Treatment of Acute HCV Infection

Background

Epidemiology of Acute HCV

In the United States, during the 1980s, an estimated average of 230,000 new hepatitis C virus (HCV) infections occurred each year.[1] After 1989, however, the annual estimated number of acute (new) HCV infections steadily declined until 2005, followed by a leveling off between 2006 through 2010, and then a steady increase from 2010 through 2018 (Figure 1).[2,3] The Centers for Disease Control and Prevention (CDC) data shows an increase of approximately 4-fold in the estimated annual number of acute (new) HCV infections in the United States from 2010 through 2018, with a peak of 50,300 new infections in 2018 (Figure 2).[3,4] Among different age groups, persons 20 to 29 and 30 to 39 had the highest number (Figure 3) and rate (Figure 4) of reported acute new HCV infections in 2018.[3] The current opioid epidemic in the United States is the predominant force driving the increase in new HCV infections, particularly in young adults.[5,6] In addition, an increase in acute HCV infections has been recognized among men who have sex with men, particularly men living with HIV infection who engage in condomless anal sex and use methamphetamine associated with sex.[7]

Definition of Acute HCV Infection

Most experts define acute HCV infection as the 6-month time period following acquisition of HCV.[8,9,10] The definition of acute HCV infection does not depend on the presence or absence of symptoms associated with the acute HCV infection because most infections are subclinical. The preferred accepted laboratory diagnosis of acute HCV infection includes documentation of either of the two following criteria:

- A positive (detectable) HCV RNA in conjunction with a negative HCV antibody, or
- Positive HCV antibody with documentation of a negative HCV antibody in the past 12 months

Factors Associated with Recent HCV Acquisition

All persons with confirmed cases of acute HCV should be interviewed to identify any risk factors for acquiring HCV infection during the 2 weeks to 6 months prior to illness onset. Knowledge of risk factors is important from an epidemiology perspective and can help identify individuals who may be at high risk of transmitting HCV to others. Assessment of ongoing HCV transmission risk may need to be considered in the decision to treat HCV in the acute infection setting.

Differentiating Acute HCV infection from HCV Reinfection

Reinfection with HCV after achieving a sustained virologic response (SVR) is uncommon, but it can occur,
especially for persons who continue or resume activities that place them at risk for acquiring HCV.[11,12] Individuals with HCV infection who achieve an SVR will have a permanently positive HCV antibody test. Therefore, for persons with HCV who achieve an SVR (at 12 weeks or later after completing HCV treatment), a diagnosis of HCV reinfection is based on the new presence of HCV RNA.[13] It is important to distinguish reinfection from relapse following an undetectable HCV RNA at the end-of-treatment; when relapse occurs, it almost always occurs within the first 12 weeks after completing therapy. Therefore, if an individual has an SVR at 12 weeks or later after completing treatment and subsequently has detectable HCV RNA, a diagnosis of HCV reinfection should be suspected. In this situation, an HCV genotype should be ordered and compared to genotype of HCV in the initial HCV infection. The finding of distinct genotypes confirms reinfection. Note, however, that persons can become reinfected with the same genotype and thus finding the same HCV genotype does not rule out reinfection. Viral sequence analysis can differentiate HCV infections that are the same genotype, but this test is not routinely performed for clinical purposes.[13]
Spontaneous Clearance of HCV Following Acute Infection

Following acquisition of hepatitis C, an estimated 25 to 35% of persons will have spontaneous clearance of HCV 12 months after HCV acquisition.\textsuperscript{[14,15,16]} Studies have shown that if spontaneous clearance occurs, most do so within 12 months of acquiring HCV (Figure 5); failure to clear HCV by 12 months is a strong predictor of developing chronic HCV infection.\textsuperscript{[14,17]} Investigators have identified several factors that predict a higher likelihood of spontaneous clearance: host IL28B CC genotype, female sex, and infection with HCV genotype 1.\textsuperscript{[14,18,19]} In contrast, lower rates of spontaneous clearance occur in males, Black persons, and those with HIV coinfection.\textsuperscript{[14,20,21]}
Comprehensive Clinical Care during Workup for Acute HCV

Additional Laboratory Evaluation

During the initial evaluation for possible acute HCV infection, all persons should also have the following tests performed:

- Testing for HIV infection, (even if previously negative)
- Testing for acute hepatitis B virus (HBV) infection (HBsAg, anti-HBc IgM, anti-HBc IgG), unless previously documented to have a positive and sufficient hepatitis B surface antibody titer (greater than 10 or 12 IU/L by most assays)
- Comprehensive testing for sexually transmitted diseases if their risk factor for acute HCV was sexual activity

Consideration for HIV Preexposure Prophylaxis

Regardless of whether a patient suspected of acute HCV infection does or does not have HCV, they should be evaluated and considered for HIV preexposure prophylaxis (PrEP), since persons engaging in activities that place them at risk for acquiring acute HCV will also have risk for acquiring HIV infection.
Acute HCV Treatment Data

Overall, treatment of acute HCV infection has been shown to result in high sustained virologic response (SVR) rates, even prior to the modern era of treatment with direct-acting antiviral (DAA) medications. Studies of peginterferon alpha-2b monotherapy in intent-to-treat analyses showed SVR rates of 71 to 96%.\[^{22,23}\] A meta-analysis of 22 studies (n = 1,075) using either standard interferon or peginterferon monotherapy reported an overall SVR rate of 78%.\[^{22}\]\[^{22}\] The SVR rates observed with interferon-based therapy of acute HCV are significantly higher than SVR rates observed with interferon- or peginterferon-based treatment of chronic HCV. With interferon-based therapy, the highest SVR rates in the acute infection setting have occurred in persons who received treatment within 12 weeks following acute HCV diagnosis.\[^{23,24}\] Highly successful outcomes were seen even in typically more challenging populations, including in persons who inject drugs and persons with HIV. The following summarizes limited data on the newer DAA regimens in clinical trials that are underway or completed for the treatment of acute HCV infection.

Elbasvir-Grazoprevir

- **Elbasvir-Grazoprevir (DAHHS-2 II):** In the Dutch Acute HCV in HIV study number 2 (DAHHS2), a single-arm phase 3b, open-label trial, investigators evaluated the efficacy of an 8-week course of elbasvir-grazoprevir in 80 adults living with HIV who develop acute HCV genotype 1 or 4 infection.\[^{25}\] At post-treatment week 12, 99% (79 of 80) had achieved an SVR12.\[^{25}\]

- **Elbasvir-Grazoprevir (SAHIV):** In this phase 2, open-label trial, French investigators have evaluated the efficacy of an 8-week course of elbasvir-grazoprevir in 30 adults living with HIV who develop acute HCV genotype 1 or 4 infection (NCT02886624).

Glecaprevir-Pibrentasvir

- **Glecaprevir-Pibrentasvir (Australian Study):** In this open-label, single-arm, multicenter, international pilot study, adults with recent HCV (duration of HCV infection less than 12 months) received glecaprevir-pibrentasvir for 6 weeks.\[^{26}\] Most (90%) were men who had sex with men and (83%) had HCV genotype 1 infection.\[^{26}\] The SVR12 rates were 90% (27/30) in the intention-to-treat and 96% (27 of 28) in the per-protocol populations.\[^{26}\]

- **Glecaprevir-Pibrentasvir (PURGE-C):** The aim of this phase 3, open-label single-arm trial is to assess the efficacy of a fixed dose combination of glecaprevir-pibrentasvir given for 4 weeks in participants with acute HCV, with or without HIV-1 coinfection (NCT04042740). Estimated completion of this study is 2023.

Glecaprevir-Pibrentasvir (TARGET-3D Part II): In this phase 3, open-label study, investigators plan to enroll 30 adults with recent HCV infection (acquired within 12 months) to receive treatment with a 6-week course of glecaprevir-pibrentasvir (NCT02634008). Estimated completion of this study is 2025.

- **Glecaprevir-Pibrentasvir (TARGET-3D Part III):** In this phase 3, open-label trial, investigators plan to enroll 30 adults with recent HCV infection (acquired within 12 months) to receive treatment with a 4-week course of glecaprevir-pibrentasvir (NCT02634008). Estimated completion of this study is 2025.

Ledipasvir-Sofosbuvir

- **Ledipasvir-Sofosbuvir (HepNet Acute HCV IV):** This prospective, single-arm study enrolled 20 individuals in Germany with acute HCV genotype 1 mono-infection.\[^{27}\] All subjects enrolled received ledipasvir-sofosbuvir for 6 weeks and 20 of 20 (100%) achieved an SVR12 (Figure 6).\[^{27}\] At baseline, 15 of 20 (75%) subjects had HCV RNA levels less than 100,000 IU/mL and only 2 had HCV RNA levels greater than 1 million IU/mL.\[^{27}\]
• **Ledipasvir-Sofosbuvir**: In this open-label, single arm study, 26 men living with HIV in Germany or England who were diagnosed with acute HCV genotype 1 or 4 infection were treated with a 6-week course of ledipasvir-sofosbuvir.[28] Overall, 20 of 26 (77%) study participants achieved an SVR12 (Figure 7).[28]

**Sofosbuvir-Velpatasvir**

• **Sofosbuvir-Velpatasvir (REACT)**: In this phase 3, randomized, international study, investigators plan to enroll 250 adults who inject drugs who are diagnosed with recent HCV infection to receive treatment with sofosbuvir-velpatasvir for either 6 or 12 weeks (NCT02625909).
AASLD-IDSA Guidance for Management of Acute HCV

The American Association for the Study of Liver Diseases and Infectious Diseases Society of America (AASLD-IDSA) Hepatitis C Guidance has recently updated the approach to treating individuals with acute HCV infection.[10] The following summary highlights key recommendations from the AASLD-IDSA HCV Guidance on managing persons with acute HCV infection.[10]

- **Treatment Approach to Persons with Acute HCV**: Persons diagnosed with acute HCV should promptly start HCV treatment. The initiation of treatment should not be delayed while determining whether spontaneous clearance of HCV has occurred. The rationale for this approach is twofold: (1) immediate treatment can have an impact on reducing HCV to others, and (2) delaying treatment may result in lost follow-up for some persons.

- **Treatment Regimens for Persons with Acute or Recent HCV**: The recommended HCV treatment regimens and duration of therapy are the same for persons with acute HCV as for those with chronic HCV.

- **Counseling**: Persons diagnosed with acute HCV should receive counseling on how to reduce their risk of transmitting HCV to others and how to minimize exposure to any hepatotoxic agent, such as alcohol or acetaminophen.

- **Referral to Addiction Medicine**: Persons with acute HCV who have ongoing injection drug use should have a referral to an addiction medicine specialist.

- **Approach to Persons with Spontaneous HCV Clearance**: Approximately 25 to 35% of persons with acute HCV who do not undergo treatment will spontaneously clear HCV. Individuals who spontaneously clear HCV do not require treatment of HCV.
Summary Points

- The number of estimated acute HCV infections has markedly increased since 2010, with the highest number of cases involving persons 20 to 39 years of age.
- Approximately 25 to 35% of persons will spontaneously clear HCV in the first year after infection.
- Individuals undergoing workup for acute HCV infection should also be evaluated for acute or new HBV and HIV infection; if their risk for acquiring HCV was through sexual contact, the evaluation should also include comprehensive testing for sexually transmitted infections.
- Persons with ongoing activities that place them at risk for acquiring HCV infection also are at risk of acquiring HIV infection and thus should be carefully considered for HIV PrEP.
- The AASLD-IDSA HCV Guidance recommends that individuals diagnosed with acute HCV should promptly receive HCV treatment. The HCV treatment regimens and duration of therapy are the same for persons with acute and chronic HCV.
- Persons diagnosed with acute HCV should receive counseling on how to reduce their risk of transmitting HCV to others and how to minimize exposure to any hepatotoxic agent, such as alcohol or acetaminophen.
- Persons with acute HCV who have ongoing injection drug use should have a referral to an addiction medicine specialist.
Citations


10. AASLD-IDSA. Recommendations for testing, management, and treating hepatitis C. Unique populations: management of acute HCV infection. [AASLD-IDSA Hepatitis C Guidance] -


References


Martinello M, Bhagani S, Gane E, et al. Shortened therapy of eight weeks with paritaprevir/ritonavir/ombitasvir and dasabuvir is highly effective in people with recent HCV genotype 1 infection. J Viral Hepat. 2018;25:1180-8.


Figures

Figure 1 Estimated Number of Acute HCV Infections in United States, 1982-2018

Figure 2 Estimated Number of Acute HCV Infections in United States, 2010-2018

Figure 3 Reported Number of Acute HCV Infections in United States, by Age Group, 2018

Figure 4 Reported Rate of Acute HCV Infections in United States, by Age Group, 2018

Figure 5 Spontaneous HCV Clearance in First 24 Months after Initial HCV Infection

These estimates for HCV clearance are based on a systematic review and meta-analysis of 43 studies.

All participants in the study achieved an SVR12. At week 4 of treatment, the 6 participants who had detectable HCV RNA had very low levels (less than 15 IU/mL).

Abbreviations: EOT = end of treatment; SVR = sustained virologic response.

Figure 7 Ledipasvir-Sofosbuvir for 6 Weeks in Adults with Acute HCV and Chronic HIV Infection

**Figure 8 Interferon alfa-2b for 24 Weeks in Adults with Acute HCV Infection**

In this study, 44 adults with acute HCV infection received 5 million IU interferon alpha-2b given subcutaneously daily for 4 weeks, followed by 3 times per week for 20 weeks. The graph shows the cumulative incidence of undetectable (lower limit 600 copies/mL) serum HCV levels during treatment and in follow-up. Hepatitis C virus levels were measured by reverse transcriptase polymerase chain reaction (RT-PCR). The mean baseline HCV RNA level was 420,000 copies/mL. Sixty-one percent of the patients had genotype 1A. The mean time from infection to the start of therapy was 89 days.

Figure 9 Peginterferon alfa-2b for 12 Weeks in Adults with Acute HCV

In this study, investigators treated adults with acute HCV infection with 1.5 mcg/kg of peginterferon alpha-2b given subcutaneously once weekly for 8 weeks. The treatment was initiated at either week 8, 12, or 20 after initial HCV infection. This graph shows SVR 12 rates. Individuals who had spontaneous clearance after randomization, but before initiation of treatment, are not included in this graph.