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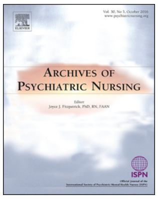

Interprofessional team-based approach to patients with chronic hepatitis C and personality disorder: Three case studies

Donald Gardenier[a,*], Angie Woody[b], Catherine Amory[c], Jeffrey J. Weiss[d]

[a] *Eisenhower Health, United States of America*
[b] *New York Harm Reduction Educators, United States of America*
[c] *Mount Sinai Health System, United States of America*
[d] *Icahn School of Medicine at Mount Sinai, United States of America*

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ABSTRACT

Hepatitis C virus is a blood borne pathogen that infects 130 million people worldwide. After a prolonged period of slowly progressive liver injury, those infected are at risk of advancing to end stage liver disease, with its associated complications, and hepatocellular carcinoma. Rates of past and/or current substance use and behavioral comorbidities are higher among those infected with hepatitis C compared to the general population. A number of patient, provider and system barriers to care and treatment have led to low rates of treatment initiation in this population despite pharmacologic advances that have made hepatitis C a curable disease. Innovation in care delivery is considered a key strategy that will help reach more patients. We present three case studies of patients with chronic hepatitis C and multiple psychiatric comorbidities who were successfully engaged in care and treated for their chronic hepatitis C in our multidisciplinary primary care-based program.

Background

The global prevalence of chronic hepatitis C is estimated to be 2.2% (130 million individuals) making it the most common blood borne pathogen worldwide. Since its discovery in 1989, the importance of chronic hepatitis C as a major cause of liver-related morbidity and mortality has been widely recognized and described. Chronic hepatitis C infection is thought to be the etiology for an estimated 25% of hepatocellular carcinoma and 27% of cirrhosis worldwide (Alter, 2007). While there is regional variation in rates, hepatitis C is of importance to all countries and regions of the world and requires dedication of resources to better characterize the pandemic and propose strategies for intervening (Lavanchy, 2011). In the United States, where an estimated 3.2 million individuals are infected, chronic hepatitis C is the leading indication for liver transplantation (World Health Organization, 2018).

Acute hepatitis C is rare, so many infected individuals are not aware of their infection and therefore often do not seek care. Chronic disease, which develops in approximately 80% of those who have been infected with the virus, is most often characterized by a prolonged period of slowly progressive disease during which individuals are either asymptomatic or experience nonspecific symptoms (Centers for Disease Control and Prevention, 2018). A majority of individuals with chronic hepatitis C are expected to progress to cirrhosis and subsequently decompensate, developing hepatocellular carcinoma and the complications of end stage liver disease at significant rates. Extra-hepatic manifestations of chronic hepatitis C have also been recognized and can occur during the chronic disease phase (Polo & Laufer, 2017). As a result of its natural history, especially the lack of specific clinical manifestations, as well as inadequate approaches to screening, it is estimated that up to 75% of individuals with chronic hepatitis C in the United States are unaware of their diagnosis (Centers for Disease Control and Prevention, 2018).

Official prevalence estimates of hepatitis C in the United States are considered by experts to be undercounts. The methodology used by the National Health and Nutrition Examination Survey sampled only civilian, domiciled individuals who were not institutionalized at the time of the survey. One analysis conservatively estimated that over 142,000 homeless and 372,000 incarcerated people were excluded by the methodology as were 6805 people on active military duty. Another model estimated between 300,000 and 1.8 million infected individuals were excluded, including 120,000 individuals living on Indian reservations (Chak, Talal, Sherman, Schiff, & Saab, 2011) (Edlin, Eckhardt, Shu, Holmberg, & Swan, 2015).

Prevalence data and ongoing findings with regard to hepatitis C natural history suggest a disparate impact and disease burden among people with behavioral health comorbidity. In a study of individuals

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[*] Corresponding author.
E-mail address: dgardenier@gmail.com (D. Gardenier).

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with chronic hepatitis C, the prevalence of depressive symptoms ranged from 21% to 58.6% and the prevalence of depressive disorder ranged from 5.7% to 45% (Cruz Neves, Dickens, & Xavier, 2006). A meta-analysis looking at 13 studies determined the prevalence of hepatitis C to be 17.4% among individuals with serious mental illness, compared to 1.6% in the general population (Hughes, Bassi, Gilbody, Bland, & Martin, 2016) (Centers for Disease Control and Prevention, 2018). Hepatitis C prevalence among individuals who inject drugs is even higher, estimated in one analysis to be between 70 and 77% (Nelson et al., 2011). Incidence of hepatitis C in the United States, which for years had been declining, has been increasing since 2011, propelled by the ongoing opioid epidemic (Zibbell et al., 2018). In a review article, hepatitis C viral activity in the central nervous system has been shown to cause cognitive dysfunction, fatigue and depression. Previously, these symptoms were thought to be associated with liver disease severity. More recent findings suggest that the cognitive features of chronic hepatitis C occur as the result of direct viral activity including replication in brain cells and neuroinflammation (Fletcher & McKeating, 2012).

Previous treatments for chronic hepatitis C included the drugs interferon and ribavirin, both of which caused serious adverse events including neuropsychiatric symptoms such as fatigue, depression/irritability, anxiety, and mood lability. Interferon and ribavirin were also characterized by poor efficacy and low rates of treatment initiation. The interaction of interferon (injected once weekly) and ribavirin (taken by mouth twice daily) with other psychoactive medications prescribed for patients' underlying behavioral health comorbidities further decreased rates of treatment initiation in this subpopulation. The pre-treatment liver biopsy that was standard of care for most patients at the time, a disinclination to self-inject medication, and poor availability of treatment also contributed to poor treatment initiation rates. (Cabre Serres, Rudi Sola, Pontes Garcia, et al., 2013).

A complex interplay of circumstances surrounding chronic hepatitis C and its treatment include behavioral health comorbidity, poor tolerability and efficacy of previously available treatments, stigma, systemic barriers to care, and compartmentalized approaches to patient care. Given this complexity, progress in the treatment of chronic hepatitis C has been slow. Newer treatments, available since 2011, are substantially more efficacious with few to no side effects reported by patients. New barriers have emerged, however, with high cost primary among these. Initial treatment guidelines promulgated by the American Association for the Study of Liver Diseases and the Infectious Disease Society of America advocated the treatment of individuals with more advanced fibrosis and complications first, and were employed by payers as grounds for excluding patients with earlier stage disease from treatment (American Association for the Study of Liver Disease, 2018).

Complicated approval requirements implemented by most payers also require that patients and providers follow a series of steps, including the provision of baseline clinical information and verification of their stage of liver disease. Approval is often denied and one or more appeals may be required. The majority of individuals with chronic hepatitis C and behavioral health comorbidity are not able to negotiate this process and most providers do not have adequate staffing resources to navigate this process on their patients' behalf. In addition to advanced liver disease, clinical preconditions, such as demonstrating abstinence from substance and alcohol use, despite evidence demonstrating treatment efficacy in these subpopulations, are also employed as reasons to deny treatment (Dore, Altice, Litwin, et al., 2016) (Sublette, Smith, George, McCaffrey, & Douglas, 2015) (Vu, Toribio, Riazi, et al., 2018).

Despite advances in the science and treatment of chronic hepatitis C, significant challenges remain, including management of the complicated comorbidities and socioeconomic factors that occur with increased frequency in the population. Interferon, with its low efficacy and substantial side effect burden is no longer indicated, but many individuals with chronic hepatitis C continue to require additional support and individualization of care plans to successfully adhere to and complete treatment.

Methods

Our treatment program began as a response to the high prevalence of chronic hepatitis C and low rates of engagement in care and treatment initiation in our patient population (McGinn, O'Connor-Moore, Alfandre, Gardenier, & Wisnivesky, 2008). To address this need, we implemented an inter-professional, team-based program to evaluate and treat chronic hepatitis C in our primary care practice. In the collaborative program we designed, the patients' multiple needs were assessed and addressed by the team as part of an individualized treatment plan specific to that patient. The overall goal was to retain patients in the primary care practice by establishing patient-provider relationships, earning trust, offering support, and eventually treating their chronic hepatitis C as well as their comorbidities as part of their primary care. The program grew over time, accommodating a number of changes in our approach to evaluation and treatment of chronic hepatitis C (Vu et al., 2018) (Gardenier, Neushotz, & O'Connor-Moore, 2007).

Our team utilized three theoretical frameworks to design and provide care to our patients: The holding environment, adaptation as defined by Roy, and the “hateful patient” nomenclature as described by Groves.

The holding environment is one in which the patient, once she or he has entered, is first made to feel safe so that therapeutic progress can then be made. The term, coined by Donald Winnicott, refers to a safe space akin to that created by a parent for a child. Within the environment, the child feels sufficient safety so that they may grow and learn (Winnicott, 1965). Individuals with personality disorder, many of whom have a history of emotional trauma, often experience crises. These crises lead to disruptions in their relationships and further chaos, thus complicating progress toward a holding environment (Lord, 2007). In many cases, including each of the three cases we present here, patients with behavioral health issues have experienced a scarcity of such relationships. We sought to establish relationships with our patients and create a holding environment so that they would engage with caregivers to the extent necessary to complete their courses of treatment. The pre-treatment evaluation for chronic hepatitis C can be useful in facilitating the creation of a holding environment since several visits are generally required before treatment may begin. We would be careful to work through the pre-treatment evaluation in steps and focus on getting to a level of mutual comfort and trust so that by the time treatment had begun we could support our patients through treatment completion.

From the adaptation model as defined by Roy we utilized the concept of the adaptation level, a constantly moving point influenced by a variety of stimuli and to which the individual reacts with an adaptive response. Given the relationship stress common in our patient population, we expected to be confronted with variable adaptation levels depending on the stimuli the patients were experiencing (Roy, 1970). Adaptation in our model became bi-directional. The patient, reacting to past and/or current stimuli, would adapt. The treatment team would adapt in turn, causing adaptation by the patient and so on, creating a loop in which almost any aspect of the patient's care could be scrutinized and evaluated for its potential to be adapted to the presenting needs. By utilizing this approach, we found ourselves considering some choices that would, under usual static frameworks (such as treatment protocols) not have been considered as options. In our framework, we considered all options as needed and adapted our clinical approach and care plan based on an individual patient's needs at any point in the patients' care. Our overarching goal was to facilitate successful completion of the patients' treatment for hepatitis C.

Individuals with personality disorder are often considered difficult to work with (Lord, 2007) and our experience has been no different. In order to further contextualize and guide our care for these three individuals with personality disorder, the treatment team reviewed Groves's analysis including his four classifications (Groves, 1978). Although dated, his article was written specifically for the medical setting and was a fit for our team. Based on his work, we assigned each of the three patients below one of the four classifications using Groves's nomenclature. The classifications were not used in any interactions with patients. Rather, given the lability of the patients' behavior patterns and caregiver feelings that patient interactions can give rise to, we found that knowing and understanding the stereotypes as Groves clarifies them, as well as keeping them in mind as we interacted with patients and coordinated their care as a team, was a useful exercise. Although these classifications contain the possibility of stigmatizing or overly pathologizing patients, our team found them to be helpful in maintaining a positive focus on patient care. It allowed us recognition of the hardships involved for all parties when disruptions in affect regulation and attachment are present. Together with peer support and frequent care plan review, the Groves classifications proved to be a useful way for the team to debrief and avoid personalizing patient interactions, to assess and adapt quickly to our patients' changing emotional needs, to strategize new treatment approaches, and to remain focused on treatment goals.

Three case studies

We selected three patients treated in our outpatient, primary care-based practice focused on treating chronic hepatitis C. All patients had comorbid personality disorder and had been treated previously for hepatitis C. Each had experienced a recurrence or non-response to the prior treatment. Each of these patients required substantial individualization of their care plans in order to accommodate their specific needs. Following are narrative descriptions of each patient case (patient characteristics are summarized in Table 1).

Patient #1: Female, age 52 when she entered our program. Her psychiatric history included borderline personality disorder, post-traumatic stress disorder, bipolar disorder, and trypanophobia (fear of needles). She was also very difficult to draw blood from which likely contributed to her fears. She had a prior history of injection drug use. We were unable to determine a likely duration of her chronic hepatitis C infection but she was presumed based on her workup to have compensated cirrhosis. She declined our recommendation to wait for what at the time were anticipated new treatments; the early data for which suggested that they would be safer for her to take. This meant that she would have to be treated with interferon and ribavirin in combination, the standard-of-care at that time. She also said that she would refuse a transfusion as a treatment for anemia. Anemia was a nearly universal side effect of interferon/ribavirin-based treatment. Anemia was almost always worse in individuals with cirrhosis and, without the option of transfusion as a treatment, we would need to manage her more conservatively. Thus we began treatment with an increased likelihood of anemia and, given that she could not be transfused, an increased risk that her treatment would need to discontinued prior to completion.

She had been treated elsewhere 12 years prior with pegylated interferon alfa and ribavirin; that treatment was stopped for side effects that she was not able to detail for us. She was treated a second time in our program two years prior with pegylated interferon alfa, ribavirin, and telaprevir. She became severely anemic that time, and because she refused to consider transfusion (and also eventually refused blood draws for monitoring) treatment was stopped at week 12 over her objection for safety reasons. She then became angry and refused for some time to follow up in our program.

Groves's classification: "Entitled Demander"

We eventually re-engaged with her through outreach and we were able to resume her care with a different medical provider at her request. The program social worker and her primary patient navigator remained with her which, along with the program's team management approach, provided continuity of care. We confirmed that she remained chronically infected. She then began a 12-week course of pegylated interferon alfa, ribavirin, and sofosbuvir. At treatment week 11, she developed cutaneous sarcoid and treatment was stopped. She again became angry and declined to follow up with her medical provider but consented to return on condition of being switched to another provider. Significantly, she continued to be responsive to our social worker and patient navigator and these relationships maintained her in care. The sarcoid resolved after treatment discontinuation and she achieved a sustained viral response despite her shortened treatment course. She

Table 1
Case study patient characteristics.

Patient	1	2	3
Age (years)	52	30	56
Gender	Female	Male	Female
HCV risk	IDU[1]	IDU[1]	IDU[1]
Time since infection	Unclear	9 years	37 years
Cirrhosis?	Yes	No	Yes
Med comorbidity?	Yes	No	Yes
Psychiatric diagnoses	Borderline personality disorder; Bipolar disorder	Narcissistic personality disorder; Bipolar disorder; ADHD[2]	Borderline personality disorder; Depression/anxiety; PTSD[3]
Prev HCV treatment (Peg/riba)?	Yes	Yes	Yes
Outcome of prior treatment	Stopped for side effects	Stopped for opioid relapse/side effects	Stopped for side effects (suicidality)
Retreatment regimen	Peg[4]/SOF[5]/riba[6]	Peg[4]/riba[6]	SMV[7]/SOF[5]
Goal duration	12 weeks	48 weeks	12 weeks
Complication?	Sarcoid@TW[8]11, treatment stopped	Hemolytic anemia, continued treatment	Admitted for psychosis, continued treatment
Completion?	No	Yes	Yes
Post treatment status	SVR[9]-20/cure	SVR[9]-21/cure	SVR[9]-12/cure

[1] Injection drug use.
[2] Attention deficit hyperactivity disorder.
[3] Post-traumatic stress disorder.
[4] Pegylated interferon alfa.
[5] Sofosbuvir.
[6] Ribavirin.
[7] Simeprevir.
[8] Treatment week.
[9] Sustained viral response.

continued with her follow up care and became active with our monthly peer support group and cure club for program alumni.

Patient #2: Male, age 30 when he entered our program. His psychiatric history included bipolar disorder, borderline personality disorder, narcissistic personality disorder, and attention-deficit/hyperactivity disorder. He also had a history of heroin use that was in partial remission. He had no medical co-morbidities and showed no signs of progressive liver disease. From his initial engagement in our program, he required a flexible visit schedule and limited contact with uninvolved people, such as other people in the waiting room and clinic staff that were not directly involved in his care. We developed approaches to these issues that allowed us to maintain sufficient contact to get him through his initial work up and he began a course of pegylated interferon alfa, ribavirin, and telaprevir. He reported intractable vomiting and severe constitutional side effects starting almost immediately after his first dose of telaprevir, so he self-discontinued it, but he continued the pegylated interferon alfa and ribavirin alone, which he tolerated without difficulty. He then asked for boceprevir. He continued on pegylated interferon and ribavirin while we obtained prior authorization for boceprevir which was added to his regimen at treatment week six. He presented one week late for follow up at treatment week 9, having had a precipitous 30-pound weight loss (compared to his pre-treatment baseline weight) and his treatment was stopped for safety reasons. We determined later that he had resumed heroin use at some point during that interval. He was then lost to follow up for five months.

Groves' classification: "Self-Destructive Denier"

After some outreach, he returned to the treatment program. He had in the interim been admitted to a residential treatment program for his drug use and was doing much better. He wanted to resume treatment while he had the additional support of the residential program but refused both telaprevir and boceprevir based on his previous adverse events with those drugs. Clinical trials on the next generation of medications had been completed and were under review but were not yet available. The usual recommendation in a case such as this would have been to wait until the new medications became available. Given his early stage liver disease, there was little likelihood that such a delay would make a difference in the long-term progression of his liver disease. Instead, he asked to begin taking pegylated interferon alfa and ribavirin alone for 48 weeks, an approach that was no longer standard of care. In addition to the additional support of the residential program that he was in, his rationale was that he had tolerated pegylated interferon and ribavirin alone in his previous round of treatment without a problem. He felt strongly that this approach would minimize his chances of another on-treatment relapse.

Upon reviewing his proposed plan of care, the team concurred that he had adequately demonstrated that he understood his options, that he would be receiving what amounted to an outdated treatment with a higher likelihood of on-treatment side effects and lower likelihood of efficacy compared to waiting for the anticipated next generation of treatment. Conversely, given that he was young and had early stage liver disease without medical co-morbidity, his chances of developing constitutional side effects were lower and his likelihood of efficacy, though not as good as it would be if he deferred until the new treatments were available, were still high for the treatment that he was choosing. His points were otherwise well taken and showed insight into his particular situation. From a liver disease point of view, the argument to move forward was weak. When considering all of his medical and behavioral health issues, age, previous treatment experience, stage of liver disease, and current living situation, his argument was much more compelling. We agreed to move forward based on his plan. He completed the 48-week treatment course with ongoing support from our team and we were able to confirm a sustained viral response before he was again lost to follow up.

Patient #3: Female, age 56 when she entered our program. Her psychiatric history included depression, post-traumatic stress disorder, fetal alcohol syndrome, and borderline personality disorder with psychotic features. She also had a prior history of injection drug use. She had a long history of frequent hospital admissions for suicidal ideation and psychotic episodes, and frequent changes in her medication regimens. At the time of her initial evaluation she had been recently discharged from a psychiatric day treatment program. Upon discharge, she was assigned a case manager with whom she had daily contact that we coordinated closely with. She also had a number of medical conditions including meningioma, seizures, peripheral vascular disease, and chronic pain. She was presumed to have been infected with chronic hepatitis C for 37 years prior to initiating treatment. She was without clinical signs of cirrhosis.

Chronic hepatitis C had been diagnosed by the program's nurse practitioner to whom she had been referred for primary care. She discontinued care with him once but then returned to his care sometime later. Five years after the initial referral, after completing her pretreatment evaluation, she initiated treatment with pegylated interferon alfa and ribavirin for an intended 48-week course. On treatment day five she presented to the emergency department and was admitted for suicidality. Treatment was immediately stopped. While still admitted, she requested to resume treatment, citing concern about the health of her liver which, under our treatment protocol and interferon prescribing guidelines, would have been contraindicated. On consultation with her inpatient team, we offered to re-initiate treatment while she remained in the hospital under observation. She declined the longer hospital stay and so was discharged home. She remained in the care of the program and was monitored during what became a nine-year interval before alternate therapy was available. Her liver disease progressed to compensated cirrhosis during that period.

Groves's stereotype: "Dependent Clinger"

The first interferon-free regimen became available as an off-label treatment in 2014. Sofosbuvir and simeprevir had both been approved by the Food and Drug Administration for use with interferon and ribavirin. Clinical trials for their co-administration without interferon or ribavirin had been completed and reported data confirmed their efficacy and safety. The regimen had already been approved for use in other countries, but was still under review and awaiting approval in the United States. As an individual with cirrhosis and an absolute contraindication to interferon, our patient met criteria for off-label use. With our team's advocacy, we were able to obtain prior authorization from her insurer for the treatment. Because she had remained engaged with our program in the interim, a detailed plan to support her through the expected 12-week course of treatment had already been devised. She had a history of frequent contact throughout her time with us. Given her need for contact and support and her prior traumatic treatment experience, our plan included weekly clinic visits. Notwithstanding, she called frequently between visits and also required occasional additional visits. We allowed her as many calls and visits as she felt she needed.

Approximately midway through her treatment she reported active psychotic symptoms (hearing voices) for some time. She had been reluctant to report them to us because she worried that she would have to stop treatment as she had previously. After consulting with our social worker, the team agreed that she needed to be evaluated for admission to a psychiatric unit for safety. Among topics covered were that the previous time, one of the medications she was taking had a known high risk for suicidal ideation, which was what she reported when she presented to the emergency room. In this case, she was reporting psychotic symptoms (not suicidality) and this was not a known side effect of her current medications and so we anticipated that there would not be a need to stop her treatment this time. She was also half way through a twelve week course this time, versus several days into a 48-week course. We promised to work with the inpatient staff to ensure optimal continuity.

While she verbalized understanding that the circumstances were different this time, she remained apprehensive that treatment would again be withheld. The program nurse practitioner assumed responsibility for coordinating with the inpatient staff. She was admitted for observation and her treatment was not interrupted. Program staff maintained contact with her during her admission and participated in her discharge planning. On discharge she resumed her outpatient visits, completed her treatment and post-treatment courses with a sustained viral response, and became a regular attendee of our patient support group.

Discussion

At the time our program was founded in 2001, chronic hepatitis C treatment had recently advanced to a combination of pegylated interferon-alfa (injected subcutaneously once weekly) and oral ribavirin (multiple pills taken twice daily) a day over a period of either 24 or 48 weeks. Treatment often did not result in cure, and significant side effects from both of these agents required close follow up, often with concurrent treatment and monitoring. Active ongoing support was needed to maintain patients on treatment. Because some of the side effects were neuro-psychiatric in nature, patients with concurrent psychiatric diagnoses, particularly depression, were often denied treatment in standard-of-care practices which were usually based in specialty care models. The presumption was that depression could be exacerbated by the treatment medications. Given that many people with chronic hepatitis C were thought at the time to be at low risk of progressing to end stage liver disease and treatment efficacy was poor, clinical benefit was uncertain, and so the risk of exacerbating a depression was thought to outweigh benefits in those with underlying mental illness (Clark, Thompson, Patel, Muir, & Volk, 2014).

In the intervening years, the medications and their side effects, as well as our understanding of the epidemiology and disease progression of hepatitis C have all changed. Current treatments are shorter, usually successful, include no injected medications, have lower pill burdens, fewer drug-drug interactions, and few if any side effects. Patients' constitutional symptoms, which previously worsened during treatment, now often improve shortly after starting. These advancements have coalesced to improve the prospects for all individuals with chronic hepatitis C and in particular those with comorbid mental illness. Higher awareness of the problem of chronic hepatitis C has led to increased interest in treatment. An increase in patients seeking treatment has in turn necessitated an increase in capacity. Expert panels, having determined that the elimination of hepatitis C as a public health problem is feasible, have called for the system and policy level changes that will be required to reach that goal (National Viral Hepatitis Roundtable, 2017) (Department of Health and Human Services, 2018).

In order to increase the number of individuals treated for hepatitis C a number of changes need to take place. First, to identify the 50%–75% of individuals who have not yet been diagnosed, we need screen more effectively and link those who are infected to care (Centers for Disease Control and Prevention, 2018). In addition, given the number of individuals with chronic hepatitis C who have limited or no access to care, or whose comorbidities make them less likely to engage with the health care system, broader innovation in approaches to care is also needed. While innovations to date have varied according to specific patient and system factors, studies have revealed successful approaches in models that have been developed to date (Bruggmann & Litwin, 2013).

Even though interferon is no longer used, unique challenges remain for individuals with hepatitis C and concomitant personality disorder, including access to care, engagement in care, and then access to medications. Once in care and on treatment, adherence support is critical. Establishing relationships with health care providers can trigger dependency issues for individuals with personality disorder, leading to nonadherence and possible treatment failure. Other challenges to successful treatment include symptom exacerbation, relapsing substance use, poor social support, logistical difficulties, homelessness or housing instability, and care continuity. For example, a patient might successfully initiate treatment but the second month's supply of medications is sent via delivery to the patient's home address of record but no one is there to receive it, or the patient no longer resides there, so the package is returned to the pharmacy, resulting in an interruption in treatment. A patient might also have an exacerbation in psychotic symptoms requiring a hospital admission. If the hospital staff is not aware that the patient is also undergoing hepatitis C treatment and the treatment team is not aware of the admission, there could be an interruption. Treatment interruptions place patients at risk for relapse and potentially for developing resistant viral strains which could in turn complicate future treatment attempts. We learned in these treatment scenarios to consider all manner of potential obstacles, not just clinical problems, and to communicate as liberally as needed with our patients.

The unique needs of individuals with chronic hepatitis C and concomitant personality disorder have been successfully addressed in coordinated care programs that have the capacity to address patients' multiple care needs concurrently. In previous treatment scenarios significant clinical focus needed to be directed toward managing side effects. Current treatments still require the evaluation and optimization of patients' concomitant medical and behavioral health issues via a coordinated care plan to be carried out while the patient is preparing for and undergoing treatment, as well as during the post-treatment phase. Successful models have been multidisciplinary with care based on patient-specific care plans. Flexibility and orientation toward a primary goal of completing hepatitis C treatment are also key elements (Bruggmann & Litwin, 2013).

Limitations

A number of factors limit the ability to conduct a study to support team-based care for this specific population, including individual differences in diagnoses and patient characteristics, various hepatitis C treatment regimens, and differing availability of resources. Nevertheless, there are lessons to be learned from the treatment experiences of patients with chronic hepatitis C and personality disorder, both in the ongoing effort to identify and treat individuals with chronic hepatitis C, as well as generalization of lessons learned to other patient populations that pose a challenge to engage in medical care because of personality disorder.

We selected these three cases from our patient population of individuals with chronic hepatitis C and complicated psychiatric comorbidity who were successfully treated in our program. We believe these cases demonstrate how the right combination of resources and care planning can engage patients in care and lead them to successful completion of treatment. There may also be strategies employed in these cases that could be applicable to other disease states and/or patient care scenarios where there are similar barriers to care.

Interferon is no longer indicated for the treatment of chronic hepatitis C. Because it played a role in each of these cases, we nevertheless felt the scenarios were of value as exemplars. Each of these patients had undergone more than one course of treatment. We felt this spoke to our efforts to engage and retain the patients in care and to establish trust. One of our patients opted to remain in care with us even as she became cirrhotic while awaiting an interferon free regimen. One opted to begin treatment with interferon despite our advice to the contrary. And one, for reasons that had more to do with his comorbidities than his liver disease, requested interferon-based treatment - even though it was not recommended for him - over delaying treatment. We felt in each of our cases, interferon was incidental to the care planning and co-management of the patients and, in generalizing these exemplars to other patient management scenarios, might even be considered an analog to another variable. Moreover, eliminating interferon from treatment regimens has not obviated the need for support and care planning when working with individuals with chronic hepatitis C and personality disorder. Notwithstanding, we recognize the limitation from a medical perspective of including detail on a medication that is no longer indicated.

As has been noted in the literature on innovation of care models, the need to customize approaches based on patients' specific needs makes testing models on a larger scale difficult. Our experience concurs. The time it would take to study larger numbers of patients is time we may not have, given the age range of a majority of people with hepatitis C and the degree to which their liver injury is expected to advance in the coming years. Likewise the more recently seen increase in acute hepatitis C mirroring the increase in injected opioid use suggests care innovation will continue to be needed (Zibbell et al., 2018). We therefore feel that, while our results are not widely generalizable, these cases have value as exemplars of successful approaches that could benefit other patients who confront similar barriers to the care they require.

Conclusion

Hepatitis C remains a major public health problem in the United States, with increasing morbidity and mortality expected over the coming years as a majority of the affected population ages. High rates of substance use and behavioral health comorbidity are among the barriers to care in the population. Innovation in care models to simultaneously address comorbidities in the population has been cited as an approach to the ongoing problem of linking patients to care. We presented three patient case studies where a dedicated care model allowed for individualized, integrated, and dynamic care of patients with hepatitis C and personality disorder. All three were successfully cured of their hepatitis C. Aspects of our approach that we believe to have been key factors include an inter-professional team approach, ongoing evaluation and accommodation of patient needs, and utilization of theoretical models allowing for patient and team member support.

References

Alter, M. J. (2007, May 7). Epidemiology of hepatitis C infection. *World Journal of Gastroenterology, 13*(17), 2436–2441.

American Association for the Study of Liver Disease (2018, March 23). HCV guidance: Recommendations for testing, managing, and treating hepatitis C. Retrieved from https://www.hcvguidelines.org/.

Bruggmann, P., & Litwin, A. (2013). Models of care for the management of hepatitis C virus among people who inject drugs: One size does not fit all. *Clinical Infectious Diseases, 57*, S56–S61. https://doi.org/10.1093/cid/cit271.

Cabre Serres, M., Rudi Sola, N., Pontes Garcia, C., et al. (2013). Abordaje Multidisciplinar Como Modelo de Deteccion y Seguimiento de la Morbilidad Psiquiatrica en Pacientes en Tratamiento con Interferon y Ribavirina. *Farmacia Hospitaliaria, 38*(3), 162–168.

Centers for Disease Control and Prevention (2018, October 1). Viral hepatitis C. Retrieved from www.cdc.gov.

Chak, E., Talal, A., Sherman, K. E., Schiff, E. R., & Saab, S. (2011). Hepatitis C virus infection in the USA: An estimate of true prevalence. *Liver International,* 1090–1101. https://doi.org/10.1111/j.1478-3231.2011.02494.x.

Clark, P. J., Thompson, A. J., Patel, K., Muir, A. J., & Volk, M. L. (2014). Trends in hepatitis C treatment uptake in the United States. *Hepatology, 60*(2), 768–769.

Cruz Neves, A., Dickens, C., & Xavier, M. (2006). Comorbidity between hepatitis C and depression: Epidemiological and etiopathogenic aspects. *Acta Médica Portuguesa, 19*, 21–28.

Department of Health and Human Services (2018, Oct 1). Responding to the threat of viral hepatitis in the United States. Retrieved September 15, 2018, from www.hhs.gov.

Dore, G., Altice, F., Litwin, A., et al. (2016, November 1). Elbasvir-Grazoprevir to treat hepatitis C infection in persons receiving opioid agonist therapy. *Annals of Internal Medicine, 165*(9), 625–636. https://doi.org/10.7326/M16-0816.

Edlin, B., Eckhardt, B., Shu, M., Holmberg, S., & Swan, T. (2015, November). Toward a more accurate estimate of the prevalence of hepatitis C in the United States. *Hepatology,* 1353–1363. https://doi.org/10.1002/hep.27978.

Fletcher, N., & McKeating, J. (2012). Hepatitis C virus and the brain. *Journal of Viral Hepatitis, 19*, 301–306. https://doi.org/10.1111/j.1365-2893.2012.01591.x.

Gardenier, D., Neushotz, L., & O'Connor-Moore, N. (2007, April). Medical/psychiatric comanagement by nurse practitioners in chronic hepatitis C treatment: A case study. *Archives of Psychiatric Nursing, 21*(2), 87–90. https://doi.org/10.1016/j.apnu.2006.11.003.

Groves, J. E. (1978, April 20). Taking care of the hateful patient. *The New England Journal of Medicine, 298*(16), 883–887.

Hughes, E., Bassi, S., Gilbody, S., Bland, M., & Martin, F. (2016, January). Prevalence of HIV, hepatitis B, and hepatitis C in people with severe mental illness: A systematic review and meta-analysis. *The Lancet Psychiatry, 3*, 40–48. Retrieved from www.thelancet.com.

Lavanchy, D. (2011). Evolving epidemiology of hepatitis C virus. *Clinical Microbiology and Infection,* 107–155.

Lord, S. A. (2007). Systemic work with clients with a diagnosis of borderline personality disorder. *Journal of Family Therapy, 29*, 203–221.

McGinn, T., O'Connor-Moore, N., Alfandre, D., Gardenier, D., & Wisnivesky, J. (2008, Oct 13). Validation of a hepatitis C screening tool in primary care. *Archives of Internal Medicine, 168*(18), 2009–2013.

National Viral Hepatitis Roundtable (2017). Elimination of hepatitis B and C: A national strategy. Retrieved from www.nvhr.org.

Nelson, P., Mathers, B., Cowie, B., Hagan, H., DesJarlais, D., Horyniak, D., & Degenhardt, L. (2011, August 13). The epidemiology of viral hepatitis among people who inject drugs: Results of global systematic reviews. *Lancet, 378*(9791), 571–583. https://doi.org/10.1016/S0140-6736(11)61097-0.

Polo, M., & Laufer, N. (2017, August). Extrahepatic manifestations of HCV: The role of direct acting antivirals. *Expert Review of Anti-Infective Therapy, 15*(8), 737–746. https://doi.org/10.1080/14787210.2017.1354697.

Roy, C. (1970, March). Adptation: A conceptual frameowrk in nursing. *Nursing Outlook, 18*, 42–45.

Sublette, V. A., Smith, S. K., George, J., McCaffrey, K., & Douglas, M. W. (2015). The hepatitis C treatment experience: Patients' perceptions of the facilitators of and barriers to uptake, adherence and completion. *Psychology & Health,* 987–1004.

Vu, T., Toribio, W., Riazi, F., et al. (2018, April). Increasing access to hepatitis C virus medications: A program model using patient navigators and specialty pharmacy to obtain prior authorization approval. *Journal of Managed Care and Specialty Pharmacy, 24*(4), 329–333.

Winnicott, D. W. (1965). *The maturational processes and the facilitating environment.* New York: International Universities Press.

World Health Organization (2018, October 1). Hepatitis C. Retrieved from www.who.int.

Zibbell, J. E., Asher, A. K., Patel, R., Kupronis, B., Iqbal, K. W., & Holtzman, D. (2018, February). Increases in acute hepatitis C virus infection related to a growing opioid epidemic and associated injection drug use, United States, 2004–2014. *American Journal of Public Health, 108*(2), 175–181. https://doi.org/10.2015/AJPH.2017.304132.