



ORIGINAL RESEARCH PAPER

Medicine

SYSTEMATIC REVIEW OF HEPATITIS C VIRUS (HCV)

KEY WORDS: Hepatitis C, cirrhosis, RNA virus, Viral genotypes, Liver disease.

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ABSTRACT

The annual incidence of acute hepatitis C virus (HCV) has fallen in recent years, primarily because of effective blood screening efforts and increased education on the dangers of needle sharing. However, hepatitis C infection is still relatively frequent in certain populations. Most patients infected with HCV are unaware of their exposure and remain asymptomatic during the initial stages of the infection, making early diagnosis during the acute phase (first 6 months after infection) unlikely. While some of those infections will have a spontaneous resolution, the majority will progress to chronic HCV. We scanned the literature for predictors of spontaneous resolution and treatment during the acute stage of HCV to identify factors that would assist in treatment decision making.

INTRODUCTION

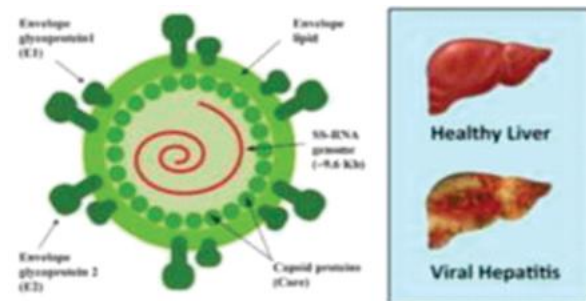
Hepatitis C is a blood-borne viral infection caused by the Hepatitis C virus (HCV), primarily affecting the liver. It often remains asymptomatic for years and may progress to chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC) if untreated. Hepatitis C is a viral infection of the liver caused by the Hepatitis C virus (HCV). It is a major global public-health problem because it often becomes chronic and can lead to liver cirrhosis, liver failure, and hepatocellular carcinoma. Many infected individuals remain asymptomatic for years, which delays diagnosis and treatment. Systematic reviews on hepatitis C (HCV) consistently highlight that chronic infection, affecting ~1% of the global population, is a major cause of cirrhosis and hepatocellular carcinoma, often requiring improved screening and access to highly effective direct-acting antiviral (DAA) therapies. Recent studies emphasize that DAAs offer >95% sustained virologic response (SVR) and reduce mortality, but high-risk groups (e.g., people who inject drugs) require targeted interventions to improve outcomes and reduce transmission.

Etiology and Virology

HCV is an enveloped, single-stranded RNA virus belonging to the Flaviviridae family.

There are multiple genotypes (1–6), with genotype 1 being the most common worldwide. The genetic variability of HCV contributes to chronic infection and immune evasion.

Global prevalence: ~58–70 million chronic cases worldwide
High-burden countries: Egypt, Pakistan, India,



China
Common risk groups:
People who inject drugs
Unsafe blood transfusion recipients Hemodialysis patients
Healthcare-related exposure
To estimate the global burden of HCV
To evaluate transmission patterns and risk factors
To assess effectiveness of antiviral therapies

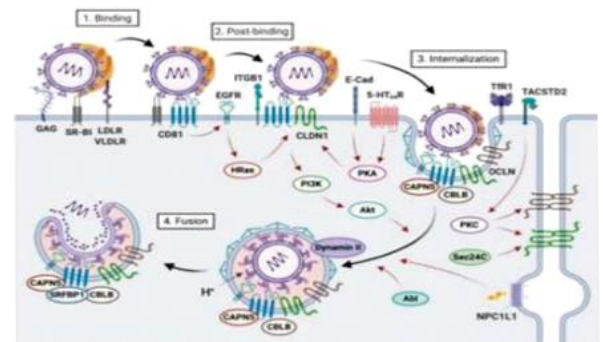
To analyze clinical outcomes after treatment

4. Pathogenesis

After entering the bloodstream, HCV infects hepatocytes. The immune response causes liver inflammation. In many cases, the virus persists, leading to chronic hepatitis, progressive fibrosis, and eventually cirrhosis.

5. Methodology (PRISMA-based)

Databases searched: PubMed, Scopus, Web of Science, Cochrane Library
Study types: Systematic reviews, meta-analyses, randomized controlled trials
Inclusion criteria: Human studies, confirmed HCV infection, treatment outcomes
Exclusion criteria: Non-English articles, case reports, editorials
Outcome measures: Sustained virologic response (SVR), mortality, liver complications



Schematic representation of the cell-free hepatitis C virus (HCV) entry pathway. This cartoon summarizes the host factors and sequence of events leading from initial viral attachment

6. Transmission

Blood-to-blood contact (major route)
Unsafe injections and unsterilized medical equipment
Transfusion of unscreened blood
Vertical transmission (low but possible)
Sexual transmission (rare)

7. Natural History of Infection

Acute HCV: Often asymptomatic; spontaneous clearance in ~15–30%
Chronic HCV: Develops in ~70–85%
Long-term complications:
• Liver fibrosis

- Cirrhosis
- Hepatocellular carcinoma
- Liver failure

8. Genotypes

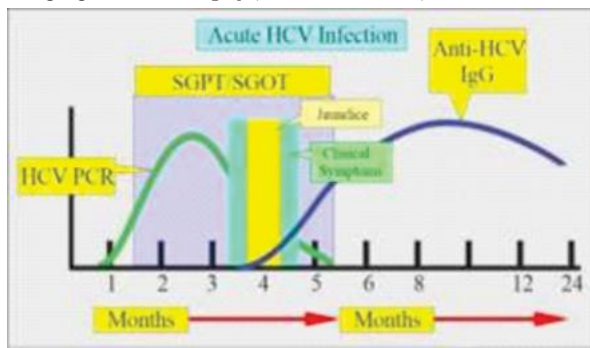
- 6 major genotypes (GT 1–6)
- Genotype 1 most common globally
 - Genotype influences treatment choice and duration

9. Clinical Features

Acute infection: Often asymptomatic or mild (fatigue, nausea, jaundice)
 Chronic infection: Long-term fatigue, liver enlargement, abnormal liver enzymes
 Advanced disease: Ascites, variceal bleeding, hepatic encephalopathy, liver cancer

10. Diagnosis

Diagnosis involves:
 Anti-HCV antibody test (screening)
 HCV RNA test (confirmation of active infection)
 Liver function tests (ALT, AST)
 Imaging and liver biopsy (in selected cases)



Hepatitis C virus (HCV) acute infection

11. Treatment Outcomes (Key Systematic Review Findings)

Direct-Acting Antivirals (DAAs) Cure rate (SVR): >90–95%
 Short treatment duration (8–12 weeks)
 Fewer side effects compared to interferon therapy
 Common DAAs

- Sofosbuvir
- Ledipasvir
- Daclatasvir
- Velpatasvir

Modern treatment uses Direct-Acting Antivirals (DAAs), which: Are taken orally Have cure rates above 95%
 Are effective across most genotypes
 Common drug classes include NS5A inhibitors, protease inhibitors, and polymerase inhibitors.

12. Benefits of Achieving SVR

Reduced risk of:
 Cirrhosis
 Hepatocellular carcinoma
 Liver-related mortality
 Improved quality of life
 Reduced viral transmission
 Barriers Identified in Systematic Reviews
 Low awareness and screening
 High cost and limited access in low-income settings
 Stigma among high-risk populations
 Poor linkage to care

13. Prevention

Screening of blood and blood products
 Safe injection practices
 Use of sterile medical equipment
 Public awareness and early screening

No vaccine is currently available for Hepatitis C.

14. CONCLUSION

Systematic reviews consistently show that Hepatitis C is a major global health problem, but it is now curable in most cases due to DAAs. Early diagnosis, equitable access to treatment, and strong public health interventions are essential to achieve elimination goals. Hepatitis C is a curable disease with early diagnosis and proper treatment. Advances in antiviral therapy have transformed patient outcomes. Strengthening prevention, screening, and access to treatment is essential to eliminate HCV as a public health threat. Hepatitis C is a global, blood-borne, systemic viral infection affecting an estimated 57-71 million people, causing significant liver inflammation, cirrhosis, and cancer. Since its discovery in 1989, treatment has evolved from ineffective injections to highly effective (>95% cure rate) 8-12 week direct-acting antiviral (DAA) oral therapies.

15. One-Line Exam Conclusion

Systematic reviews confirm that Hepatitis C is a curable chronic viral infection, and widespread use of direct-acting antivirals can significantly reduce liver-related morbidity and mortality worldwide.

16. Public Health Implications

WHO target: Eliminate HCV as a public health threat by 2030
 Strategies:
 Universal screening
 Affordable generic DAAs
 Integrated community-based care
 Harm-reduction programs

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