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Issues of Diagnosis, Treatment and Rehabilitation of Patients with Alcohol Intoxication in the Post-Intoxication Period

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Abstract **Objective:** to study the effectiveness of the developed scoring system for early diagnosis of cognitive and metabolic disorders, as well as a complex of drug hepatoprotective therapy and psychosocial correction in patients with alcohol intoxication during the post-intoxication period. **Materials and methods:** We examined 280 patients aged 18 to 60 years who were admitted with alcohol intoxication due to binge drinking at the Republican Scientific Center for Emergency Medical Care and its Bukhara branch in 2019-2023. Of these, 238 were men - 85% and 42 women - 15%., average age 41.4±5.6 years. The study was divided into 2 stages: Stage 1 – study of the state of liver function, cognitive functions and the impact of their disorders on alcoholism in patients with alcohol intoxication during the post-intoxication period. At this stage, 150 patients were examined, admitted in 2022-2023, who received standard drug therapy, at the end of which all patients on the 5th day underwent a study of ammonia and lactate levels in the blood, a study of cognitive functions using the MMSE and the Reitan test, and an assessment of severity their violations using the scale we developed. Also on day 5, problematic alcohol consumption was assessed using the AUDIT test. Stage 2 to study the effectiveness of the developed measures of complex drug and psycho-social therapy for patients with alcohol intoxication in the post-intoxication period. At this stage, the data of 223 patients who received treatment in 2019-2023 were studied. The patients were divided into 3 groups: Group I 93 patients with mild and moderate cognitive-metabolic disorders who were treated in the toxicology department in 2022-2023 and who, after discharge from the toxicology department, received additional complex hepatoprotective therapy: the antihypoxant cytoflavin 1 tablet 2 times a day, ammonia-binding drug L-ornithine-L-aspartate 1 powder 3 times a day and ademetionine 750 mg 2 times a day for 7 days. After the end of treatment, standard FBI (Family Brief Intervention) interventions were carried out on the 7th, 30th day, after 6 and 12 months. Group II - 48 patients who were treated in the toxicology department in 2021, who also underwent standard FBI (Family Brief Intervention) interventions on the 7th day after discharge from the hospital, also on the 7th, 30th day, after 6 and 12 months without preliminary hepatoprotection. Group III (archival) - 82 patients who were treated in the toxicology department in 2019-2020 and did not receive any medication or psycho-social assistance after discharge from the hospital. **Results:** The development of a scoring system for cognitive-metabolic disorders in patients with alcohol intoxication in the post-intoxication period, based on laboratory and screening research methods, made it possible to determine in more detail the timing and strategy for drug and psychosocial correction of patients. **Conclusion:** The complex of drug hepatoprotective therapy and psychosocial correction we have developed for patients with alcoholism who have suffered alcohol intoxication significantly reduces the craving for repeated drinking of alcoholic beverages and improves the quality of life of this category of patients.

Keywords Cognitive functions, Hepatic encephalopathy, AUDIT test, FBI (Family Brief Intervention)

1. Introduction

The dynamics of disorders associated with the use of psychoactive substances in Uzbekistan is characterized by an increase in alcohol dependence with a constant decrease in drug abuse [1]. According to available data, more than 90% of all patients with alcohol intoxication are admitted to the toxicology departments of the RSCEMP and its branches as a result of a combination of acute and chronic alcohol intoxication, i.e. binge drinking [1,2]. alcohol intoxication against the background of previous alcoholism, we noticed

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that all patients had disorders of the liver function, primarily detoxification, which was manifested by an increase in the level of free ammonia in the blood [1,2,3,4]. There was also a significant clinical deterioration in the patient's condition with its increase and a significant positive effect from appropriate hepatoprotective, ammonia-binding therapy [1,4]. However, despite the change in the tactics of intensive care for this category of patients in the toxicology departments of our country, the very strategy of the emergency medical care system does not imply a complete cure of patients after binge drinking, but only withdrawal from a critical condition [1]. The average duration of hospitalization of patients admitted with alcohol intoxication is 5.2±1.2 days, which is absolutely insufficient for the complete recovery of the body of such patients, including liver functions [1,2,6]. Withdrawal is also partially preserved, which increases the risk of renewed alcohol abuse. At the same time, the overwhelming majority of patients, after being discharged from the toxicology department, for various reasons, refuse to continue treatment in narcological clinics, thereby the problem of alcoholism itself is not resolved. Therefore, there is an urgent need to create a set of treatment measures and improve the rehabilitation of people who abuse alcohol in the post-intoxication period [1,5,8].

Personality disorders caused by alcohol abuse do not develop in isolation. For many people suffering from chronic alcohol abuse disorders, interaction with relatives determines the patterns and dynamics of their alcohol problems [9,7,16]. Moreover, the interaction of family members with a person suffering from alcoholism can either consolidate and aggravate the problem, or significantly help in solving it. Family therapy is offered when the patient shows signs that substance abuse is strongly influenced by the behavior of family members or communication with them [9,10,12,13].

Thus, short-term interventions and total family intervention are effective mechanisms to reduce alcoholism of the population, because Uzbekistan is an Islamic state and the family is of great importance, the word of parents is often absolute and children respect their parents very much. However, these methods are effective only in patients without cognitive deficits [1,15,16]. At the same time, the works of domestic and foreign authors have proven that the majority of patients admitted to emergency hospitals with alcohol intoxication are discharged with persistent intellectual disorders of varying severity, due to metabolic disorders, hypoxia, and toxic liver damage [14,15,16]. As a result, there is an urgent need to identify latent cognitive disorders in patients at the time of discharge from toxicology departments, which will allow determining the timing of psychosocial interventions, as well as the need for additional medical support [4,7].

The aim of the study was to study the effectiveness of the developed point system for early diagnosis of cognitive and metabolic disorders, as well as a complex of hepatoprotective drug therapy and psychosocial correction in patients with alcohol intoxication in the post-intoxication period.

2. Research Methods

280 patients aged 18 to 60 years who were admitted with alcohol intoxication against the background of binge drinking to the Republican Scientific Center for Emergency Medical Care and its Bukhara branch in 2019-2023 were examined. Of these, 238 were men - 85% and 42 women - 15%, the average age was 41.4±5.6 years.

The study was divided into 2 stages:

Stage 1 – study of the state of liver function, cognitive functions and the impact of their disorders on alcoholization in patients with alcohol intoxication in the post-syntoxication period.

At this stage, 150 patients admitted in 2022-2023 who received standard drug therapy, at the end of which all patients on the 5th day underwent a study of the level of ammonia and lactate in the blood, the study of cognitive functions using the MMSE and the Reitan test, and the assessment of the severity of their disorders using the scale developed by us. Also, on the 5th day, the problem alcohol consumption was assessed using the AUDIT test.

Stage 2 to study the effectiveness of the developed measures of complex drug and psycho-social therapy of patients with alcohol intoxication in the post-intoxication period.

At this stage, the data of 223 patients who received treatment in 2019-2023 were studied.

The patients were divided into 3 groups: group I: 93 patients with mild and moderate cognitive and metabolic impairment who were treated in the toxicology department in 2022-2023 and who, after being discharged from the toxicology department, received additional complex hepatoprotective therapy: antihypoxant cytoflavin 1 tablet 2 times a day, ammonia-binding drug L-ornithine-L-aspartate 1 powder 3 times a day and ademetionine 750 mg 2 times a day for 7 days. After the end of treatment, standard FBI (Family Brief Intervention) interventions were performed on the 7th, 30th day, 6th and 12th months later.

Group II – 48 patients treated in the toxicology department in 2021, who also underwent standard FBI (Family Brief Intervention) interventions on the 7th day after discharge from the hospital, as well as on the 7th, 30th day, after 6 and 12 months without prior hepatoprotection.

Group III (archival) – 82 patients who were treated in the toxicology department in 2019-2020 and did not receive any medication and psycho-social assistance after discharge from the hospital.

All patients on the 7th day, 30th day, 6 and 12 months after discharge from the hospital underwent an assessment of problematic alcohol consumption using the AUDIT test. The rate of readmissions within a year of hospital discharge was also examined.

To conduct research at both stages, permission was obtained from the Ethics Committee of the Republic of Uzbekistan No9/4-1829.

Patients suffering from significant concomitant chronic diseases (coronary artery disease, thyrotoxicosis, hypertension),

with poisoning of other etiologies, under the age of 18 years, and pregnant women were excluded from the study.

3. Results of the Survey and Their Discussion

In the course of stage I, all patients were divided into three groups depending on the level of free ammonia on day 5 according to the clinical guidelines "Russian consensus of hyperammonemia in adults from 2019":

Group I, n=58 - with a relatively low level of free ammonia, mild hyperammonemia (< 100 μmol/l).

Group II, n=56 - with an average level of free ammonia, hyperammonemia of moderate severity (100-200 μmol/l).

Group III, n=36 – with a high level of free ammonia, severe hyperammonemia (over 200 μmol/l).

After stratification of patients according to the level of free ammonia, we obtained the following results (Table 1).

Table 1. Distribution of patients depending on the level of free ammonia (n=150) (M±m)

Indicator, unit, norm	Group I n=58	Group II n=56	Group III n=36
Free ammonia, μmol/l, 18-33	78.3±9.2	141.6±32.4*	221.5±8.4*

Note: * – p<0.05 compared to the group of patients with a low level of free ammonia.

We studied a number of clinical, laboratory and instrumental indicators depending on the level of this metabolite:

- the level of consciousness according to the Glasgow scale. The level of consciousness in all groups remained clear (Table 2).
- all patients with high and moderate degrees of hyperammonemia had moderate tachycardia, with relatively normal BP and HR values. As for the victims with mild and moderate degrees, they did not have any hemodynamic disorders (Table 2).

In order to more fully reflect the body's response to an increase in free ammonia, all patients were examined on biochemical blood tests and cognitive functions upon discharge from the hospital (Table 3).

Our observations showed that all victims with high hyperammonemia of poisoning had moderate signs of toxic hepatitis, which was manifested by an increase in liver enzymes ALT, AST, LDH, exceeding the norm by 2.1, 2.0, 1.1 times, respectively, ALP and bilirubin remained at the level of the upper limit of normal values (Table 3).

In patients with an average level of free ammonia, we observed a moderate increase in the enzymes ALT, AST, LDH, ALP by 1.8, 1.7 times, respectively, and the level of LDH, ALP, bilirubin remained within the upper limits of normal. In patients of group I, we observed only a slight increase in ALT and AST, and the rest of the biochemical tests were within the range (Table 3).

The level of lactic acid showed the presence of medium and high tissue hypoxia in all patients with hyperammonemia, in proportion to the level of free ammonia, which was manifested by an increase in the level of lactate in patients of groups II and III by 1.5 and 2.0 times higher than normal, respectively (Table 3).

Table 2. Clinical parameters in patients with toxic hepatates depending on the severity of hyperammonemia (n=150) (M±m)

Indicators	Group I n=58	Group II n=56	Group III n=36
Duration of binge drinking in a day	10.7 ± 2.2	7.0 ± 1.4	5.3 ± 1.1
Level of consciousness according to ShkG	14.3 ± 0.5	14.4 ± 0.2	14.1 ± 0.7
AH	124.7 ± 7.5	126.6 ± 9.5	132.3 ± 12.4
Heart rate per minute	82.5 ± 8.5	104.3 ± 9.6*	112.5 ± 6.8*

Note. * – p<0.05 compared to the group of patients with a low level of free ammonia.

Table 3. Biochemical parameters in patients with liver toxicity (n=150) (M±m)

Indicator, units of measurement	Norm	Group I n=58	Group II n=56	Group III n=36
AlT, u/l,	0-42	56,5±7,2	76.2±11.1	81.8±12.3*
AsT, u/l,	0-37	49.4±9.3	67.4±12.5	79.6±9.2*
LDG, u/l,	313-618	522.3±33.4	585.1±72.2	642.6±79.6*
ALP, u/l,	30-126	108.9±12.6	122.4±19.1	125.2±20.4*
Total bilirubin, μmol/l,	8,55-20,5	Select size 20.2±1.8	19.2±3.1	17.8±3.4
Venous blood lactate, mmol/l,	0,9-1,6	1.9±0.32	2.4±0.41*	3.2±0.31*
MMSE Scale Points	28-30 points	27.7±2.1	25.8±2.1	23.3±1.8*
Reitan's test, sec	Norm up to 100 sec	82.6±7.2	98.6±6.4	128.7±11*

Note: * – p<0.05 compared to the group of patients with a low level of free ammonia.

The study of cognitive functions on day 5 also showed their deterioration in proportion to the severity of hyperammonemia (Table 3). According to the screening of the level of intelligence according to the MMSE scale, patients of group I had practically no cognitive deficit, group II patients had mild cognitive impairment - 27.7±2.1 and 25.8±2.1 Points. As for the patients of group III, they had moderate cognitive impairment and the MMSE scale scores for all positions were 1.2, 1.3 times lower than in groups II and I (Table 5).

As for the marker of hepatic encephalopathy – the Reitan test, the best result was found in patients of group I who performed the test within the normal range – in 82.6±7.2 seconds, slightly longer in patients of group II – 1.2 times worse than in group I. Patients with high hyperammonemia performed this test much slower than in other groups – 1.6 and 1.3 times, respectively.

We assessed the informative value of the studied clinical and laboratory parameters, from which the most significant in assessing the severity of toxic encephalopathy were selected: the level of ammonia, lactate, MMSE and the Reitan test. Depending on the level of indicators, a point assessment of patients' cognitive impairments was developed. Each indicator was evaluated from 1 (mild impairment or none) to 3 (severe impairment) points. Patients with severe cognitive impairment (ammonia levels greater than 200 μmol/L, lactate levels greater than 3.0 mmol/L, MMSE less than 25 points, and Reitan test greater than 120 seconds) received scores in the range of 11-12 points. With moderate disorders (ammonia level 100-200 μmol/l, lactate more than 2.0-2.5 mmol/l, MMSE 25-27 points and Reitan test more than 90-120 seconds) – 6-10 points. With mild (ammonia level less than 100 μmol/l, lactate less than 2.0 mmol/l, MMSE more than 27 points and Reitan test less than 90 seconds) – 4-6 points.

Using the scale developed by us, we evaluated the indicators of all admitted patients (Table 4).

Table 4. Distribution of patients depending on the severity of toxic encephalopathy (n=150) (M±m)

Group	Severity of cognitive impairment in points		
	10-12 points	6-10 points	Less than 6 points
I группа, n=58	0 (0%)	4 (6,8%)	54 (93,2%)
Group II, n=56	3 (5,3%)	49 (85,8%)	5 (8,9%)
Group III, n=36	32 (88,8%)	4 (11,2%)	0 (0%)

According to the data obtained, 35 (23.4%) patients were diagnosed with severe metabolic and cognitive impairments, on average, they scored 10.7±0.6 points on the scale developed by us, 58 (38%) were diagnosed with moderate cognitive-metabolic disorders, on average they scored 7.7±0.8 points, and 59 (38.6%) had mild cognitive-metabolic disorders, on average, they scored 3.8±0.5 points, thus the sensitivity of our scale was 89.2%, Which is quite a high indicator.

After determining the severity of cognitive and metabolic disorders, we studied the degree of alcoholism of patients according to the AUDIT test. At the same time, 30 (85.7%) patients who scored more than 10 points on the scale developed by us could not undergo the AUDIT screening and they required additional drug therapy in the hospital and repeated intervention was carried out a week later, according to which they scored an average of 24.5±5.2 points, that is, serious alcohol dependence was detected. In all patients who scored from 6 to 10 points, the AUDIT screening showed 15.6±3.8 points, which corresponded to health-threatening consumption and an average risk of developing addiction. In patients with mild cognitive-metabolic impairment, the AUDIT screening showed 9.4±2.1 points, that is, a relatively low risk of alcohol dependence.

At the 2nd stage of the study, after determining the severity of cognitive-metabolic disorders in patients with alcohol intoxication in the post-intoxication period, 93 patients with moderate and severe disorders (group I) underwent a complex of drug therapy, after which the patients received standard FBI (Family Brief Intervention) interventions on the 7th, 30th day, after 6 and 12 months. Results of our study according to the AUDIT test in comparison with the group patients who received only FBI (II) and the archival comparison group (III) are shown in Table 5.

According to the data obtained, already on the 7th day, there was a slight difference between the groups in the degree of alcohol dependence, while in the group of patients who underwent hepatoprotective and antihypoxant therapy in the post-intoxication period, a slightly lower level of alcohol dependence was revealed than in the groups that did not receive it – by 1.2 and 1.3 times, respectively (Table 5). In dynamics, on the 30th day, we observed a positive effect of FBI on patients of groups I and II, however, in patients who received an additional complex of hepatoprotective therapy, a significant decrease in alcoholism was noted not only in relation to the comparison group (group III), but also to alcohol addicts who received only family psychotherapy (Table 5).

Table 5. Indicators of the AUDIT test and the rate of readmission in patients with alcohol intoxication in the post-intoxication period (n=223) (M±m)

Indicator, units of measurement	Norm	Group I n=93	Group II n=48	Group III n=82
AUDIT test for day 7, points	0-4 points	20,1±3,4	24,7±6,1	25.1±7.2
AUDIT test for 30 day points,		15,4±2,2	22,4±4,1*	27.2±3.9*
AUDIT test in 6 months, points		13.8±2.4	17.1±2.3	26.6±4.1*
AUDIT test after 12 months of points,		8.7±1.5	12.1±1.7	27.8±4.7*
Rate of readmission		0.6±0.2	1.8±0.6*	3.9±0.9*

Note: * – $p<0.05$ compared to the first group of patients.

Similar results were obtained when studying the alcoholism of patients using the AUDIT test at 6 and 12 months. The use of FBI significantly reduced the craving for alcohol consumption in the interviewees, which was especially manifested by a decrease in the aggressiveness of patients

towards others, the frequency of alcohol abuse, and an improvement in their performance, while the test indicators in patients of groups I and II were 1.9 and 1.5 months after 6 months. and after 12 months, it was 3.1 and 2.2 times lower than in the comparison group (Table 5). The effect of our hepatoprotective therapy, even a year after its use, was manifested by the best results of the AUDIT test in patients who received it (Table 5).

As for one of the direct criteria for the effectiveness of our study – the frequency of repeated hospitalizations in the toxicology departments of the RSCEMP, the data obtained indicate an almost complete cessation of repeated visits among patients of group I, while patients of group II were hospitalized on average twice, and III patients were hospitalized four times with repeated intoxication of varying severity (Table 5).

4. Findings

1. The development of a point assessment system for cognitive-metabolic disorders in patients with alcohol intoxication in the post-intoxication period, based on laboratory and screening research methods, made it possible to determine in more detail the timing and strategy of drug and psychosocial correction of patients.
2. The complex of hepatoprotective drug therapy and psychosocial correction developed by us for patients with alcoholism who have suffered alcohol intoxication significantly reduces the craving for repeated use of alcoholic beverages and improves the quality of life of this category of patients.

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