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Prevalence of Liver Cirrhosis on patients with Chronic Hepatitis C during treatment by Velso 400/100 mg only at The NGaoundere Protestant Hospital in Adamawa Region Cameroon

Olivier Lieuga^a, Tatiana Jiengoué^a, and Augustine Nji Asakizi^a

Affiliations

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ABSTRACT

Introduction: Globally, 71 million people are viremia for HCV infection, about 15 to 25 per cent of infected individuals spontaneously clear the virus, within six months of infection. However, the remaining 75 to 55 per cent will develop chronic HCV. Of those chronically infected, the risk of cirrhosis is 15 to 30 per cent within 20 years with a one to four per cent per annum risk of hepatocellular carcinoma.

Methods: It is descriptive cross – sectional study prevalence of liver cirrhosis done on 35 patients tested positives with HCV confirmed by the following exams such as ELISA HCV, Viral Load HCV among 100 patients presented some clinical manifestations of Chronic Hepatitis C such as jaundice, abdomen pain hepatosplenomegaly, ascites, hepatic encephalopathy, legs swelling (godet) and abdomen distention at the NGaoundere Protestant Hospital in Adamawa Region Cameroon from June 2023 to September 2023 after receiving Ethical Clearance and Research Authorization from The Health Work of the Evangelical Lutheran Church of Cameroon (HWELCC) Chairman.

Results: The prevalence of chronic hepatitis C on 100 patients was 35% and Out to 35 patients tested positive of chronic hepatitis C, the prevalence of Liver Cirrhosis were 82,85%.

Conclusions: This study showed the high level of Liver Cirrhosis prevalence to the patients tested positive with chronic hepatitis C despite taking Velso 400/100 mg(Sofosbuvir 400 mg and velpastavir100mg). To prevent cirrhosis related to hepatitis C, direct oral antiviral therapy (DOAT) is crucial, curing more than 95% of cases. It is essential to eliminate alcohol, adopt a balanced diet, avoid hepatotoxic medications, and get vaccinated against hepatitis A and B

Keywords: *Hepatocellular Carcinoma, Liver Cirrhosis, Hepatitis B, Hepatitis C*

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1. INTRODUCTION

Hepatitis C virus, which before its identification was labelled “non – A, non – B Hepatitis” is a linear, single – stranded enveloped RNA virus belonging to the flavivirus family, *Mohd Hanafiah K and al (2013)*. There are six clinically relevant HCV genotypes and more than 80 subtypes. Genotype prevalence varies according to geographic region and route of acquisition. HCV remains viable on environmental surfaces at room temperature for at least 16 hours, but typically no longer than four days, 13, 14 and transmission occurs via parenteral and non-parenteral routes, *Ellis LA, Brown D, Conradie JD and al (1990)*. Then, to 40 per cent of HCV infected individuals have no clear identifiable risk factor. HCV infection is usually acquired through infected syringes and needles, and transfusion of infected blood, *David GI (1999)*. Sexual transmission of HCV occurs infrequently in heterosexual couples. It is reported to be more common in HIV – positive persons, particularly in MSM.

The risk of transmission of HCV from a mother to her child occurs in 4 – 8% of births to women with HCV infection, and in 10,8 – 25% of births to women with HIV and HCV co - infection, *Choo QL, Richman KH, Han JH and al (1991)*. HCV causes both acute and chronic hepatitis. Acute hepatitis is often clinically mild and marked by fluctuating elevations of serum aminotransferase levels > 50% likelihood of chronicity, leading to cirrhosis in > 20%, *Scheibe A, Young K, Moses L and al (1991)*. Chronic infection with HCV is usually clinically silent, and is only very rarely associated with life – threatening disease. Spontaneous clearance of acute HCV infection occurs within six months of infection in 15 – 45% of infected individuals in the absence of treatment.

2. RELATED WORKS

Many people with HCV do not have symptoms and do not know there are infected, *Amedei B., et al (2011)*. The incubation period ranges from 5

to 10 weeks (mean 7 weeks), acute hepatitis c commonly has a mild clinical course, and most are anicteric. Those with symptoms are more likely to clear the virus, *David GE (1999)*. Chronic HCV infection develops in 70 to 80% of patients, who then have a significant risk of developing cirrhosis and chronic liver failure. Fatigue is the most frequent complaint followed by some vague manifestations like nausea, anorexia, myalgia, arthralgia and cognitive impairment, *Balagopal A, et al (2010)*

According to *Scheibe A, Young K, Moses L and al (2013)*, chronic HCV has been associated with several extrahepatic manifestations such as autoimmune disorders like (Sjogren syndrome, Cryoglobulinaemia and polyarthritis nodosa), porphyria cutanea tarda, lymphoproliferative diseases like (B-cell non-Hodgkin’s lymphoma), insulin resistance disturbances like (progressive insulin resistance impaired fasting glucose (IFG), and/or type 2 diabetes mellitus (DM), are higher in chronic patients (50%), than in the general population and neurocognitive infection.

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Serological tests for HCV either identify viral antibody (ELISA) or constitute molecular tests to detect the virus (HCV-RNA using polymerase chain reaction, termed PCR) and classify its genotype, *Arora S., et al (2010)*. The presence of anti-HCV antibody suggests viral exposure and is not a marker of immunity. The majority of patients exposed to HCV then become carriers of

the virus. The presence of anti-HCV antibody however does not necessarily indicate chronic infection, *Balagopal A, et al (2016)*. The diagnosis of chronic hepatitis C infection requires detecting the virus with the PCR test. The antibody test (ELISA, enzyme-linked immunosorbent assay) is the primary screening test. It identifies antibodies to the non-structural as well as the structural epitopes of the virus, *Dessouki O., et al (2010)*.

Being both sensitive and specific, this ELISA test is very useful in identifying patients who had exposure to the hepatitis C virus. False-positive ELISA testing occurs with hypergammaglobulinemia. False negatives occur soon after acute hepatitis C onsets, and in association with immunosuppression or renal failure, *Ahlenstiel G. et al (2011)*. HCV RNA PCR test is thus essential to clinch the diagnosis and assess the viral load. This information guides the management of chronic hepatitis C infection including the response to treatment. Genotypes assist in understanding the epidemiology, the natural course of HCV and importantly, the response to therapy, *Messina JP, Humphreys et al (2015)*

Chronic HCV becomes difficult to treat. The goal of treatment in chronic HCV hepatitis seeks to eradicate the virus, best predicted by a sustained virologic response: absence of HCV-RNA 6 months after stopping treatment, *David GE (1999)*. A combination of antiviral agents is necessary: PEGylated interferon plus ribavirin. Genotype 1, being the most difficult HCV to treat, requires the addition of a direct antiviral agent: a protease inhibitor like telaprevir or boceprevir, boosting the response rate to 70-80%, *Scheibe A, Young K, Moses L and al (2013)* These antiviral therapies are undergoing further evaluation. Chronic hepatitis C requires surveillance for

progression to cirrhosis, liver failure and the development of hepatocellular hepatoma. About Prevention There is no vaccine or specific immunoglobulin available for HCV. The risk of sexual transmission is extremely low. In stable, monogamous relationships, the use of condoms is unnecessary, *Mohd Hanafiah K et al (2013)*. Chronic hepatitis C infection remains a significant health issue and may lead to the development of liver cirrhosis, liver failure and hepatocellular carcinoma. The incidence of these complications is expected to continue to rise and peak by 2020, *Tapper EB, Parikh ND et al (2016)*. However, H is curable, and viral eradication has been shown to reduce these complications and improve quality of life. Hepatitis C virus remain underdiagnosed; hence, all patients with risk factors or a high clinical index of suspicion should be screened and referred for treatment, *Flemming JA, Dewit Y, Mah JM, Saperia J, Groome PA, Booth et al (2019)*.

The addition of telaprevir and boceprevir for genotype-1 infection, which have recently been approved in Australia, has significantly increased cure rates and will hopefully improve treatment uptake, *Hirode G, Saab S, and Wong RJ (2020)*. The HCV treatment landscape is rapidly evolving, with highly efficacious interferon-free all-oral therapies on the horizon. HCV is the leading cause of chronic liver disease and cirrhosis and is the main cause of liver transplantation in the Western world, *Arsani SK, Hall L, Hagan M et al (2019)*. Although the total number of HCV-infected individuals is estimated to be stable or decline in the future, an increase in liver cirrhosis, liver cancer, hepatic decompensation and liver-related deaths is expected in the coming years, *Tarao K, Nozaki A, Ikeda T et al (2019)*. This assessment is underlined by the World Health Organization

(WHO) statement that the burden of HCV disease has been largely ignored as a health priority, and the organization has developed the first-ever global health sector strategy for addressing the viral hepatitis pandemic. Untreated chronic hepatitis C can lead to severe, long-term complications, primarily cirrhosis (liver scarring), which affects up to 1 in 3 people within 20–30 years. Other major, life-threatening complications include liver failure and liver cancer (hepatocellular carcinoma), *Choo QL, Richman KH, Han JH and al (1991)*. Early diagnosis and treatment are crucial to prevent these outcomes. Chronic inflammation causes scarred tissue to replace healthy liver tissue, which can take decades to develop.

As cirrhosis progresses, the liver loses its ability to function, *Mohd Hanafiah K and al (2013)*, leading to potential complications such as fluid buildup in the abdomen (ascites) or legs (oedema). Hepatitis C is a leading cause of hepatocellular carcinoma, particularly in those who have already developed cirrhosis. Increased pressure in the vein that carries blood from the digestive organs to the liver, which can lead to bleeding. Hepatitis C can also cause serious health issues in other parts of the body, often due to the immune system reacting to the virus, *Colin JF, Cazals-Hatem D, Lorient MA, et al (1999)*. Chronic hepatitis C is a serious infection that can lead to long-term health issues, including cirrhosis (liver scarring), liver failure and hepatocellular carcinoma (liver cancer). It is a systemic disease causing extrahepatic complications like cryoglobulinemia, diabetes, cardiovascular disease, and chronic kidney disease, *Thio CL, et al., (2002)*.

Chronic hepatitis C infection remains a significant health issue and may lead to the development of liver cirrhosis, liver failure and

hepatocellular carcinoma. The incidence of these complications is expected to continue to rise and peak by 2020, *Tapper EB, Parikh ND et al (2016)*. However, H is curable, and viral eradication has been shown to reduce these complications and improve quality of life. Hepatitis C virus remain underdiagnosed; hence, all patients with risk factors or a high clinical index of suspicion should be screened and referred for treatment, *Flemming JA, Dewit Y, Mah JM, Saperia J, Groome PA, Booth et al (2019)*. The addition of telaprevir and boceprevir for genotype-1 infection, which have recently been approved in Australia, has significantly increased cure rates and will hopefully improve treatment uptake, *Hirode G, Saab S, and Wong RJ (2020)*. The HCV treatment landscape is rapidly evolving, with highly efficacious interferon-free all-oral therapies on the horizon. HCV is the leading cause of chronic liver disease and cirrhosis and is the main cause of liver transplantation in the Western world, *Arsani SK, Hall L, Hagan M et al (2019)*. Although the total number of HCV-infected individuals is estimated to be stable or decline in the future, an increase in liver cirrhosis, liver cancer, hepatic decompensation and liver-related deaths is expected in the coming years, *Tarao K, Nozaki A, Ikeda T et al (2019)*. This assessment is underlined by the World Health Organization (WHO) statement that the burden of HCV disease has been largely ignored as a health priority, and the organization has developed the first-ever global health sector strategy for addressing the viral hepatitis pandemic.

3. MATERIALS & METHODS

It is descriptive cross – sectional study prevalence of liver cirrhosis done on 35 patients tested positives with HCV confirmed by the following exams such as ELISA HCV, Viral Load

HCV among 100 patients presented some clinical manifestations of Chronic Hepatitis C such as jaundice, abdomen pain, hepatosplenomegaly, ascites, hepatic encephalopathy, legs swelling (godet) and abdomen distention at the NGAoundere Protestant Hospital in Adamawa Region Cameroon from June 2023 to September 2023 after receiving Ethical Clearance and Research Authorization from The Health Work of the Evangelical Lutheran Church of Cameroon (HWELCC) Chairman. Convenience sampling was done. The analysis included management of risk factors, clinical manifestations, diagnostic methods, treatment and complications of Chronic Hepatitis C.

Convenience sampling was done, all the cases of elective Chronic Hepatitis B admitted during the study period were included. Age > 20 residents in Cameroon. The simple size was 25 Hepatitis calculated using the formula $n = (Z^2 \times p \times q) / e^2$ where n = minimum sample size, z= confidence interval, p= q= 1 – p and e= margin of error, 5%.

The Adamawa region is a constituent region of the republic of Cameroon, it borders the Centre and East regions to the south, the Northwest and West regions to the Southwest, Nigeria to the West, the Central African Republic to the East, and the North region to the North. This mountainous area forms the barrier between Cameroon's forested South and Savana North. At almost 64,000 km² in land area, the Adamawa is the third largest of Cameroon's ten regions.

The East region on its part occupies the South portion of the Republic of Cameroon, it is bordered to the East by the Central African Republic, to the South by Congo, to the North by the Adamawa region and to the West by the Centre and South regions. With 109,002 km² of

territory, it is the largest region in the nation as well as the most sparsely populated.

The Health Work of the Evangelical Lutheran Church of Cameroon (HWELCC) possesses three large hospitals namely: The Ngaoundere Protestant Hospital (NPH), the Ngaoubela Protestant Hospital (NGBELAPH) and the Garoua Boulai Protestant Hospital (GBLAIPH) and several health centres and clinics, we have marked our passage particularly at the Ngaoundere Protestant Hospital.

The data for this study were collected using structured questionnaires, entered and analyzed in Microsoft Excel 2016, confidence interval was calculated along with frequency and percentages for binary data. The inclusion criteria included only patients (adults) tested positive with Liver Cirrhosis, aged from 18 years old..

4. RESULTS & DISCUSSION

To assess the prevalence of Liver Cirrhosis to these HCV Patients, we collected and analyzed data on patient's characteristics, clinical manifestations, diagnostic methods used, types of treatment given and some complications occurred before, during and after treatment

[See Annex — Table 1. Results of Patient Characteristics]

[See Annex — Table 2. Results of Chronic Hepatitis C Clinical Manifestations]

[See Annex — Table 3. Results of Exams and Tests done to confirm Chronic Hepatitis C]

[See Annex — Table 4. Results of Chronic Hepatitis C Treatment]

[See Annex — Table 5. Results of Hepatitis B Complications analyzed on 100 Patients]

82,85% of patients have developed liver cirrhosis despite taking Velso (sofosbuvir 400mg/velpastavir100mg), 11,42% have developed Hepatocellular Carcinoma and 20%

developed fulminant hepatitis. 65,72% of patients didn't take viral load HCV test, 0% for genotype HCV and 68,58% for liver function tests. These shortcomings observed in the diagnosis and treatment of hepatitis C in patients at the Protestant Hospital of N'Gaoundere led to numerous complications, including the development of cirrhosis and liver cancer. This study aimed to evaluate the prevalence of liver cirrhosis in patients who tested positive for hepatitis C and were being treated with Velso 400/100 mg. Based on clinical data, the prevalence of liver cirrhosis (both compensated and decompensated) in patients with chronic hepatitis C (CHC) treated with sofosbuvir/velpatasvir 400/100 mg (such as Velso) varies across studies, generally ranging from approximately 28% to over 50% in real-world cohort studies focusing on patients with advanced liver disease, Chen CJ et al.,(2019). Despite the high sustained virologic response (SVR) rates of DAAs, a small number of patients does not eradicate the virus, and these patients represent a challenge, Da BL et al.,(2021). The Sofosbuvir (SOF)/Velpatasvir (VEL) and a second-generation HCV-protease inhibitor, Voxilaprevir (VOX), is a pan-genotypic DAAs combination and the only combination approved for treatment-experienced patients, including those who received non-structural-5A inhibitors. Real-world experiences are still needed for this combination, El Kassas ME et al.,(2000). Unfortunately, current salvage therapies are not accessible in many regions and there are limited data available about the efficacy of different retreatment regimens.

5. CONCLUSION

Treatment failure for hepatitis C, although rare (over 95% cure rate with direct-acting antivirals - DAAs), is usually manifested by a virological

drop within 6 months of stopping medication, when viral RNA reappears. Causes include viral resistance, poor treatment adherence, or host-related factors.

To prevent cirrhosis related to hepatitis C, direct oral antiviral therapy (DOAT) is crucial, curing more than 95% of cases. It is essential to eliminate alcohol, adopt a balanced diet, avoid hepatotoxic medications, and get vaccinated against hepatitis A and B.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest in relation to this work.

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ANNEXES

Annex I — Table 1. Results of Patient Characteristics

Chronic Hepatitis C Patient Characteristics	Patients	
	n	%
Nationalities		
Cameroonians	35	100
Age (Years Old)		
18 – 35	13	37,14
36 - 55	7	20,00
55 – Over	15	42,85
Marital Status		
Single	15	42,85
Married	9	25,71
Divorced	11	31,42

Annex II — Table 2. Results of Chronic Hepatitis C Clinical Manifestations

Clinical Manifestations	Abdomen Distention		Ascites		Jaundice		Legs Swelling (Godet)		Hepatosplenomegaly	
	n	%	n	%	n	%	n	%	n	%
Patient	35	100	16	45,71	31	88,57	21	60	30	85,71

Annex III — Table 3. Results of Exams and Tests done to confirm Chronic Hepatitis C

Exams and Tests Done	Elisa HCV		Viral Load HCV		Genotype HCV		Ultrasounds		LFTs	
	n	%	n	%	n	%	n	%	n	%
Patient	35	100	12	34,28	0	0	27	77,14	11	31,42

Annex IV — Table 4. Results of Chronic Hepatitis C Treatment

Treatment Received by HCV Patients	Velsco 400/100 mg (Sofosbuvir/Velpastavir)		Sofosbuvir 400mg/Daclastavir 100 mg		Sofosbuvir 400mg/Ledipasvir 90mg		Interferon alfa 2 b	
	n	%	n	%	n	%	n	%
Patient	20	100	0	0	0	0	0	0

Annex V — Table 5. Results of Hepatitis B Complications analyzed on 100 Patients

Complications of Chronic Hepatitis C	Liver Cirrhosis		Hepatocellular Carcinoma		Fulminant Hepatitis		Pulmonary Embolism		Cardiac Liver		Digestive Bleeding	
	n	%	n	%	n	%	n	%	n	%	n	%
Patient	29	82,85	4	11,42	7	20	0	0	0	0	0	0