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Population Mechanisms of Risk of Development of Cholelithiasis, Algorithms of Early Diagnosis, Prevention and Optimization of its Treatment Among the Population of the Fergana Valley of the Gerontological Group

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Abstract

The article presents modern, foreign and domestic data on the problem of epidemiology, prevention and treatment of cholelithiasis (gallstone disease). The analysis of population studies and preventive programs forcholelithiasisin the population of the gerontological and geriatric group is carried out. The article discusses modern recommendations for the use of screening, various types of preventive studies, conservative and surgical methods of treatment of cholelithiasis.

Keywords: Cholelithiasis, epidemiology, prevention, pharmaco-epidemiology, risk factors, geriatric features of early detection and treatment of cholelithiasis.

Introduction

The aim of the study is to study the prevalence, pharmacoepidemiology of cholelithiasis and its main risk factors among the male and female unorganized population of the gerontological group of the Fergana Valley to enable scientifically based planning and optimization of early diagnosis, prevention and treatment of this disease.

Materials and Methods

The object of the study The sample included a contingent of 4,500 individuals from the gerontological age population, formed using random number tables based on the nominal electoral lists of men and women in three regions of the Fergana Valley; as well as 779 patients with cholelithiasis who were undergoing inpatient treatment in the regional multidisciplinary hospitals of Andijan, Namangan and Fergana (for VEN analysis).

Subject of the research There were results of general clinical and biochemical blood tests, a survey, physical, instrumental and pharmacoepidemiological monitoring; as well as the method of "daily nutrition reproduction" adapted to the peculiarities of Uzbek cuisine.

Research methods

To solve the set tasks, epidemiological, clinical, laboratory, biochemical, instrumental, pharmacoepidemiological and statistical research methods were used, as well as the "daily nutrition reproduction" method.

Results and Discussion

Primary and secondary prevention of chronic non-communicable diseases (CNCD), including cholelithiasis (ChT) is approved as the most effective means of reducing morbidity and mortality of people with non-communicable pathologies. First of all, this is associated with the implementation, in the example of other CNCD, of a population strategy and a high-risk strategy. Such a strategy is aimed at identifying the population with a high probability of developing CNCD/ ChT.

The priority and mandatory step of primary prevention activities is the correction of risk factors based on data on population mechanisms of the risk of developing chronic renal disease with the implementation of regional algorithms for early diagnosis and treatment. To date, there are no scientific data obtained in this direction on cholelithiasis among the gerontologically aged population in the regions of Uzbekistan, in particular in the Fergana Valley. And scientific results on primary prevention and pharmacovigilance of cholelithiasis make it possible to achieve a further significant reduction in morbidity, disability and mortality from this disease, which is currently observed in developed countries.

Table – 1 Risk of developing cholelithiasis in the population of the gerontological group of the Fergana Valley in connection with risk factors

№	Risk factors	ChT, n	χ^2	P	RR	95%CI
1	Gender (men)	371	0,004	>0,05	0,997	0,914-1,088
2	Gender (women)	516	0,004	>0,05	1,002	0,942-1,066
3	60-74 years	487	16,49	<0,001	1,135	1,064-1,211
4	75-89 years	376	17,12	<0,001	0,824	0,754-0,900
5	90 years and older	24	0,003	>0,05	1,013	0,652-1,572
6	Dyslipidemia	598	13,01	<0,001	0,903	0,856-0,952
7	Arterial hypertension	611	0,045	>0,05	1,005	0,957-1,056
8	Alcohol consumption	140	1,716	>0,05	0,891	0,750-1,058
9	Low consumption of vegetables and fruits	230	10,14	<0,001	1,212	1,073-1,368
10	Diabetes mellitus	233	0,826	>0,05	1,058	0,936-1,195
11	Use of antihypertensive drugs	483	7,664	<0,01	0,905	0,845-0,969
12	Burdened heredity	242	5,964	<0,01	0,857	0,758-0,968
13	Overweight	661	22,43	<0,001	0,889	0,890-0,930
14	Obesity	616	24,10	<0,001	0,872	0,828-0,917
15	Liver cirrhosis	33	6,904	<0,01	0,588	0,394-0,876
16	Comorbidity	416	0,637	>0,05	1,032	0,955-1,115

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Table – 2 Risk of developing cholelithiasis in the population of women of gerontological age in the Fergana Valley in connection with risk factors

№	Risk factors	ChT, n	χ^2	P	RR	95%CI
1	60-74 years	268	17,19	<0,001	1,192	1,090-1,304
2	75-89 years	235	19,95	<0,001	0,767	0,687-0,857
3	90 years and older	13	0,536	>0,05	1,244	0,692-2,237
4	Dyslipidemia	337	3,453	<0,05	0,932	0,868-1,001
5	Arterial hypertension	353	0,037	>0,05	1,006	0,943-1,074
6	Alcohol consumption	2	0,525	>0,05	1,715	0,391-7,523
7	Low consumption of vegetables and fruits	116	23,48	<0,001	1,491	1,257-1,770
8	Diabetes mellitus	140	0,027	>0,05	1,013	0,866-1,186
9	Use of antihypertensive drugs	275	5,242	<0,05	0,895	0,816-0,981
10	Burdened heredity	121	6,370	<0,01	0,791	0,661-0,946
11	Overweight	369	8,990	<0,01	0,902	0,847-0,961
12	Obesity	354	10,94	<0,001	0,885	0,827-0,947
13	Liver cirrhosis	18	2,960	>0,05	0,626	0,366-1,071
14	Comorbidity	231	1,643	>0,05	1,070	0,963-1,190

Taking into account the above-stated literary background, we studied the population mechanisms of the risk of developing cholelithiasis among the gerontologically aged population of the Fergana Valley. The results obtained in the population of the gerontological group of the Fergana Valley on the risk of developing cholelithiasis in connection with risk factors are presented in Table 1. As follows from Table 1, each range of risk factor values corresponds to a certain level of risk of developing cholelithiasis. The prognosis of the risk of cholelithiasis based on the assessment of risk factors differs significantly: gerontological groups of low risk of developing cholelithiasis, moderate risk, high risk and very high risk are distinguished.

A very high risk of developing cholelithiasis in the gerontological group population of the Fergana Valley is confirmed by the following risk factors: 1) age 60–74 years (X2 = 16.49; P<0.001; RR = 1.135; 95% CI = 1.064–1.211); 2) old age 75–89 years (X2 = 17.12; P<0.001; RR = 0.824; 95% CI = 0.754–0.900); 3) dyslipidemia (X2 = 13.01; P<0.001; RR = 0.903; 95% CI = 0.856–0.952); 4) low consumption of vegetables and fruits (X2 = 1.14; P<0.001; RR = 1.212; 95% CI = 1.073 – 1.368); 5) overweight (X2 = 22.43; P<0.001; RR = 0.889; 95% CI = 0.890 – 0.930); 6) obesity (X2 = 24.10; P<0.001; RR = 0.872; 95% CI = 0.828 – 0.917). A high risk of developing cholelithiasis in this group of the Fergana Valley population is associated with the use of antihypertensive drugs (X2 = 7.664; P<0.001; RR = 0.905; 95% CI = 0.845 – 0.696), a burdened heredity (X2 = 5.964; P<0.001; RR = 0.857; 95% CI = 0.758 – 0.968) and liver cirrhosis (X2 = 6.904; P<0.001; RR = 0.588; 95% CI = 0.394 – 0.876).

In the group of moderate risk of developing cholelithiasis, in this group of examined gerontological age patients of the Fergana Valley, the population - patients - were not found. And the low risk of developing cholelithiasis is asserted in connection with other seven risk factors: 1) male gender (X2 = 0.004; P<0.001; RR = 0.997; 95% CI = 0.914 - 1.088); 2) female gender (X2 = 0.004; P>0.05; RR = 1.002; 95% CI = 0.942 - 1.066); 3) with age of 90 years and older (X2 = 0.003; P>0.05; RR = 1.013; 95% CI = 0.652 - 1.577); 4) arterial hypertension

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Table – 3 Risk of developing cholelithiasis in the population of gerontologically aged men in the Fergana Valley in connection with risk factors

№	Risk factors	ChT, n	χ^2	P	RR	95%CI
1	60-74 years	219	1,902	>0,05	1,066	0,971-1,170
2	75-89 years	141	1,251	>0,05	0,918	0,793-1,064
3	90 years and older	11	0,782	>0,05	0,739	0,377-1,447
4	Dyslipidemia	261	11,49	<0,001	0,865	0,800-0,935
5	Arterial hypertension	258	0,010	>0,05	1,004	0,931-1,082
6	Alcohol consumption	138	2,601	>0,05	0,881	0,758-1,025
7	Low consumption of vegetables and fruits	114	0,740	>0,05	0,926	0,780-1,101
8	Diabetes mellitus	93	1,464	>0,05	1,125	0,927-1,365
9	Use of antihypertensive drugs	208	2,495	>0,05	0,918	0,829-1,018
10	Burdened heredity	121	0,854	>0,05	0,924	0,784-1,090
11	Overweight	292	14,61	<0,001	0,872	0,819-0,928
12	Obesity	262	13,62	<0,001	0,853	0,790-0,922
13	Liver cirrhosis	15	4,106	<0,05	0,542	0,297-0,987
14	Comorbidity	185	0,075	>0,05	0,984	0,878-1,103

(X2 = 0.045; P>0.05; RR = 1.005; 95% CI = 0.957 – 1.056); 5) alcohol consumption (X2 = 1.716; P>0.05; RR = 0.891; 95% CI = 0.750 – 1.058); 6) diabetes mellitus (X2 = 0.826; P>0.05; RR = 1.058; 95% CI = 0.936 – 1.195); 7) comorbidity (X2 = 0.637; P>0.05; RR = 1.032; 95% CI = 0.955 – 1.115).

Table 2 also presents the results of the analysis of the study and assessment of the risk of developing cholelithiasis in the population of women of gerontological age in the Fergana Valley in connection with risk factors.

In women of gerontological age in the Fergana Valley, a very high risk of developing cholelithiasis was confirmed due to the following risk factors: 1) age 60-74 years (X2 = 17.19; P<0.001; RR = 1.192; 95% CI = 1.090-1.304); 2) age 75-89 years (X2 = 19.95; P<0.001; RR = 0.767; 95% CI = 0.687-0.857); 3) low consumption of vegetables and fruits (X2 = 23.48; P<0.001; RR = 1.491; 95% CI = 1.257-1.770); 4) obesity (X2 = 10.94; P<0.001; RR = 0.885; 95% CI = 0.827 – 0.947).

A high risk of developing cholelithiasis is noted in connection with a burdened heredity (X2 = 6.370; P<0.001; RR = 0.791; 95% CI = 0.661 – 0.946) and excess weight of calves (X2 = 8.990; P<0.001; RR = 0.902; 95% CI = 0.847 – 0.961).

In connection with the following risk factors, such as dyslipidemia (X2 = 3.453; P<0.05; RR = 0.932; 95% CI = 0.868 – 1.001) and the use of antihypertensive drugs (X2 = 5.242; P<0.05; RR = 0.895; 95% CI = 0.816 – 0.981), a moderate risk of developing cholelithiasis is confirmed in the examined female population of the gerontological group.

Low risk of developing cholelithiasis was associated with the following risk factors: age 90 years and above (X2 = 0.536; P>0.05; RR = 1.244; 95% CI = 0.692 – 2.237), arterial hypertension (X2 = 0.037; P>0.05; RR = 1.006; 95% CI = 0.943 – 1.074), alcohol consumption (X2 = 0.525; P>0.05; RR = 1.715; 95% CI = 0.391 – 7.523), diabetes mellitus (X2 = 0.027; P>0.05; RR = 1.013; 95% CI = 0.866 – 1.186), liver cirrhosis (X2 = 2.960; P>0.05; RR = 0.626; 95% CI = 0.366 – 1.071) and comorbidity (X2 = 1.643; P>0.05; RR = 1.070; 95% CI = 0.963 – 1.190).

Further, a similar statistical analysis was carried out in the population of gerontologically aged men in the Fergana Valley (Table 3).

It was noted that in this population group the risk of developing cholelithiasis is associated with 14 risk factors and all those examined are included in the very high risk, moderate and low risk groups; the high risk group is not observed. Thus, a very high risk of developing gallstone disease is confirmed in connection with dyslipidemia (X2 = 11.49; P<0.001; RR = 0.865; 95% CI = 0.800 – 0.935), overweight (X2 = 14.61; P<0.001; RR = 0.872; 95% CI = 0.819 – 0.928) and obesity (X2 = 13.62; P<0.001; RR = 0.853; 95% CI = 0.790 – 0.922).

A moderate risk of developing cholelithiasis in men of gerontological age is predicted in connection with liver cirrhosis (X2 = 4.106; P<0.05; RR = 0.542; 95% CI = 0.297 – 0.987).

Low risk of developing cholelithiasis in this population is confirmed by the following risk factors: 1) age 60–74 years (X2 = 1.902; P>0.05; RR = 1.066; 95% CI = 0.971–1.170); 2) age 75–89 years (X2 = 1.251; P>0.05; RR = 0.918; 95% CI = 0.793–1.064); 3) age ≥ 90 years (X2 = 0.782; P>0.05; RR = 0.739; 95% CI = 0.377–1.447); 4) arterial hypertension (X2 = 0.010; P>0.05; RR = 1.004; 95% CI = 0.931 – 1.082); 5) with alcohol consumption (X2 = 2.601; P>0.05; RR = 0.881; 95% CI = 0.758 – 1.025); 6) with low consumption of vegetables and fruits (X2 = 0.740; P>0.05; RR = 0.926; 95% CI = 0.780 – 1.101); 7) diabetes mellitus (X2 = 1.464; P>0.05; RR = 1.125; 95% CI = 0.927 – 1.365); 8) with the use of antihypertensive agents (X2 = 2.495; P>0.05; RR = 0.918; 95% CI = 0.829 – 1.018); 9) burdened heredity (X2 = 0.845; P>0.05; RR = 0.924; 95% CI = 0.784 – 8.090); 10) comorbidity (X2 = 0.075; P>0.05; RR = 0.984; 95% CI = 0.878 – 1.103).

Thus, the obtained new epidemiological data, in contrast to the previous and outdated clinical and statistical data of the literature, can significantly change the understanding of the risk of cholelithiasis in gerontological individuals of the Fergana Valley. Prognostic assessment of cholelithiasis in connection with its risk factors allows: 1) to identify individuals who have a very high risk of cholelithiasis and its complications; 2) to identify the gerontological population in groups of high, moderate and low risk of cholelithiasis. The use of such "rescreening" + "reclassification" can lead to increased efficiency: a) before nosological diagnosis of cholelithiasis, b) before nosological prevention of cholelithiasis and its complications, c) pharmacoprophylaxis and pharmacovigilance of cholelithiasis, d) preventive surgery of cholelithiasis; d) existing algorithms for examination, early diagnosis and optimization of treatment (surgical and conservative) of cholelithiasis among the population of the regions of Uzbekistan (in the example of the Fergana Valley) of the gerontological group.

Conclusion

In the formation of "aggressive" epidemiological conditions in relation to cholelithiasis among the gerontologically aged population of the Fergana Valley, exogenous and endogenous common factors play a key role. They are characterized by the following prevalence rates in men and women (≥60–90 years), respectively: arterial hypertension - 42.1% and 57.9%, alcohol consumption - 98.4% and 1.6%, low consumption of vegetables and fruits - 39.8% and 60.2%, type 2 diabetes mellitus - 41.9% and 58.1%, overweight - 42.5% and 57.5%, obesity - 41.7% and 58.3%, burdened heredity - 52.8% and 47.2%, cirrhosis of the liver - 42.9% and 57.1%.

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