HEPATITIS C

Behavioural predictors of subsequent hepatitis C diagnosis in a UK clinic sample of HIV positive men who have sex with men

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Objective: To explore the associations between self reported high risk sexual behaviours and subsequent diagnosis with hepatitis C virus (HCV) infection.
Methods: The Sex, Health and Anti-Retrovirals Project (SHARP) was a cross sectional study of sexual behaviour in HIV positive, men who have sex with men (MSM) attending a London outpatient clinic. From July 1999 to August 2000 participants completed a computer assisted self interview questionnaire (CASI) on recent sexual behaviour, recreational drug use, and detailed reporting of the last two sexual episodes involving different partners. Results were combined with routine clinic data and subsequent testing for HCV up to 21 April 2005. A new HCV diagnosis was defined as anti-HCV antibody seroconversion or positive HCV RNA following a previous negative. Incident rate ratios (IRR) were calculated using Poisson regression in Stata (version 9). Men contributed time at risk from interview until either their diagnosis or their last negative test result.
Results: Of the 422 men who completed questionnaires, 308 (73%) had sufficient clinical and HCV testing data available for analysis. Incident HCV infection was identified in 11 men. Unprotected anal intercourse, more than 30 sex partners in the past year, higher numbers of new anal sex partners, rimming (oro-anal sex), fisting, use of sex toys, and intranasal recreational drug use were associated with HCV. In multivariate analysis only fisting remained associated with HCV (adjusted IRR 6.27, $p = 0.005$).
Conclusions: In this study of HIV positive MSM, fisting is strongly associated with HCV infection. Where individuals report high risk sexual behaviours, clinicians should offer appropriate testing for HCV infection.

Most hepatitis C virus (HCV) infection in the United Kingdom is associated with parenteral exposure. Sexual transmission occurs but with low efficiency, consistent with reports of a low prevalence among sexual health clinic attenders.[1] Increases in diagnoses of acute HCV infection have been reported among HIV infected men who have sex with men (MSM) attending HIV treatment centres in Europe.[2–4] Most cases are asymptomatic, diagnosed during investigation of abnormal liver function during routine HIV care. Routes for sexual transmission of HCV and factors influencing transmission remain uncertain. Using data from a survey of HIV positive MSM, we examined self reported sexual behaviours and subsequent HCV infection.[5]

METHODS

SHARP (Sex, Health and Anti-Retrovirals Project) was a cross sectional study of sexual behaviour in HIV positive MSM attending a London HIV outpatient clinic. Men attending routinely were eligible, and between July 1999 and August 2000, 422 completed a computer assisted self interview (CASI) questionnaire providing data on recent sexual behaviour, recreational drug use, and detailed reporting of the last two sexual episodes involving different partners. We combined questionnaire results and clinic data on disease stage, treatment, CD4 and HIV viral load at interview, with subsequent testing for HCV infection, up until 21 April 2005.

A new HCV diagnosis was defined as either seroconversion from negative to positive HCV antibody or negative to positive HCV RNA. The first positive HCV test was required to be after completing the SHARP interview. The last negative was either after, or in the 6 months before the SHARP interview.

Incident rate ratios (IRR) were calculated using Poisson regression in Stata (version 9). Men contributed time at risk from interview until either their diagnosis or their last negative test result.

Ethical approval for the SHARP study was given by the Camden and Islington local research ethics committee. Enduring consent for subsequent analysis of anonymised questionnaire and clinical data was obtained at enrolment.

RESULTS

Questionnaire and clinical data were available for 349 men, with adequate HCV testing data to include 308 in this analysis. A new HCV infection was identified in 11 men; of these, 10 had the last negative test after the SHARP interview and one 5 months earlier. The median (range) time from interview to HCV diagnosis was 50 (0.5–61) months. Negative HCV test results post-interview were available for 297 men with a median (range) time from interview to last negative test result of 50 (5–67) months. The total follow up time for this analysis was 1190 person years.

Factors associated with a higher risk of HCV diagnosis were unprotected anal intercourse (UAI), having more than 30 sex partners in the past year, higher numbers of new anal sex partners in the past month, and in relation to the last two sexual episodes, rimming (oro-anal sex), fisting, use of sex

Abbreviations: CASI, computer assisted self interview; HCV, hepatitis C virus; IRR, incident rate ratios; MSM, men who have sex with men; SHARP, Sex, Health and Anti-Retrovirals Project; UAI, unprotected anal intercourse

toys, and intranasal recreational drug use (table 1). Risk of HCV diagnosis was most strongly associated with reporting fisting (IRR 9.39, $p \leqslant 0.001$). Furthermore, only fisting remained associated with risk of HCV diagnosis after controlling for numbers of new anal sex partners and more than 30 partners in the past year (Adjusted IRR 6.27, $p = 0.005$). Of the six men who reported fisting with a subsequent HCV diagnosis, all reported at least one other rectal sex practice and three reported unprotected anal intercourse as part of the same sexual episode. There was no association between HCV diagnosis and the use of public sex venues for example, saunas, sex clubs, or cruising grounds. Injecting drug use in the past 5 years was reported in 25 (8.1%) men with no significant difference between men who subsequently became HCV positive and those who did not (table 1).

DISCUSSION

These results suggest an association between HCV infection and a number of sexual practices with increased risk of rectal trauma, although only fisting remained significant after adjusting for number of anal sex partners. It should be noted that the prevalence of fisting reported here relates to only two sexual episodes with different partners.

The possibility of bias in selection of patients for HCV testing, and testing frequency, in the sample cannot be excluded. However, all men in our analysis had had at least one HCV test and most were tested as part of routine care rather than as a result of reported sexual behaviours or abnormal liver function. For most men who became HCV positive, infection occurred over 4 years after interview. This reflects the pattern over time of acute HCV incidence in HIV positive MSM men in the United Kingdom, which has climbed sharply from low levels.[3] We acknowledge the possibility that the sexual behaviour and drug use patterns of men in our analysis may have changed during this time period and reporting of highly stigmatised behaviours may incur social desirability bias; however, the likely effect is probably to dilute rather than magnify any associations found. Cohort studies of incident HCV infection are needed to improve understanding of risk of HCV infection in relation to sexual practices.

Table 1 Sociodemographic, health, and behavioural factors in HIV positive men with a new hepatitis C diagnosis versus hepatitis C negative HIV positive men

Risk factor		New HCV diagnosis (n = 11) (%)	HCV negative (n = 297) (%)	IRR (95% CI)	p Value
Sociodemographic and health factors					
Age	Median (range)	34 (24–44)	38 (21–64)	0.93* (0.85 to 1.01)	0.087
Ethnicity	White	10 (90.9)	271 (91.6)	1 –	0.989
	Other	1 (9.1)	25 (8.5)	1.01 (0.13 to 7.93)	
Employment status	Employed	6 (54.6)	146 (49.3)	1 –	0.782
	Unemployed	3 (27.3)	55 (18.6)	1.28 (0.32 to 5.10)	
	Medically retired	1 (9.1)	64 (21.6)	0.40 (0.05 to 3.31)	
	Other	1 (9.1)	31 (10.5)	0.76 (0.09 to 6.33)	
Education >O level	Yes	8 (72.7)	226 (76.1)	1 –	
	No	3 (27.3)	71 (23.9)	1.22 (0.32 to 4.58)	0.772
Clinical HIV stage at interview	Asymptomatic	6 (54.6)	113 (38.1)	1 –	0.465
	Symptomatic	2 (18.2)	104 (35.0)	0.37 (0.07 to 1.81)	
	AIDS	3 (27.3)	80 (26.9)	0.71 (0.18 to 2.85)	
Year first HIV diagnosis	Median (range)	1995 (1987–1999)	1994 (1983–2000)	1.06* (0.92 to 1.22)	0.444
ART at interview	Yes	6 (54.6)	218 (73.9)	0.43 (0.13 to 1.40)	0.160
	No	5 (45.5)	77 (26.1)	1 –	
HIV viral load at interview (log_{10})	Median (range)	2.35 (1.69–5.70)	2.30 (1.69–5.70)	1.15* (0.69 to 1.92)	0.583
CD4 count at interview	Median (range)	420 (110–1130)	360 (30–1070)	1.00* (0.998 to 1.005)	0.369
Any STI in past year	Yes	6 (55.6)	92 (31.1)	2.65 (0.81 to 8.68)	0.111
	No	5 (45.5)	204 (68.9)	1 –	
Recent risk behaviours					
Sex in past year	Yes	11 (100.0)	280 (94.3)	NA	NA
	No	0 (0.0)	17 (5.7)		
Number of partners in past year	>30	6 (54.6)	65 (21.9)	3.95 (1.21 to 12.95)	0.023
	⩽30	5 (45.5)	232 (78.1)	1 –	
New partners in past year	Median (range)	5 (0–40)	1 (0–50)	1.05* (1.01 to 1.10)	0.015
New anal sex partners in past year	Median (range)	2 (0–40)	0 (0–18)	1.10* (1.05 to 1.16)	<0.001
UAI with new partner in past year	Yes	8 (72.7)	110 (38.5)	4.11 (1.09 to 15.50)	0.037
	No	3 (27.3)	176 (61.5)	1 –	
Injecting drug use in past 5 years	Yes	1 (9.1)	24 (8.1)	1.24 (0.16 to 9.66)	0.840
	No	10 (90.9)	272 (91.9)	1 –	
Sexual practice in last two episodes involving different partners					
Fisting†	Yes	6 (54.6)	30 (10.1)	9.39 (2.87 to 30.77)	<0.001
	No	5 (45.5)	267 (89.9)	1 –	
Rimming	Yes	9 (81.8)	137 (46.1)	4.72 (1.02 to 21.83)	0.047
	No	2 (18.2)	160 (53.9)	1 –	
Use of sex toys†	Yes	4 (36.4)	34 (11.5)	4.50 (1.32 to 15.38)	0.016
	No	7 (63.6)	263 (88.6)	1 –	
Anal fingering†	Yes	10 (90.9)	179 (60.3)	6.51 (0.83 to 50.84)	0.074
	No	1 (9.1)	118 (39.7)	1 –	
Intranasal recreational drugs use	Yes	5 (45.5)	58 (19.5)	3.42 (1.04 to 11.21)	0.042
	No	6 (54.6)	239 (80.5)	1 –	
Sex occurred in public sex venue	Yes	4 (36.4)	105 (35.4)	1.00 (0.29 to 3.43)	0.994
	No	7 (63.6)	192 (64.7)	1 –	

*IRR corresponds to an increase of 1 in the risk factor
†Insertive, receptive, or both.
ART, antiretroviral therapy.

Fisting and other high risk practices are not confined to HIV positive men, but the prevalence and incidence of HCV in HIV negative MSM is unknown. Risk factors for HCV transmission in MSM are poorly understood. Investigating HCV incidence in HIV negative MSM may shed light on the influence of HIV on the sexual transmission of HCV.

Our results show a clear association between fisting and HCV infection. However, fisting is not an isolated sexual practice, but one component of a larger sexual episode that probably includes several different sexual practices. The actual mechanism of sexual HCV transmission is unknown; however, we postulate that HCV infection may occur when mucosal disruption as a consequence of receptive fisting occurs and is followed by receptive unprotected anal intercourse either within the same sexual episode or a subsequent one.

In light of our findings we recommend enhanced surveillance for HCV in HIV positive individuals who report fisting and sexual practices with increased risk of rectal trauma. In individuals highlighting risks, timely health promotion and prevention interventions can be instigated, aiming to reduce ongoing risks of HCV infection. This study strengthens the case for selective screening for HCV infection in HIV positive MSM and raises questions with regard to screening for HCV infection in MSM of unknown HIV status. Given the reports of improved outcomes with treatment of acute HCV infection, consideration should be given to HCV RNA screening in individuals identified as being at high sexual risk, detecting acute infection before anti-HCV antibody seroconversion.[6 7]

CONTRIBUTORS

JT wrote the report, contributed to the design of this study; AR analysed and interpreted the results; JI coordinated the original SHARP study, brought together the group to undertake this study, and contributed substantively to the writing of the first draft; AC contributed to the writing of the drafts of the text, advised on the statistical analysis and its interpretation; SE, study conception to investigate HCV using the SHARP data, contributed to the design of this study and successive drafts of the text; JD contributed to the interpretation of the analysis and assisted in drafting and editing of the text; JS was the principal investigator on the original SHARP study and contributed to the editing of successive drafts of the text on behalf of the Sex, Health, and AntiRetrovirals Project (SHARP) study group.

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REFERENCES

1 **Balogun MA**, Ramsay ME, Parry JV, *et al.* A national survey of genitourinary medicine clinic attenders provides little evidence of sexual transmission of hepatitis C virus infection. *Sex Transm Infect* 2003;**79**:301–6.
2 **Götz HM**, van Doornum G, Niesters HG, *et al.* A Cluster of acute hepatitis C virus infection among men who have sex with men—results from contact tracing and public health implications. *AIDS* 2005;**19**:969–74.
3 **Browne R**, Asboe D, Gilleece Y, *et al.* Increased numbers of acute hepatitis C infections in HIV-positive homosexual men: is sexual transmission feeding the increase? *Sex Transm Infect* 2004;**80**:326–7.
4 **Gambotti L**, Batisse D, Colin-De-Verdiere N, *et al.* Acute hepatitis C infection in HIV positive men who have sex with men in Paris, France, 2001–2004. *Euro Surveill* 2005;**10**:115–17.
5 **Stephenson JM**, Imrie J, Davis MMD, *et al.* Is the use of antiretroviral therapy among homosexual men associated with increased risk of transmission of HIV infection? *Sex Transm Infect* 2003;**79**:7–10.
6 **Jaeckel E**, Cornberg M, Wedmeyer H, *et al.* German Acute Hepatitis C Therapy Group. Treatment of acute hepatitis C with interferon alfa-2b. *N Engl J Med* 2001;**345**:1452–7.
7 **Gilleece YC**, Browne RE, Asboe D, *et al.* Transmission of hepatitis C virus among HIV-positive homosexual men and response to a 24-week course of pegylated interferon and ribavirin. *J Acquir Immune Defic Syndr* 2005;**40**:41–6.