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REGISTRATION OF ACUTE VIRAL HEPATITIS – AN "ICEBERG PHENOMENON"

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Abstract

The quality of registration of acute liver damage caused by hepatitis A, B and C viruses can be questioned. A comparative study of the frequency of detection of serological markers of acute liver damages associated with three pathogens and indicators of officially registered morbidity was carried out. It has been established that in some cases the diagnosis of hepatitis A is established only on the basis of clinical symptoms and the exclusion of markers of acute damage by other hepatitis viruses. The results of serological studies on the detection of aHBcor IgM in patients with hepatitis symptoms suggest that in half of cases there is an under-registration of acute hepatitis B. The estimated incidence of acute hepatitis C, according to the identified markers (aHCV IgM), is more than 10 times higher than the recorded level. It is necessary to optimize the information subsystem of epidemiological surveillance of this group of diseases by organizing a vertical line between the diagnostic and therapeutic link in the health care system.

Key words: acute hepatitis A, B, C; calculated morbidity; serological marker; acute liver damage.

Urgency. Viral hepatitis is one of the most pressing contemporary public health

problems that cause significant economic damage and lead to serious consequences, especially at combined lesions.

About 1.5 million clinical cases of hepatitis A (HA) are registered annually in the world, but the level of infection in the population in many countries is much higher. Morbidity is significantly associated with socio-economic indicators and access to good-quality drinking water. The risk of infection with HA virus (HAV) is correlated with the level of sanitary culture of the population. The age and severity of the disease's course in different countries of the world has features. The level of HA endemicity is determined by the seroprevalence of the population [1].

The urgency of hepatitis B (HB) problem is determined by its widespread, complexity of infectious and epidemic process (EP) and frequent formation of chronic hepatitis (HG), liver cirrhosis (LC), hepatocellular carcinoma (HCC) associated with fatalities, the number of which increased by 33% from 1990 to 2013 [2]. Even with universal vaccination programs, it is impossible to significantly prevent cases of hepatitis B virus (HBV) infection, especially in high-risk populations [3, 4].

By present data, about 240 million people in the world are chronic carriers of surface HBV antigen (HBsAg) with fluctuations in endemic levels in different territories from less than 2% to more than 8% [5]. It has been established that the detection rate of HBsAg depends on the socio-economic status of the country, the effectiveness of vaccination prevention programs, and timely antiviral treatment [6]. Migration processes accompanying globalization contribute to the prevalence and increase in the incidence of hepatitis B in low-endemic countries of the European Union (Italy, Germany), which is associated with a high level of infection among migrants and refugees who intensively inhabit these countries [7, 8].

Hepatitis C virus (HCV) most often causes a chronic infection without vivid symptoms, but with the development of complications: chronic hepatitis, LC and HCC [9]. It is believed that today about 130-170 million people are infected with HCV, the overall estimate of the prevalence of infection is 2-3% [10]. The highest levels of hepatitis C endemicity are in Africa and the Middle East, most of the cases are registered in Egypt, Cameroon, Saudi Arabia, Iraq and Syria with the prevalence from 2% to 15% [11].

Objective: to compare morbidity rates of acute hepatitis A, B and C with the results of serological studies for identification of acute infection markers among residents of the Odessa Region (Ukraine).

Materials and methods. A retrospective epidemiological analysis of the forms of sector wide statistical reporting of the Odessa Region from 2010 to 2017 (N 1, 2) and the

results of serological studies on hepatitis markers A, B, C (form 40) was carried out. Clinical material was studied in certified state and private laboratories of the region. Statistical data processing was carried out using Microsoft Excel 2010 software packages and STATISTICA 5 computer program.

Results and Discussion

We analyzed the results of serological studies of the city of Odessa and the Odessa region inhabitants for markers of acute hepatitis A, B and C from 2010 to 2017. The patients hospitalized at the Odessa City Clinical Infectious Diseases Hospital with a diagnosis of acute viral hepatitis (AVH), persons who sought medical attention in the municipal hepatocenter and other medical institutions, pregnant women, children born from the mothers with chronic hepatitis B and C, and other persons were under examination. Studies on the presence of aHAV IgM, aHBcor IgM, aHCV IgM were performed.

In jaundice patients in order to confirm or exclude acute viral hepatitis caused by HAV a study for the presence of aHAV IgM was conducted. In some cases to confirm the diagnosis, HAV antigen (AgHAV) was determined in feces.

For the observation period on the territory of Odessa Region 1371 cases of HA were registered. For aHAV IgM presence 8392 persons were examined, a positive result was obtained in 591 of cases (Table 1).

Table 1

The dynamics of the detection and registration of hepatitis A in the Odessa region, 2010-2017

Year	Total checked up for aHAV IgM	aHAV Ig M positive, %	Total checked up for AgHAV	AgHAV positive	Total laboratory-confirmed cases, %	Total registered cases of HAV	Without laboratory conformation
2010	845	65(7.69)	23	1	66(48.18)	137	51.82
2011	863	57(6.61)	48	6	63(84.00)	75	16.00
2012	811	28(3.45)	75	11	39(76.47)	51	23.53
2013	1007	62(6.16)	66	4	66(56.41)	117	56.41
2014	1436	35(2.44)	8	0	35(85.37)	41	14.63
2015	1316	36(2.74)	5	0	36(100)	36	0
2016	1080	92(8.52)	123	1	93(32.63)	285	67.37
2017	1034	216(20.89)	123	1	217(34.44)	630	65.56
Total	*8392*	*591(7.04±2.25)*	*471*	*24*	*615(44.86)*	*1371*	*55.14*

Feces study of 471 patients with acute VH for the presence of AgHAV was also conducted, in 24 of them there was a positive result. In total there were 615 (44.86%)

laboratory-confirmed cases, while in 55.14% of cases, the diagnosis of HA was made clinically. As Table 1 shows, in some years in almost half of the cases, the diagnosis of HA was not confirmed in the laboratory, and another causative agent could be the cause of acute VH. Besides for the years of observation 16 studies were conducted on viral hepatitis E (HEV) and in 6 cases aHEV IgM was detected which indicates free circulation of HEV along with HAV.

It has been established that the level of HA morbidity among the population of the Odessa region during 2010-2017 had significant fluctuations, amounting to 1.39 per 100 thousand of population in 2015, and 25.94 in 2017 or at average 7.14 ± 3.15. The calculation of the developmental tendency of HA EP showed that there is an increase in morbidity rate (Fig. 1), which is associated with a decrease of the "immune layer" and formation of a part of population susceptible to HAV.

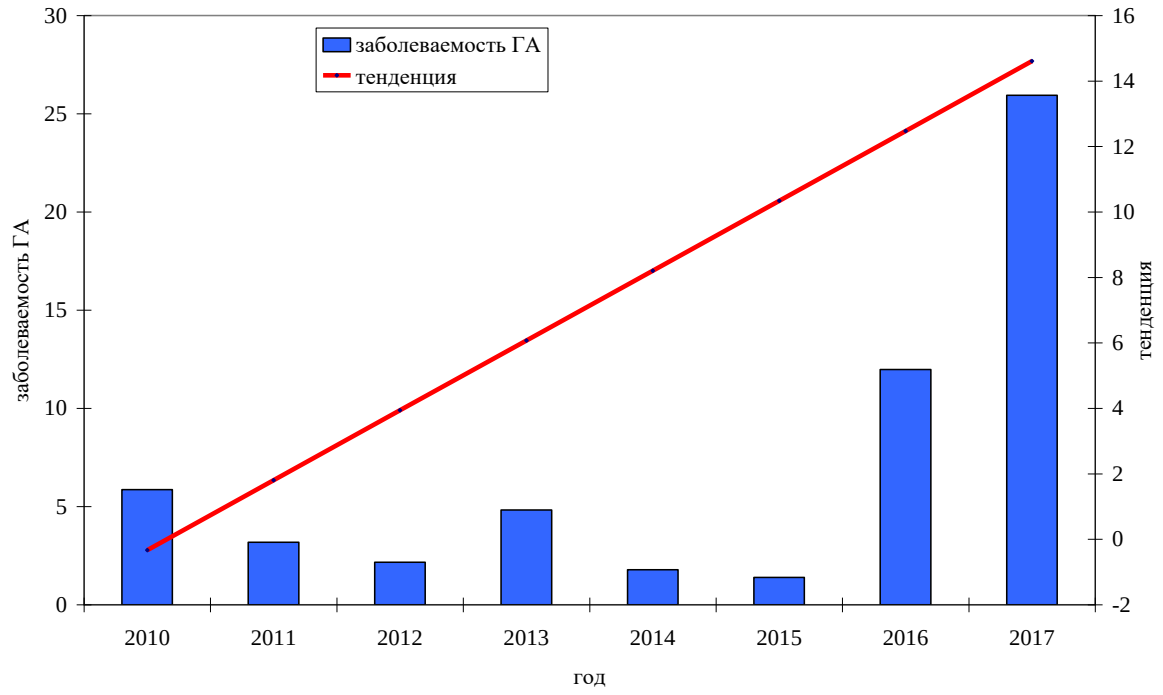

Fig. 1. The dynamics and trend of the incidence of HA in the Odessa Region in 2010-2017

We analyzed the results of studies of aBCO IgM presence - markers of acute hepatic inflammation caused by HBV. During the period of observation 4645 individuals who applied to municipal and regional medical establishments both with jaundice syndrome and other complaints were examined and in 1282 of them aBco IgM was detected (Table 2). At the same time, in total from 2010 to 2017, 534 cases of acute hepatitis B were registered, 748 were not taken into account (58.35%).

Thus, in some cases there is an incomplete registration of acute viral hepatitis morbidity. According to the results of serological studies in 2011, 2012, 2013 from 1/5 to 1/3 cases have not been reported. In 2017 2.309 people were examined, in 745 of them acute viral hepatitis markers were found but only 60 cases were recorded (8.05%).

Table 2

The dynamics of the identification of markers and registration of acute hepatitis B among the Odessa Region population, 2010 - 2017

Year	Total checked up for aBcor IgM	aBcor Ig M positive, S.G.,%	Total N of acute HB registered, %	Calculated under-registration of acute HB cases	S.G. of under-registrated cases of acute HB, %
2010	390	98(25.13)	98(100)	0	0.00
2011	421	117(27.79)	81(69.23)	36	30.77
2012	398	84(21.11)	62(73.81)	22	26.19
2013	354	75(21.19)	60(80.00)	15	20.00
2014	255	48(18.82)	48(100)	0	0.00
2015	272	66(24.26)	66(100)	0	0.00
2016	246	59(23.98)	59(100)	0	0.00
2017	2309	745(32.27)	60(8.05)	685	91.95
Total	*4645*	*1282(27.60)*	*534(41.65)*	*748*	*58.35*

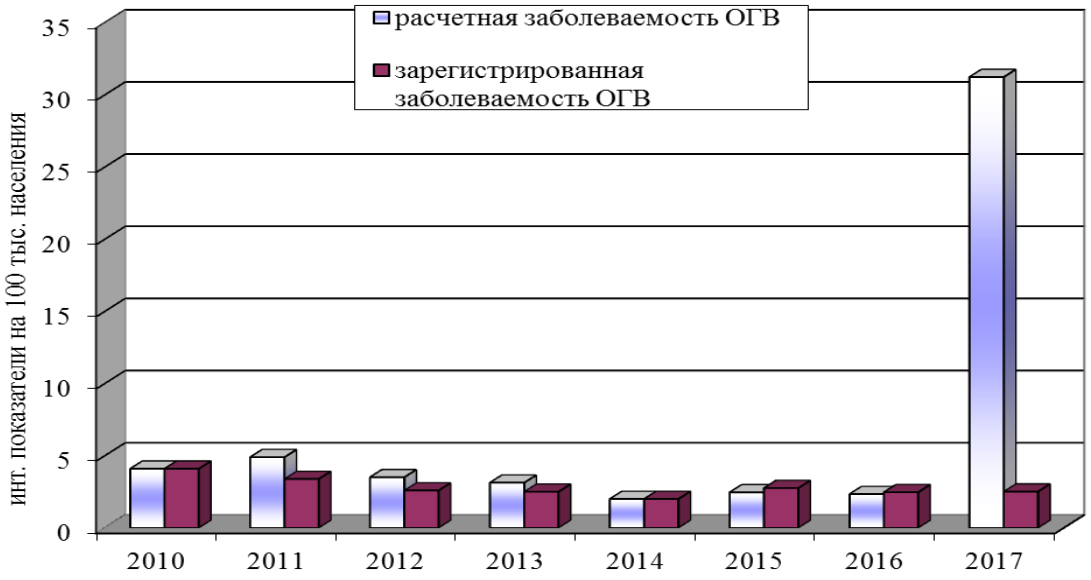

Fig. 2. Calculated and registered morbidity of acute hepatitis B in the Odessa Region in 2010-2017

It was established that the level of registered morbidity of acute HB did not have significant fluctuations: from 2.00 (2014) to 4.10 (2010), averaged 2.79 ± 0.25 per 100 thousand of population, the calculated - from 2.00 (2014) to 4.90 (2011), but in 2017

amounted to 31.24, on average - 6.71 ± 3.76, which is 2 times higher (Fig. 2).

Thus, the registration of acute HB is more objective than that of HA. At the same time, it can be argued that, judging from the proportion of positive results obtained in different years, the number of positive results for acute HB markers varies within small limits (18.82-32.27, on average 24.32 ± 1.61%).

The results of studies on the presence of markers of acute liver inflammation caused by HCV - aHCV IgM (Table 4) were analyzed. During the observation period 6977 people were examined. They applied to municipal and regional medical institutions for medical aid and in 3138 of them antibodies were detected. At the same time, in total 282 new cases of acute HC were reported in 2010 - 2017.

Table 3

The dynamics of the detection and registration of acute hepatitis C in the Odessa Region, 2010-2017

Year	Total checked up for aHCV IgM	aHCV Ig M positive	Total N of acute HC registered, %	Calculated under-registration of acute HC cases	S.G. of under-registrated cases of acute HC
2010	838	441(52.63)	56(12.70)	385	87.30
2011	978	428(43.76)	56(13.08)	372	86.92
2012	940	487(51.81)	30(6.16)	457	93.84
2013	975	529(54.26)	32(6.05)	497	93.95
2014	891	425(47.70)	28(6.59)	397	93.41
2015	907	381(42.01)	33(8.66)	348	91.34
2016	672	255(37.95)	29(11.37)	226	88.63
2017	458	216(47.16)	18(8.33)	198	91.67
Total	*6977*	*3138(44.98±2.14%)*	*282(8.99)*	*2856*	*91.01*

Annually 216 - 529 seropositive individuals were identified and from 18 (8.33%) to 56 (13.08%) cases, respectively, were recorded. In total, over the years of observation, about 9.0% cases of sickness were recorded, while 91.0% of acute HC cases remained orphaned.

Morbidity registered in the period under study had slight fluctuations: from 0.75 (2017) to 2.34 (2010, 2011) and averaged 1.47±0.22 per 100 thousand of population. At the same time calculated morbidity constituted from 9.06 (2017) to 22.08 (2013), avg – 16,53±1,71, which for more than 10 times is above the level registered (Fig.3).

The proportion of positive results when examining jaundice syndrome patients for anti-HAV IgM averaged 7.31 ± 2.25%, for aBcor IgM - 24.32 ± 1.61%, for aHCV IgM - 44.98 ± 2. 14% (Tables 1, 2, 3). Marker of acute HC was significantly more frequently

detected than acute hepatitis B (t = 8.15; p<0.001) and acute hepatitis A (t = 13.38; p<0.001).

Thus, according to laboratory data, in the structure of acute viral hepatites, hepatitis C prevails.

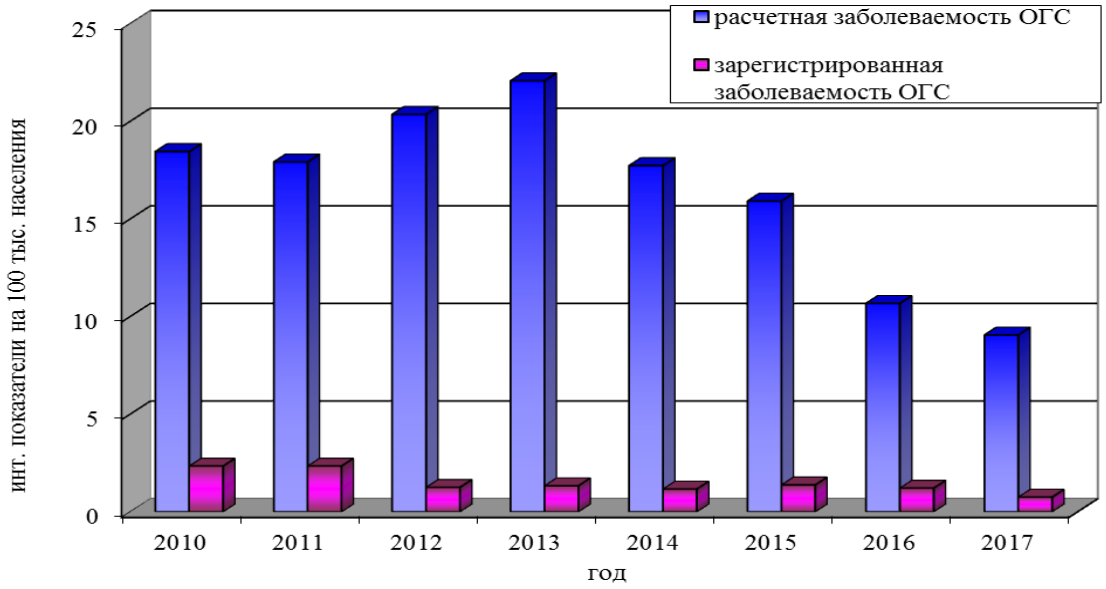

Fig. 3. Estimated and recorded morbidity of acute HC in the Odessa Region, 2010 – 2017

The under-registration of acute hepatites is a result of inconsistency between the diagnostic and treatment units of the health care system, which requires improvement. The previously existing system of epidemiological surveillance (ES) for this group of diseases had drawbacks and in recent years the quality of registration has not changed for the better. At the present stage of public health centers (PHC) formation, which are beginning to function at the regional levels, it is necessary to optimize the operation of ES information subsystem. It is necessary to organize the work in such a way that information on the number and results of serological studies conducted by all existing laboratories in the region, on-line goes to the data collection center of PHCs, carefully analyzed, and the fate of seropositive persons subsequently traced. There should be a vertical link between PHCs and centers of primary medical-sanitary care for persons with markers of acute viral infection, education about the need for timely treatment and long-term follow-up, the consequences of this formidable disease, etc.

Conclusions:

1. Hepatitis A morbidity was constantly recorded in the Odessa Region in 2010 - 2017 with a relatively low level (7.14 ± 3.15) and a tendency to its increase. This is associated with

the “immune layer” decrease and formation of a susceptible part of the population to viral HA. In 44.86% of cases the diagnosis was laboratory confirmed, in the rest - clinically.

2. The registered acute hepatitis B morbidity had slight fluctuations in some years and averaged 2.79 ± 0.25 per 100 thousand of population. According to the results of serological studies for markers of acute hepatitis B, the estimated morbidity on average was 6.71 ± 3.76, which is 2.4 times higher than the registered one.

3. Acute hepatitis C registered morbidity was low and averaged 1.47 ± 0.22 per 100 thousand of population, the estimated morbidity was 16.53 ± 1.71, which is more than 10 times higher than the registered one.

4. The levels of acute hepatites B and C registered morbidity among the Odessa Region population do not correspond to the probable data due to significant under-registration of patients, low attendance and registration.

5. According to laboratory data acute hepatitis C dominates in the structure of this group diseases.

6. It is necessary to optimize the information subsystem of epidemiological surveillance of this group of diseases so that information on the number and results of serological studies conducted by all existing laboratories in the region are sent online to the data collection center of the health care center, carefully analyzed, and the fate of seropositive individuals is subsequently traced.

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