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Research paper

Injecting risk behaviours following treatment for hepatitis C virus infection among people who inject drugs: The Australian Trial in Acute Hepatitis C

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ABSTRACT

Background: A barrier to hepatitis C virus (HCV) treatment among people who inject drugs (PWID) has been a concern that interferon-based HCV treatment may increase injecting risk behaviours. This study evaluated recent (past month) injecting risk behaviours during follow-up among PWID that did and did not receive HCV treatment.

Methods: The Australian Trial in Acute Hepatitis C (ATAHC) was a prospective study of natural history and treatment of recent HCV infection. Analyses were performed using generalized estimating equations.

Results: Among 124 participants with a history of injecting drug use (median age 32 years), 69% were male, and 68% were treated for HCV infection. HCV treatment was not associated with an increase in recent injecting drug use (adjusted odds ratio (aOR) 1.06, 95% CI 0.93, 1.21) or recent used needle and syringe borrowing during follow-up (aOR 0.99, 95% CI 0.89, 1.08). HCV treatment was associated with a decrease in recent ancillary injecting equipment sharing during follow-up (aOR 0.85, 95% CI 0.74, 0.99). Further, among treated participants who remained in follow-up ($n = 24$), ancillary injecting equipment sharing significantly decreased from 54% at enrolment to 17% during follow-up ($P = 0.012$).

Conclusions: HCV treatment was not associated with drug use or used needle and syringe borrowing during follow-up, but was associated with decreased ancillary injecting equipment sharing during follow-up. Programs to enhance HCV assessment and treatment among PWID should be expanded, given that HCV treatment does not lead to increases in injecting risk behaviours and has previously been demonstrated to be safe and effective among PWID.

Introduction

The prevalence of hepatitis C virus (HCV) infection is high among people who inject drugs (PWID), ranging from 64 to 94%, globally (Hajarizadeh, Grebely, & Dore, 2013; Nelson et al., 2011). HCV infection is a major cause of morbidity and mortality among PWID (Dore & Grebely, 2011; Grebely & Dore, 2014). Interferon-based HCV treatment is safe and effective among people with a

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history of injecting drug use (Dimova et al., 2013; Hellard, Sacks-Davis, & Gold, 2009) and those who actively inject drugs (Aspinall et al., 2013). International guidelines now recommend HCV treatment for PWID (European Association for the Study of the Liver, 2011; Ghany, Strader, Thomas, & Seeff, 2009; Grebely et al., 2015; Robaeys et al., 2013). However, HCV treatment uptake remains suboptimal among PWID (Alavi et al., 2014; Grebely et al., 2009; Iversen et al., 2014; Mehta et al., 2008; National Centre, 2014), due to several barriers at the levels of system, providers and patients (Grebely & Dore, 2014; Grebely, Oser, Taylor, & Dore, 2013; Grebely et al., 2010). Concerns of ongoing drug use or relapse to drug use during interferon-based antiviral therapy among practitioners have contributed to low HCV treatment uptake in this population (Grebely et al., 2013).

A recent meta-analysis among people with a history of injecting drug use has demonstrated similar rates of treatment success, compared to responses obtained in registration trials in the general population (Dimova et al., 2013). Similarly, a recent systematic review among people who reported active drug use has shown acceptable HCV treatment outcomes, high treatment adherence and low treatment discontinuation in this population (Aspinall et al., 2013). Earlier studies have shown that HCV treatment is safe among people receiving opioid substitution treatment (OST) and does not increase drug use (Mauss, Berger, Goelz, Jacob, & Schmutz, 2004; Sasadeusz et al., 2011; Van Thiel, Anantharaju, & Creech, 2003). However, recent data on drug use behaviours following initiation of HCV treatment among PWID is scarce. The availability of interferon (IFN)-free direct acting antiviral (DAA) therapies (Dore & Feld, 2015) will likely lead to an expansion of treatment among PWID. As such, a better understanding of the impact of HCV treatment on drug use and injecting behaviour is needed to inform clinical decision making in this area. This is particularly important because some clinicians often withhold therapy from PWID, given unfounded concerns that the side effects of interferon-based HCV treatment may mimic opioid withdrawal or lead to depression, thereby leading to a relapse to injecting drug use or increase injecting risk behaviours (Myles, Mugford, Zhao, Krahn, & Wang, 2011).

The Australian Trial in Acute Hepatitis C (ATAHC) was designed to investigate treatment for recent HCV infection, predominantly in those with injecting drug use-acquired infection. The aim of this study was to evaluate recent injecting risk behaviours during follow-up among people with a history of injecting drug use and recent HCV infection enrolled in the ATAHC study that did and did not receive HCV treatment.

Methods

Design, setting and participants

ATAHC was a multicentre, prospective cohort study of the natural history and treatment of recent HCV infection, as previously described (Dore et al., 2010). Study recruitment occurred from June 2004 to February 2008 through an Australian network of tertiary hospitals ($n = 13$) and general practice/primary care clinics ($n = 3$).

Inclusion criteria for the study required recent HCV infection (acute or early chronic HCV infection), defined as first positive anti-HCV antibody within 6 months of enrolment and either acute clinical hepatitis C infection or asymptomatic hepatitis C infection with seroconversion (Dore et al., 2010). Heavy alcohol intake and active drug use were not exclusion criteria. Participants with a history of injecting drug use formed the study population for this specific analysis.

All participants with detectable HCV RNA were assessed for HCV treatment eligibility and subsequent HCV-related care and treatment provided at the site of study recruitment. From enrolment, participants were followed for up to 12 weeks to allow for spontaneous HCV clearance and if HCV RNA remained detectable were offered treatment (Dore et al., 2010). All treated and untreated participants had study visits at enrolment and every 12 weeks for up to 144 weeks (unless lost to follow-up).

All study participants provided written informed consent. The study protocol was approved by St. Vincent's Hospital, Sydney Human Research Ethics Committee as well as through local ethics committees at all study sites. The study was registered with clinicaltrials.gov registry (NCT00192569).

HCV treatment

Participants who began HCV treatment received PEG-IFN -α2a 180 μg weekly for 24 weeks. Due to non-response at week 12 in the initial two participants with HCV/HIV co-infection, the study protocol was amended to provide PEG-IFN and ribavirin combination therapy for 24 weeks in HIV positive individuals. Ribavirin was prescribed at a dose of 1000–1200 mg for those with genotype 1 infection and 800 mg in those with genotype 2/3.

Study measurements

Behavioural surveys were administered to all participants at enrolment and every 12 weeks during the first year and every 24 weeks during second and third years. The behavioural survey included sections on demographics (age, sex, ethnicity, education, main source of income and accommodation), history of opioid substitution treatment (including methadone and buprenorphine), injecting drug use, and injecting drug use behaviours. At enrolment, injecting drug use history was collected for lifetime, previous six months and the previous month (recent). Recent (previous month) associated risk behaviours including use of a new sterile needle/syringe for all injections, needle/syringe borrowing and lending, and ancillary injecting equipment sharing (including mixing container, filter and water) were also collected. Follow-up information on injecting drug use and associated risk behaviours in the previous month were used for subsequent longitudinal analyses. Social functioning was measured using the shortened Social Functioning Scale of the Opiate Treatment Index (OTI) (Lawrinson et al., 2003; Darke, Hall, Wodak, Heather, & Ward, 1992).

Study outcomes

The primary aim of this analysis from the ATAHC study was to evaluate the impact of HCV treatment on recent (past month) injecting risk behaviour outcomes, measured longitudinally. The injecting risk behaviour outcomes included: (1) injecting drug use; (2) used needle and syringe borrowing; and (3) ancillary injecting equipment sharing. The study population for this aim included all participants with a history of injecting drug use at enrolment. Injecting risk behaviour outcomes from all study visits during follow-up (i.e. all visits after enrolment) were included for analysis.

Given that some participants were lost to follow-up, a secondary aim of this analysis was to evaluate changes in recent injecting risk behaviours among treated and untreated participants with recent injecting drug use at study enrolment who remained in follow-up (indicative of maintained engagement in the study). The injecting risk behaviour outcomes for this aim included: (1) used needle and syringe borrowing; and (2) ancillary injecting equipment sharing. The study population for this analysis included all participants with injecting drug use in the previous month at enrolment and remained in follow-up $\geq$24 weeks following study enrolment (i.e. for treated individuals, this included end of treatment and/or $\geq$24 week follow-up visits).