THE OPTIMAL STRATEGY OF HEPATITIS C THERAPY IN GENOTYPE 1B TREATMENT-NAÏVE PATIENTS WHO INJECT DRUGS IN CHINA: A DECISION AND COST-EFFECTIVENESS ANALYSIS

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Background & Aims

- The prevalence of hepatitis C virus (HCV) among people who injected drugs (PWID) are high in China (above 60%);
- To eliminate HCV, the World Health Organization (WHO) put forward a 2030 target that 80% of diagnosed HCV cases could be treated;
- To assess the cost-effectiveness of treating acute HCV versus (*vs*) deferring treatment until the chronic phase, and the cost-effectiveness of early treatment at F0 stage *vs* delayed treatment at F3 stage for chronic HCV infection, using combination Daclatasvir (DCV) plus Asunaprevir (ASV) regimen and Peginterferon-α with ribavirin (PR) regimen.

Methods

- ***Seven treatment strategies were modelled using a decision analytical Markov model (Fig.1).***

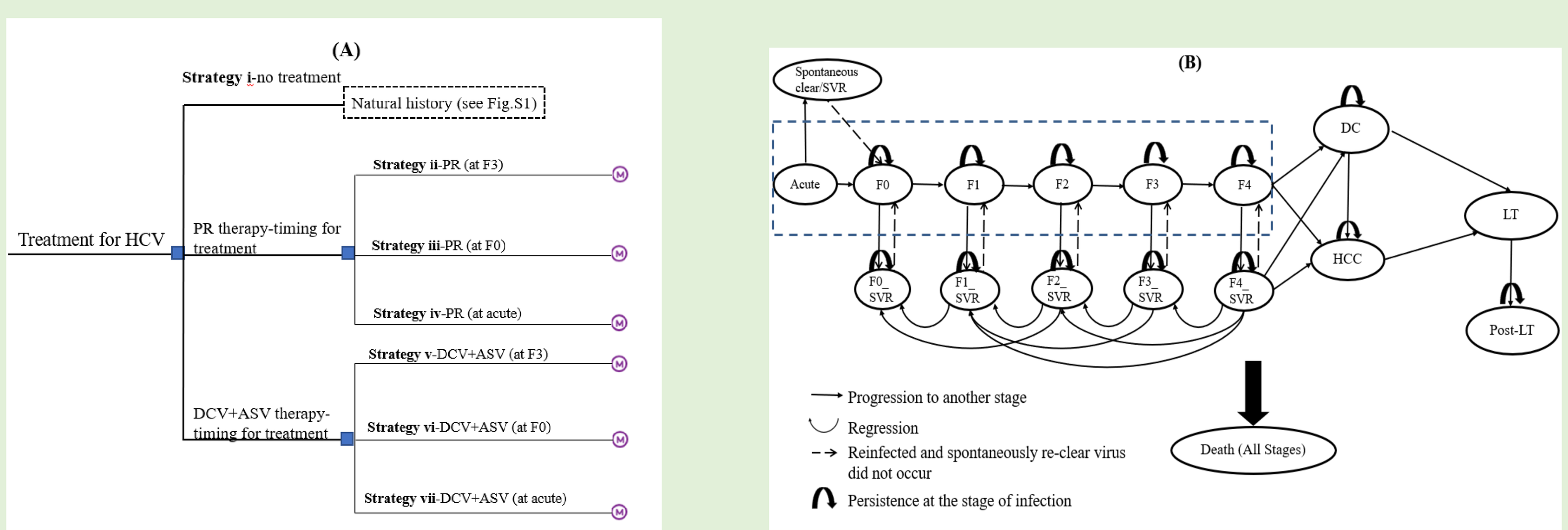

Fig. 1. Decision analytical Markov model. Fig. 1(A) depicts seven treatment strategies with consideration for therapy and timing, each strategy analysis starts at the node marked with an 'M'; Fig. 1(B) shows the Markov model. The Markov model structure is the similar for all strategies, within each strategy, the fibrosis state at which the treatment is initiated is selected. The square in the Markov model represents initial cohorts.

- ***Patient cohort***

➢ This base-case cohort was representative of newly diagnosed and treatment-naïve HCV RNA positive PWID in China. Patients coinfected with HIV or HBV were excluded.

- ***Costs and Health State Utility Values***

➢ All direct medical costs for HCV management and therapy were calculated from the societal perspective of Chinese healthcare

➢ Utility values defined as QALYs were obtained from published literatures based on SF-36

➢ All future costs and QALYs were discounted at 5% per year.

- ***Model Outcomes and Statistical Analysis***

➢ ICER as the ratio of the difference in costs between treatment strategies divided by the difference in QALYs were calculated.

➢ A strategy producing an ICER of US $29,295 per QALY, as 3-times per capita GDP of China in 2018 was considered as cost-effective. A strategy producing an ICER of US $9,765 per QALY, as 1-time per capita GDP of China in 2018, was considered as highly cost-effective.

➢ One-way sensitivity analysis was conducted to determine the effects of parameters on the ICER.

➢ Probabilistic sensitivity analysis based on a second-order Monte Carlo simulation with 1,000 iterations was then conducted to ascertain the model stability.

Abbreviation

F0, no fibrosis; F1, portal fibrosis with septa;
F2, portal fibrosis with rare septa; F3, numerous septa without cirrhosis;
F4, compensated cirrhosis; DC, decompensated cirrhosis;
HCC, hepatocellular carcinoma; LT, liver transplantation;
ICER, Incremental cost-effectiveness ratio;
QALYs, quality-adjusted life years ; GDP, gross domestic product.

Results

- ***Base-case results***

➢ Treatment for chronic HCV among PWID was highly cost-effective regardless of fibrosis stage, and early treatment resulted in a gain of QALY.

➢ Treatment at acute phase was cost-saving and more effective compared with delayed to chronic phase.

➢ DCV+ASV cost less and gained more QALY than PR, when initiating treatment at the same stage of HCV.

Table 1. Cost, QALY, and CER of seven treatment strategies

Strategy	Total Treatment Costs (US $)	QALYs	CER (Cost/QALY)
no treatment	18,739.183	12.006	1,560.82
DCV+ASV (at F3)	14,488.762	14.107	1,027.06
DCV+ASV (at F0)	16,224.250	14.566	1,113.84
DCV+ASV (at acute)	14,486.975	14.573	994.11
PR (at F3)	16,876.220	13.771	1,225.49
PR (at F0)	22,101.584	14.116	1,565.71
PR (at acute)	19,734.794	14.148	1,394.87

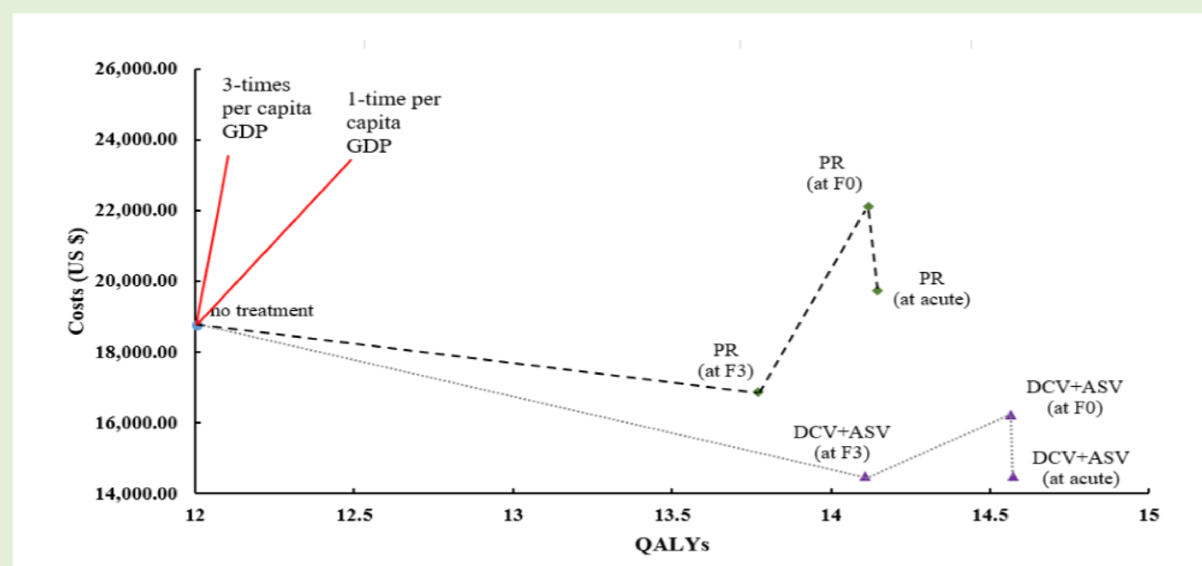

Fig. 2. Cost-effectiveness map of strategies.

- ***One-way Sensitivity Analysis***

➢ Treating patients had lower costs and more QALYs across all parameters' ranges. With the reduction of reinfection rate, early treatment was more cost-effective.

➢ The ICER of treatment at acute phase compared with at chronic stage was most sensitive to the reinfection rate after clearing virus.

➢ The ICERs of DCV+ASV compared with PR initiating treatment at the same stage were most sensitive to the SVR of PR, the weekly costs of PR and the weekly costs of DCV+ASV, and not sensitive to the reinfection rate after clearing virus.

- ***Probabilistic Sensitivity Analysis***

➢ At a threshold of 1-time per capita GDP, treatment at acute using DCV+ASV was most cost-effective compared to the other strategies, with a high probability of 99.0%. This probability raised to 100% at a threshold of 3-times per capita GDP. (Fig. 3)

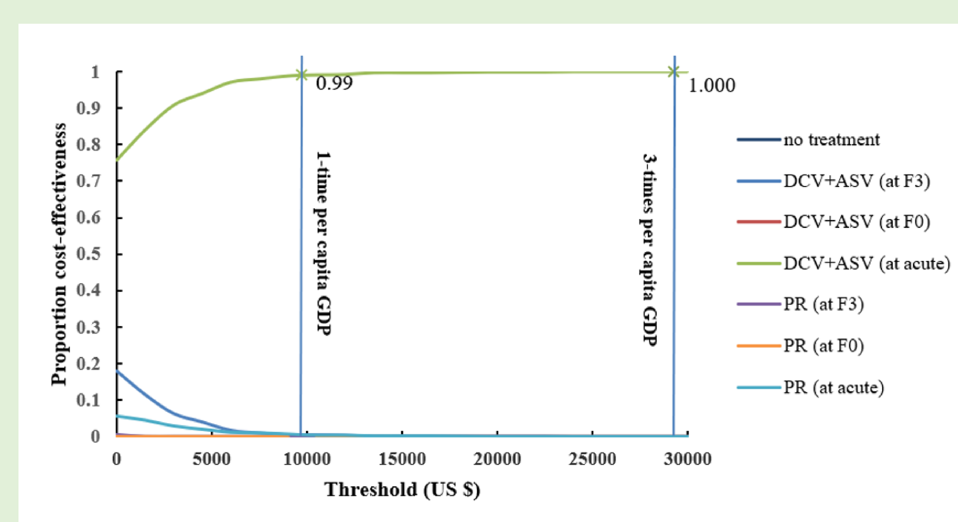

Fig. 3. Cost-effectiveness acceptability curves for seven strategies.

Conclusions

➢ Treating acute HCV was cost-saving and more effective.;

➢ When patients had been chronic infected, early treatment with DCV+ASV regimen was more cost-effective.

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