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**HCV and Coronary Heart
Disease**

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HCV and Coronary Heart Disease

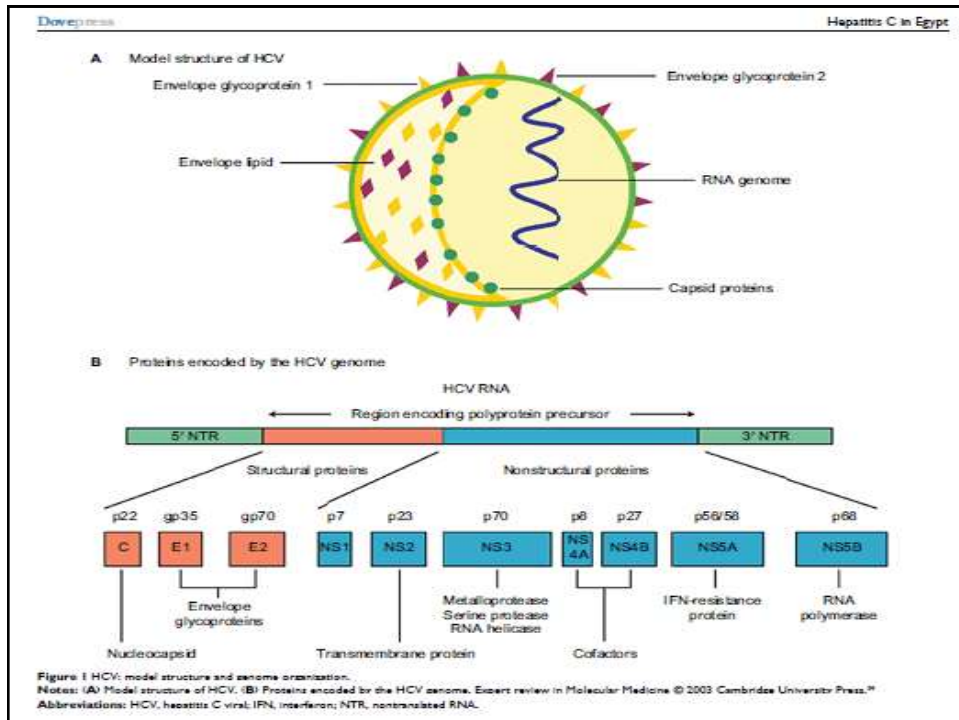
- HCV in Egypt
- Infection and atherothrombotic disease
- Chronic HCV infection and cerebrovascular disease
- Chronic HCV and CHD
- Pathophysiologic mechanisms
- Conclusion



HCV and Coronary Heart Disease

- HCV in Egypt





What is HCV?

- First known 1990
- Hepatotropic RNA virus
- 6 major genotype
- The most common HCV RNA genotype in Egypt is genotype 4
- >85% of all HCV cases in Egypt
- Mild asymptomatic acute hepatitis
- 20-30years silent period
- Hepatic cirrhosis its complications
- HCC



Extrahepatic manifestations



HCV is a major endemic medical health problem in Egypt

- 14.7% of the population are infected
- The highest prevalence in any population in the world.
- Nile Delta and Upper Egypt, infection rates can be much higher at around 26% and 28%
- HCV seroprevalence up to 40% in some areas of Egypt based on blood-bank surveys
- 170,000 new cases every year to add to the
- 11.5 million patients suffering from the disease



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REVIEW

Hepatitis C in Egypt – past, present, and future

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HCV and Coronary Heart Disease

- HCV in Egypt
- Infection and atherothrombotic disease



Infection and atherothrombotic disease

In addition to common cardiovascular risk factors: diabetes, hypertension, obesity, smoking, dyslipidemia, Several infectious agents

- a) Chlamydia pneumoniae
- b) Cytomegalovirus
- c) Human Immunodeficiency Virus



Infection and atherothrombotic disease

- HCV infection has been associated to a very large number of extrahepatic manifestations
- Some authors have hypothesized that infections could contribute to the inflammatory cascade and result in atherosclerosis
- Associations have been found between HCV infection and coronary (Vassalle C, et al. Heart 2004; 90: 565–6) and carotid (Ishizaka Y, et al Circ J 2003; 67: 26–30) atherosclerosis



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HCV infection and carotid atherosclerosis

Table 1. Main studies assessing the association between hepatitis C virus (HCV) infection and carotid atherosclerosis

References, year	Type of study	Country	HCV+ (n)	HCV- (n)	Statistics	Diagnosis method
Studies showing an association						
Ishizaka et al. (12), 2002	Cross-sectional	Japan	104	4784	OR = 2.9 95% CI: 2.3–3.6	HCV antibody
Ishizaka et al. (13), 2003	Cross-sectional	Japan	25	1967	OR = NA	HCV core protein
Tomiyawa et al. (14), 2003	Cross-sectional	Japan	87	7427	OR = NA	HCV antibody
Fukui et al. (16), 2003	Cross-sectional	Japan	31	179	OR = NA	HCV antibody
Boddi et al. (17), 2007	Cross-sectional	Italy	31	120	OR = 4.4 95% CI: 1.4–13.9	HCV antibody
Targher et al. (18), 2007	Cross-sectional	Italy	60	60	OR = 1.6 95% CI: 1.5–2.6	HCV antibody and HCV RNA
Mostafa et al. (19), 2010	Cross-sectional	Egypt	329	795	OR = 3.5 95% CI: 1.2–9.9	HCV antibody and HCV RNA
Petta et al. (28), 2012	Prospective	Italy	174	174	OR = NA	HCV genotype 1
Adinolfi et al. (25), 2012	Case-control	Italy	326	477	OR = 5.2 95% CI: 2.6–10.5	HCV RNA
Hsu et al. (29), 2015	Cross-sectional	Taiwan	7641	30564	OR = 1.43 95% CI: 1.23–1.67	ICD-9
Studies not showing an association						
Völzke et al. (30), 2004	Transversal	Germany	21	4033	OR = NA	HCV antibody
Bilora et al. (21), 2008	Case-control	Italy	40	40	OR = NA	HCV RNA
Caliskan et al. (22), 2009	Prospective*	Turkey	36	36	OR = NA	HCV antibody
Tien et al. (24), 2009	Cross-sectional**	USA	273	1502	OR = NA	HCV antibody + HCV RNA
Masia et al. (23), 2011	Cross-sectional**	Spain	63	138	OR = 0.61 95% CI: 0.55–0.65	HCV RNA

*Haemodialysis patients.

**HV patients.

ICD-9, International Classification of Diseases-9; NA, not available; OR, odds ratio; 95% CI, 95% confidence interval.

HCV infection and cerebrovascular involvement

Table 2. Main studies assessing the association between hepatitis C virus (HCV) infection and ischaemic cerebrovascular accident

References, year	Type of study	Country	HCV+ (n)	HCV- (n)	Statistics	Diagnosis method
Studies showing an association						
Lee et al. (31), 2010	Prospective cohort	Taiwan	1307	22 358	HR = 2.2 95% CI: 1.5–3.2	ICD-9
Liao et al. (33), 2012	Cross-sectional	Taiwan	4094	16 376	HR = 1.27 95% CI: 1.14–1.14	ICD-9
Adinolfi et al. (32), 2013	Cross-sectional	Italy	79	741	OR = 2.4 95% CI: 1.69–2.46	HCV antibody
Hsu et al. (49), 2013	Retrospective cohort	Taiwan	3113	12452	HR = 1.23 95% CI: 1.06–1.42	ICD-9
Hsu et al. (50), 2014	Cross-sectional	Taiwan	2875	12 450	HR = 0.53 95% CI: 0.30–0.93	ICD-9 and HCV antibody
Pothineri et al. (38), 2014	Retrospective cohort	USA	8251	14 799	OR = 1.32 95% CI: 1.09–1.60	HCV antibody
Hsu et al. (51), 2015	Prospective cohort*	Taiwan	12 384	–	HR = 0.62 95% CI: 0.42–0.83	ICD-9
Studies not showing an association						
Younossi et al. (34), 2013	Cross-sectional	USA	173	19 568	OR = 2.49 95% CI: 1.04–5.96	HCV RNA

*12 394 HCV treated patients vs 27 768 HCV untreated patients.

HR, hazard ratio; ICD-9, International Classification of Diseases-9; OR, odds ratio; 95% CI, 95% confidence interval.

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HCV infection and ischaemic heart disease

Table 3. Main studies assessing the association between hepatitis C virus (HCV) infection and ischaemic heart disease

References, year	Type of study	Country	HCV+ (n)	HCV- (n)	Statistics	Diagnosis method
Studies showing an association						
Vassalle et al. (11), 2004	Cross-over	Italy	491	195	OR = 4.2 95% CI: 1.4-13	HCV antibody
Alyan et al. (40), 2008	Cross-sectional	Turkey	139	225	OR = 2.02 95% CI: 1.58-2.58	HCV antibody
Butt et al. (36), 2009	Cross-sectional	USA	82 083	89 582	HR = 1.25 95% CI: 1.2-1.3	ICD-9
Tsui et al. (35), 2009	Cross-sectional	USA	84	897	HR = 2.13 95% CI: 1.19-3.80	HCV antibody
Ramdeen et al. (45), 2010	Retrospective cohort	USA	78	-	OR = NA	HCV antibody
Freiberg et al. (41), 2011	Cross-sectional**	USA	1439	5453 (HIV-) 1687 (HIV+)	HR = 2.03 95% CI: 1.28-3.21	ICD-9
Studies not showing an association						
Völzke et al. (30), 2004	Transversal	Germany	21	4033	OR = NA	HCV antibody
Butt et al. (42), 2007	Cross-sectional	USA	126 926	126 926	OR = NA	ICD-9
Forde et al. (37), 2012	Retrospective cohort	UK	4809	71 668	HR = 1.1 95% CI: 0.67-1.83	ICD-9
ounossi et al. (34), 2013	Cross-sectional	USA	173	19568	OR = NA	HCV RNA

**HIV patients HR, hazard ratio; ICD-9, International Classification of Diseases-9; NA, not available; OR, odds ratio, 95% CI, 95% confidence interval



CardioAlex 2013 Abstracts

Patients and methods: This study group included two groups of patients with angiographically documented CAD; 25 HCV seropositive patients as test group and another 25 HCV seronegative patients as control group. Both groups were comparable as regard, age, sex, hypertension, and diabetes mellitus, and smoking. A detailed qualitative coronary angiographic analysis and SYNTAX score were used to assess the extent and severity of CAD.

Results: The presence of total occlusion was significantly higher in the HCV seropositive group ($p < 0.05$) and the SYNTAX score was higher (14.86 ± 6.64 vs. 10.86 ± 7.28 , $p < 0.05$). After adjustment, HCV seropositivity still represented an independent predictor for severity of coronary atherosclerosis demonstrated by higher SYNTAX score ($p < 0.05$).

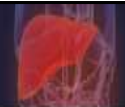
Conclusion: HCV infection is an independent predictor for severe coronary atherosclerosis, as demonstrated by higher syntax score. It also associated with higher incidence of totally occluded coronaries.

Hepatitis C Virus (HCV) Infection as a novel risk factor for severe coronary artery disease: A Prospective Angiographic Study

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REVIEW ARTICLE

Chronic hepatitis C virus infection, a new cardiovascular risk factor?

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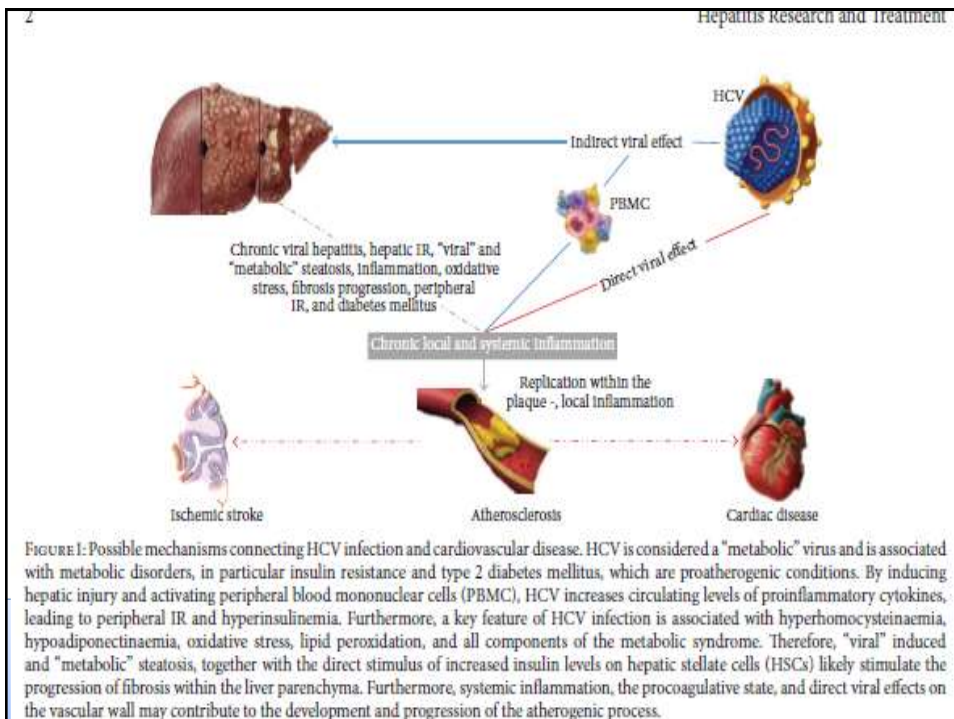
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Review Article

Atherosclerosis as Extrahepatic Manifestation of Chronic Infection with Hepatitis C Virus

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CONCLUSION

- Chronic HCV infection and its sequelae is a major health problem in Egypt
- Coronary atherothrombotic disease is an important cause of morbidity and mortality
- Chronic HCV infection is independent risk factor for coronary heart disease via many pathophysiologic mechanisms
- Diagnosis and therapy of CHD among patients with chronic HCV carries a great importance especially after the National program of eradication HCV infection

