Journal of Clinical Virology 58 (2013) 385–390

Contents lists available at ScienceDirect

Journal of Clinical Virology

journal homepage: www.elsevier.com/locate/jcv

Anti-hepatitis C virus antibody detection in oral fluid: Influence of human immunodeficiency virus co-infection

Benoit Visseaux[a], Lucile Larrouy[a], Ruxandra Calin[b], Christine Katlama[b], Thierry Poynard[c], Vlad Ratziu[c], Vincent Thibault[d,*]

[a] Laboratoire de Virologie, Hôpital Bichat-Claude Bernard, Groupe Hospitalier Paris Nord Val de Seine, APHP, 46 rue Henri Huchard, 75018 Paris, France
[b] Service de Maladies-Infectieuses et Tropicales, Hôpital de la Pitié Salpêtrière, Groupe hospitalier Pitié Salpêtrière – Charles Foix, APHP, 47 boulevard Hôpital, 75013 Paris, France
[c] Service d'Hépato-Gastro-Entérologie, Hôpital de la Pitié Salpêtrière, Groupe hospitalier Pitié Salpêtrière – Charles Foix, APHP, 47 boulevard Hôpital, 75013 Paris, France
[d] Laboratoire de Virologie, Hôpital de la Pitié Salpêtrière, Groupe hospitalier Pitié Salpétrière – Charles Foix, APHP, 47 boulevard Hôpital, 75013 Paris, France

ARTICLE INFO

Article history:
Received 17 May 2013
Received in revised form 5 July 2013
Accepted 19 July 2013

Keywords:
Hepatitis C virus
Human Immunodeficiency virus
Saliva
Sensitivity
Specificity
Rapid screening test

ABSTRACT

Background: Saliva sampling may provide an easier access to hepatitis C virus (HCV) screening test. HIV infection influence on specific salivary antibody detection has not been extensively studied.
Objectives: An anti-HCV antibodies (HCV-Ab) test was adapted for saliva specimens and its performances were analysed according to the patients' HIV status and related factors such as CD4 cell counts and HIV viral load.
Methods: Four patients groups were selected: (i) HCV and HIV negative volunteers ($n = 28$); (ii) HCV positive and HIV negative patients ($n = 30$); (iii) HCV negative and HIV positive patients ($n = 30$); (iv) HCV and HIV co-infected patients ($n = 30$). Saliva samples were collected (Salivette system, Sarstedt) and an in-house adapted HCV-Ab detection assay was performed (MONOLISA anti-HCV PLUS Version 2, Biorad). HIV viral load, CD4 cells counts and HCV viremic status were reported.
Results: Sensitivity and specificity of saliva anti-HCV antibody tests in the HIV negative groups were 90% and 100%, respectively, compared to 73% and 93%, respectively in the HIV infected population. Compared to the HIV negative population, HIV mono-infected patients presented higher absorbance values ($p = 0.01$) and HIV/HCV co-infected population presented lower HCV-Ab absorbance values ($p < 0.001$). Sensitivity decline was associated with HIV replication ($p = 0.02$), HCV replication ($p = 0.16$) but not with CD4 cell counts ($p = 0.64$).
Conclusion: Performances of salivary HCV antibodies testing are strongly deteriorated in the HIV positive population, especially for patients with residual HIV replication. This serious limitation should prompt careful testing of non-invasive screening tests for hepatitis C in HIV-infected patients before use in real screening conditions.

1. Background

Worldwide, it is estimated that over 170 million people are chronically infected with hepatitis C virus (HCV) leading to as many as 50,000 deaths each year. Unfortunately, the vast majority of these infections remains undiagnosed [1].

Lack of reliable epidemiological data on HCV is one of the biggest hurdles to advancing policy, especially in risk groups who have lower access to medical care and screening tests. Epidemiological knowledge is needed to evaluate and modify HCV related recommendations. Indeed, the Centre for Diseases Control and Prevention has recently modified its previous recommendations for HCV testing and now recommends a one-time testing for persons born between 1945 and 1965 without prior ascertainment of HCV risks [2]. Screening of populations at high risk of being infected is critical and cost-effective given the silent nature of HCV infection and the current development of new highly efficacious drugs that can provide viral eradication [3]. The development of easy to perform assays may offer relevant opportunities to facilitate HCV screening, particularly in populations with limited access to healthcare facilities and sometimes damaged venous conditions. Some rapid screening assays for HCV antibody (HCV-Ab) detection have recently been developed for blood samples but only one of them is approved for saliva specimens [4]. At the time of this study, there was no test approved for HCV-Ab detection with a sampling method easily usable in non-health care facilities. In this aspect, capillary

* Corresponding author.
E-mail address: vincent.thibault@psl.aphp.fr (V. Thibault).

1386-6532/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jcv.2013.07.015

Table 1
Previous studies evaluating oral fluid use for the detection of anti-HCV antibodies.

Article	Studied population	N_{HCV-}	N_{HCV+}	Saliva collection kit	Antibodies detection method	Sensitivity	Specificity
Thieme et al. [15]	Patients from clinic (20) and laboratory workers volunteers (6)	13	13	Orasure	Abbott HCV EIA (Abbott Laboratories)	100	100
Sherman et al. [16]	Patients with (50) and without (59) chronic hepatitis C	107	109	Orasure	Abbott HCV EIA 2.0 (Abbott Laboratories)	98.2	99.1
McIntyre et al. [17]	Patients attending National Health Service dental, psychiatric, drugproblem clinics (18) or blood donors (49)	49	18	Salivette	Ortho HCV 3.0 (Ortho Diagnostics)	72.2	98.0
					Monolisa anti-HCV (Sanofi-Pasteur)	100	100
Bello et al. [7]	Patients attending centre for anonymous HIV and HCV testing, Internal Medicine, Hepatology, and Infectious Diseases departments	109	161	Salivette	Abbott HCV 3.0 EIA (Abbott Laboratories)	94.4	99.1
	131 HIV−			Salivette	Abbott HCV 3.0 EIA (Abbott Laboratories)	95,1	100
	46 HIV+			Salivette	Abbott HCV 3.0 EIA (Abbott Laboratories)	91,9	100
Elsana et al. [8]	Patients attending Liver Clinic (141) or Rheumatology Clinic (27 with systemic lupus erythematosus, 25 with rheumatoid arthritis)	120	73	Spitting	Abbott HCV EIA 2.0 (Abbott Laboratories)	90.4	100
Cameron et al. [9]	Patients attending hepatitic C clinics	52	115	Salivette	Monolisa anti-HCV (Sanofi-Pasteur)	85.2	100
Allwright et al. [7]	NA	318	216	Orasure	Ortho HCV 3.0 (Ortho Diagnostics)	87.0	100
Van Doornum et al. [10]	Patients attending Municipal Health Service in an ongoing cohort study of HIV infection among illegal drug abusers	50	102	Salivette	Ortho HCV 3.0 (Ortho Diagnostics)	77.5	98
					Monolisa anti-HCV Plus (Sanofi Diagnostics Pasteur)	79.4	98
				Omni-sal	Ortho HCV 3.0 (Ortho Diagnostics)	76.5	98
					Monolisa anti-HCV Plus (Sanofi Diagnostics Pasteur)	76.5	94
Zmuda et al. [11]	NA	31	127	Salivette	Ortho HCV 3.0 (Ortho Diagnostics)	81.1	100
					Ortho HCV 3.0 – Modified Conjugate with detection of IgG, M and A	100	100
Judd et al. [11]	Patients with chronic hepatitis C (252) and blood donors (392)	392	252	Orasure	Ortho HCV 3.0 (Ortho Diagnostics)	91.7	99.2
		391	251	Salivette	Ortho HCV 3.0 (Ortho Diagnostics)	74.1	99.0
Lucidarme et al. [13]	Intravenous drug users	63	45	Salivette	Monolisa anti-HCV plus V.2 kit (Biorad) *(manual)*	71.1	96.8
					Monolisa anti-HCV plus V.2 kit (Biorad) *(automatised)*	77.7	98.4
De Cock et al. [14]	Gastroenterology Service patient and other Hospital Services (all HCV negative)	73	73	Orasure	Ortho HCV 3.0 (Ortho Diagnostics)	89.0	100
Moorthy et al. [25]	Patients with chronic liver disease patients attending the liver clinic	93	49	Omni-sal	Hepanostika HCV Ultra (UBI Diagnostics)	81.6	92.5
Gonzales et al. [19]	Patients attending HIV clinic (11), detoxification unit (34) or blood donors (45)	45	45	OraSure	Ortho HCV 3.0 (Ortho Diagnostics)	86.7	100
Lee et al. [21]	Subjects at risk for HCV or with hepatits symptoms in Hepatology, Gastroenterology or Infectious disease departements	1426	757	OraSure	OraQuick HCV Rapid Antibody Test	98.1	99.6
Cruz et al. [20]	HIV negative patients without other concomittant liver disease	63	33	Salivette	HCV Ab, Radim Diagnostics, Pomezia (RM) ITALY	93.4	100
				Spitting	HCV Ab, Radim Diagnostics, Pomezia (RM) ITALY	90.9	95.2
Larrat et al. [24]	Patients attending Hepatology or Infectiology units	88 (17 HIV+)	113 (22 HIV+)	OraSure	Monolisa® HCV-Ag-Ab-ULTRA (Biorad)	71.7	94.3