

ISSN 1561-6894

**NR 13 (123) 2014**

# Nauka i Studia

Przemysł  
Nauka i studia  
2014

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## SOME EPIDEMIOLOGICAL ASPECTS OF HEPATITIS C IN BUKOVINA

**Abstracts:** *The morbidity of acute hepatitis C at Bukovina is increasing. More typical is the leading role of hidden epidemic process, distributed mostly among persons aged 16-30 years old and different social groups. Clinically subclinical and anicteric forms become prevalent nowadays. The disease has tendency to be lingering with long-lasting elevated serum liver enzymes.*

**Key words:** *acute hepatitis C, epidemic process, Bukovina.*

### I. Background.

Nowadays hepatitis C infection becomes the most important disease among all modern leading problems of infectology and hepatology. According to various references, from 500 to 700 million people in the world are infected with hepatitis C, representing 10 % of the population [1]. Each year, from acute hepatitis C (HCV) suffer 3-4 million people. The frequency of HCV markers in Eastern Europe, including Ukraine is 1,5-4 % [2,3]. In Ukraine, the official registration of hepatitis C began in 2003, but certain data about frequency of HCV is still collected. In the USA and Western Europe, two-thirds of HCV patients aged from 30 to 50 years [4,5,6]. Based on the results of epidemiological studies conducted in Ukraine at the beginning of this century the markers of hepatitis C are also often found in adults, mostly men aged 25 to 44 years [7,8]. According to consequences of that, the manifestation of HCV should occur within 10-15 years, and these patients will require hospitalization as well as serious antiviral treatment. The significance of the problem is determined by different factors: a wide spread of the HCV, the rapid increase of number of patients, the polymorphism of clinical manifestations, the multiplicity of contamination routes, high-risk of developing chronic hepatitis, cirrhosis and hepatocellular carcinoma.

Long-term persistence of HCV in humans leads not only to the formation of chronic liver disease, but also to the development of multiple extra hepatic manifestations, which could masked main infectious process and made obstacles in diagnostics and treatment of HCV-infection.

## II. Research purpose.

To summarise and analyze of some epidemiologic aspects (morbidity or sickness rate, tendency, quantitative and qualitative parameters of epidemic process) hepatitis C at Bukovina (Western Ukraine).

To analyze the HCV morbidity and for identification of dominant transmission routes and factors the materials of Regional Sanitary Control Inspection and history cards of patients treated in 2011-2013 in Regional Clinical Hospital of Chernivtsi. All calculations were carried out using functions of mathematical statistics provided by the computer program Microsoft Excel.

Laboratory diagnostics of HCV- infection suggested positive findings of total antibodies to virus in serum of infected persons by ELISA test (anti-HCV). Primary positive results confirmed by detection of antibodies to core antigens NS3, NS4 and NS5. Results processed by statistical method.

## III. Discussion of results.

The current analysis proved that in 2011 there were 35 cases of hepatitis among citizens: 8 persons with acute hepatitis A, 19 – with acute hepatitis B, 8 – with acute hepatitis C. In 2012 the quantity patients with hepatitis was increasing. HAV-infection diagnosed in 11 persons, HBV – in 19, HV – in 10. According to statistics about chronic hepatitis, the increasing of total quantity of patients in 1,4 times more, as well as with chronic HCV in 1,5 times more had determined. If in 2011 in Bukovinian Region registered 64 HCV-infected persons, in 2012 – up to 100 persons. Hepatitis B morbidity remain constant. All cases had officially registered with appropriate documentation.

In total hepatitis morbidity structure, acute hepatitis C has 22,8% in 2011, 25% – in 2012 and 18% in 2013. Among chronic hepatitis, HCV infection has leader position. Thus, in 2011 the diagnosis of chronic hepatitis C was 82%, in 2012 – 84%, and in 2013 – 78 %. (see table 1.)

**Table 1. Comparatively data of infectious morbidity on acute viral hepatitis A, B and C and chronic hepatitis B & C in Bukovina (Western Southern part of Ukraine) in 2011-2013**

№	Type of infection	Absolutely figures			Morbidity on 100 000 population		
		2011	2012	2013	2011	2012	2013
1.	Acute hepatitis A	8	11	6	1,12	1,53	0,83
2.	Acute hepatitis B	19	19	19	2,65	2,64	2,64
3.	Acute hepatitis C	8	10	8	1,11	1,39	1,11
4.	Chronic hepatitis B	13	19	18	1,82	2,64	2,50
5.	Chronic hepatitis C	63	100	64	8,80	13,94	8,89

Epidemiologic analysis of transmission routes and mechanisms of distribution of hepatitis B at Bukovina proved that sexual way was reason in 38% patients; drug abusers got infection in 32% by contaminated syringes. Intra-hospital contamination with HCV infection within medical institutions during different medical manipulations had noticed in 18%. Getting hepatitis C infection by means medical non-sterile instruments in beauty saloons (manicure, tattoo) – in 8%. In 4 %, it was impossible to detect the route of transmission.

Analysis of aged structure proved the prevalence of young people 16-30 years old. That could explained due to the epidemic meanings of sexually transmission and using intravenous drugs. It must announced about direct correlation between sexual activity and morbidity rate on HCV in aged group 38-46 years old. Among persons aged 47-53 years the most actual was parenteral interventions.

Social status of patients was different. Pupils and students part close to 21,6%, workers – 16,3%, retired elderly people – 13,9%, medical personnel – 11,1%, not employed officially – 37,1 %.

It should pointed at moment, that wrong assessment according to situation with hepatitis C is calm and favorable. Indeed, in this issue deals only with officially registered icteric clinical forms of hepatitis C. Taking into consideration the prevalent mild and asymptomatic anicteric course of HCV-infection the true level of infected people in Chernivtsi region of Ukraine is much greater (in 5-6 times more). Following the literature data, per one icteric form the six non-icteric is registered [8]. Severity of clinical course had evaluated by manifestation of intoxication, intensity of jaundice, liver functioning test shifts. The mild and moderate clinical courses were prevalent – 83,3 %.

Prodromal latent period of HCV-infection has a great variety: thus, dyspeptic syndrome noticed in 52,8 %, catarrhal – in 13,9 %, asthenic – in 5,6 %, mixed – in 22,2 %, undetermined type – in 5,5 % patients with hepatitis C. Average duration of latent pre-icteric period lasted 9,2±1,3 days. In 49 % patients pre-icteric period lasted 1-7 days, in 25 % – up to 2 weeks, in 28,2 % – 15-21 days. Thereby, enrolled patients the dyspeptic syndrome of pre-icteric prodromal period has lasted 7 days. Duration of icteric phase lasted in average 19,8±1,3 days. So, since 1 till 14 day jaundice was present in 38,9%, since 15 till 22 days – in 36,1 %, over 23 days – in 25 % patients.

Enlargement of liver noticed in 80,5 % patients: till 1 sm – 36,1 %, on 1,5-2 sm – in 25%, from 2,5 to 3,5 sm – in 5,5% and more 4 sm – in 13,9% patients. On the discharging time a hepatomegaly, remain in 30%, a splenomegaly in 7% patients.

Biochemical parameters of blood evaluated twice: at the admission time and in dynamics of disease. Furthermore, in 64 % patients hyperbilirubinemia were within interval from 25 till 85 mkmol/l, in 36 % – from 86 till 188 mkmol/l. At the discharging, the level of bilirubin normalized in 78 % patients.

Cytolysis level of hepatocytes evaluated by ALT activity. At the admission period in 12 % of patients, the ALT activity was up to 1 mkmol/ml per hour, in 81% – from 1 to 3 mkmol/ml per hour, in 7 % – more than 3 mkmol/ml per hour. At the discharging from hospital in 62 % convalescents, the ALT activity not normalized the norm parameter that proved the continuing of cytolysis of liver cells in these patients.

Assessment of protein-synthetic function of liver proved that sulema test on mainly part of patients (89%) was higher than 1,6 ml, tymolova test – within 0,5 and 2 IU in 22,1%, ranged from 4 to 7 IU – in 62,3%, more than 8 IU – in 15,6%. At the

discharging time from the stationary tymolova test remained elevated in 52,4% of convalescents, that confirmed the tendency to extended chronic course of disease. In all investigated patients with hepatitis C coagulogram figures remained normal.

#### IV. Conclusions:

1. Bukovina has been an increase in the incidence rate of hepatitis C.
2. HCV widely distributed among different populations
3. A large number of different routes of transmission of HCV determines the functioning of many foci of infection, the social activity of which may contribute to the deterioration of the epidemiological situation in the Bukovina.
4. Mainly young people aged 16-30 years involved in the epidemic process of hepatitis C infection.
5. The leading role of the hidden epidemic process is important, that supported by prevalence of subclinical, anicteric forms of acute hepatitis C.
6. Despite of the favorable course of acute hepatitis C disease has a tendency to prolonged duration of long lasted hyperenzymemia (elevated ALT levels).

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## MICRONUTRIENTS IN THE DIET OF YOUNG ATHLETES

### Introduction

From a physiological point of view, many minerals are of major importance for the high intensity physical activity given their role in the maintenance of muscle contraction, nerve impulse, transport of oxygen, activation of enzymes, immune function, anti oxidant activity, bone health, and acid-base balance of blood (Dressendorfer et al., 2002).

The aim of the study is assessment of mineral status in the hair of young athletes. **Methods** The content of magnesium, zinc and calcium in the hair samples of 15 young athletes (figure skaters) and 28 healthy children aged 12-16 years was investigated. We used a method of mass spectrometry with inductively coupled plasma mass spectrometer «Elan-9000», the optical emission spectrometry with inductively coupled plasma optical emission spectrometer for «Optima 2000DV».

### Results

It was revealed that the level of magnesium, calcium and zinc was significantly lower in the hair of young athletes than in the hair of the control group: magnesium 84,3±4,8 vs. 171,6±3,9 (p<0.05); zinc 158,5±7,2 vs. 204,5±6,4 (p<0.05) (Micheletti, 2001); copper 11,4±0,8 vs. 15,4±0,4(p<0.05). Following the mineral screening, the athletes were given individual advice on the basis of gender, age, micronutrient deficiencies, and physical activity. Repeated hair samples were taken one month after the correction. It was shown that the correction of nutrient intake with mineral supplements led to a significant increase in the mineral content of hair samples.

### Conclusions

Identified deficit of the minerals in the hair of athletes is probably due to two reasons: the loss of macro- and micronutrients with sweating (Maughan, 2000) and their movement into the intracellular region (in the active muscle cells). Correction changes can lead to better tolerance of stress among athletes who require special endurance (Lukaski, 2001).