory microenvironment could be attenuated by viral eradication (SVR in this case), this might lessen the occurrence of HCC.⁷

Implications

Studies had documented that SVR is associated with a long-term clearance of HCV infection, a virologic cure.⁴⁴ The clearance of HCV from blood (i.e., at the attainment of SVR to the dual therapy) will also be beneficial in preventing end-stage chronic liver disease and its complications, and the subsequent eradication of HCV infection. This is important implication because HCV is the leading cause of liver transplantation in the developed countries, and the most common chronic blood-borne infection in the United States⁴ and elsewhere.

The trend of HCV treatment is moving toward the triple therapy. A review has reported that a triple combination therapy with PEG-IFNa, RBV, and a first-generation DAA, NS3/4A protease inhibitor, has shown limited efficacy in addressing nonresponsiveness to PEG-IFNa and RBV.⁴⁵ Hemolytic anemia

is a frequent AE in patients treated with RBV and this could be aggravated by the additional DAA (telaprevir or boceprevir) as a result of bone-marrow suppression. Follow-up studies with patients already achieved SVR to PEG-IFNa/RBV documented that such SVR is usually durable⁴⁴ and associated with improvement in biomarkers of disease. There is a favorable long-term prognosis and lack of evidence of the progression of liver disease⁴⁴ which may obviate the need for a protease inhibitor therapy. There is still a role for combination PEG-IFNa/RBV treatment in HCV-infected patients even in the triple therapy context.

CONCLUSION

The efficacy and safety of the dual therapy in treating HCV-infected patient particularly GT3 in Myanmar is comparable to other settings and at the acceptable level. We recommend a prospective randomized control trial looking at duration of therapy and rates of achieving SVR, which could significantly impact the care of HCV-infected patients in Myanmar and perhaps other countries as well.

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