PREVALENCE OF GALLSTONES IN WOMEN IN SLOVAKIA: ULTRASONOGRAPHIC STUDY
PREVALENCIA ŽLČNÍKOVÝCH KAMEŇOV U ŽIEN NA SLOVENSKU: ULTRASONOGRAFICKÁ ŠTÚDIA

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ABSTRACT

Background: Cholelithiasis is one of the most frequent diseases in the female population. Despite of this fact, there was not realised a prevalence study of cholelithiasis in females in Slovakia.

Methods: 2 102 female patients, aged 15 – 80+, were examined over a four year period in this ultrasonographic study. The study was realised from 1989 to 2003 as a consecutive study by the ultrasonographic outpatient department of Trenčín Hospital. The results were evaluated by chi-quadrat and Fischer tests.

Results: The prevalence of gallstones in the group of 1952 patients without cholecystectomies was 17.21%, e.g. in 336 cases the cholelithiasis was found. There were 150 cases after cholecystectomies due to gallstones. This group was comparable with the main group mentioned above. The whole prevalence of gallstone disesase, with inclusion of subgroup after cholecystectomy, e.g. in the whole group of 2102 female patients, was 23.12 %. Cholelithiasis was found in 8.19 % in the group without symptoms, in 17.67 % in the group of atypical symptoms and in 75 % in the group with typical symptoms. Maternal history of cholelithiasis had 15.52 % of women in comparison of 3.18 % with paternal history. Increasing age was a significant risk factor for cholelithiasis from 0.24 % in age group from 15 to 18 to 62.5 % in an age group over 80. Cholelithiasis in obese women was detected in 28.92 % opposite to 11.31 % women with normal weight. Cholelithiasis was found in 6.7 % in women with no pregnancy, in 21.8 % in the group with one pregnancy, and in 23.3 % with two and more pregnancies. In the group with diabetes mellitus, cholelithiasis occured in 36.91% vs. 15.55 % without diabetes mellitus. Women who were smokers had cholelithiasis in 11.5 % vs 17.96 % in no smoking women. Women who drank coffee had cholelithiasis in 15.54 % vs 17.96 % women who drank coffee occassionally. Women who work as administrative staff had cholelithiasis in 18.7 % vs 25.58% of women who worked in manual labour jobs. Maternal cholelithiasis was significantly higher in the group with cholecystectomies e.g. 24.67 % vs 15.525 % in the group without cholecystectomies.

Conclusions: The significant risk factors for cholelithiasis were: Age, maternal history, pregnancy, diabetes mellitus, obesity in younger and middle age nad manual kind of work. Hormonal contraception and smoking were no risk factors. Caffeine could have protective effect against cholelithiasis.

Key words: Gallstones. Women population. Prevalence. Ultrasonography.

ABSTRAKT

Východiská: Cholecystolitiáza je jedným z najčastejšie zastúpených ochorení v ženskej populácii. Napriek uvedenej skutočnosti, doposiaľ nebola na Slovensku realizovaná prevalenčná štúdia zameraná na výskyt cholecystolitiázy u žien.

Metódy: V rámci ultrasonografickej štúdie bolo vyšetrených celkom 2 102 žien a dievčat v období štyroch rokov. Štúdia bola realizovaná v rokoch 1989 až 2003 ako konzekutívna štúdia na ultrasonografickom pracovisku Nemocnice s poliklinikou Trenčín. Výsledky boli hodnotené pomocou chí-kvadrátového testu a Fischerovho testu.

Výsledky: Prevalencia cholecystolitiázy v súbore 1 952 pacientok bez cholecystektómie bola 17,21 %, t.j. vyskytla sa v 336 prípadoch. Do prevalencie bol započítaný aj súbor 150 pacientok po cholecystektómii pre cholecystolitiázu. Tento súbor bol porovnateľný so súborom pacientok bez cholecystektómie. Celková prevalencia cholecystolitiázy v súbore 2 102 dievčat a žien bola 23,12 %. Cholecystolitiáza sa vyskytla v skupine pacientok bez príznakov v 8,19 %, v skupine s atypickými príznakmi v 17,67 % a v skupine s typickými príznakmi v75,0 %. Pozitívny výskyt cholecystolitiázy u matiek sa zistil v 15,52 % pacientok, kým v prípade výskytu cholecystolitiázy u otcov to bolo v 3,18 %. Vek bol signifikantný rizikový faktor pre vznik cholecystolitiázy s výskytom 0,24 % vo vekovej kategórii od 15 až 18 rokov až po 62,5 % vo vekovej kategórii nad 80 rokov. V prípade obezity sa cholecystolitiázy vyskytla u 28,92 % pacientok, kým v prípade normálnej hmotnosti to bolo 11,31 %. U netehotných žien sa cholecystolitiáza vyskytla v 6,7 %,v prípade jedného tehotenstva to bolo v 21,8 % a v prípade dvoch a viac tehotenstiev to bolo v 23,3 %. Cholecystolitiáza u žien s diabetes mellitus sa vyskytla v 36,91% oproti 15,55 % bez diabetes mellitus. U fajčiarok sa cholecystolitiáza vyskytla v 11,5 % oproti 17,96 % u nefajčiarok. Pacientky pijúce pravidelne čiernu kávu mali výskyt cholecystolitiázy v 15,54 %, kým u pacientok, ktoré čiernu kávu pili len príležitostne sa cholecystolitiáza zistila v 17,96 % prípadov. U pacientok s administratívnym typom práce sa cholecystolitiáza vyskytla v 18,7 % oproti 25,58% u pacientok, ktoré pracovali manuálne. Výskyt cholecystolitiázy u matiek bol signifikantne vyšší v skupine žien s cholecystektómiou a to v 24,67 ˇoproti 15,52 % v skupine žien bez cholecystektómie.

Záver: Rizikovými faktormi pre vznik cholecystolitiázy boli: vek, pozitívna anamnézy cholecystolitiázy u matky, tehotenstvo, diabetes mellitus, obezita v mladom a strednom veku a manuálna práca. Hormonálna antikoncepcia a fajčenie nemali vplyv na vznik cholecystolitiázy. Kofeín môže mať protektívny účinok na vznik cholecystolitiázy.

Key words: Cholecystolitiáza. Ženská populácia. Prevalencia. Ultrasonografia.

INTRODUCTION

Cholelithiasis (Ch.l.) has been present in humans for ages. As documented by findings in mummies, the disease was present in ancient Egypt as early as

3400 B.C. [1]. There are many epidemiological studies in research studies and investigation continues. Based on autopsies and clinical studies the attention was focused on ultrasonographig methods of examination. Kratzer reffered to 22 ultrasonographic studies in 1999, in which 12 had more than 1 000 patients included [2]. In former Czechoslovakia one ultrasonographic study and two autopsy studies have been published [3-5]. No study has been published regarding the prevalence of Ch.l. in females in the Slovak Republic.

METHODS

Our ultrasonographic study examined 2106 female patients over a four-year-period (1989 – 1993). They were all asymptomatic for Ch.l. having been referred by their physicians for examination of other organs, primarily kidney and thyreoid. Each patient completed a preexamination questionnaire that was checked by our staff following the ultrasound examination. The questionnaire collected following informations: Age, clinical symptoms in patient history, clinically expressed Ch.l. in the family, weight, number of pregnancies, suffering of diabetes mellitus, use of hormonal contraception, smoking, caffeine use and kind of work.

All examinations were performed while fasting and in both supine and left side positions. We used the Toshiba SAL 22 with a linear 3.5 MHz probe. Findings were evaluated using Crade scale [6]. Two of the findings of the 3rd type were excluded from the study. Two patients were excluded from the study due to inaccurate information given in the questionnaire. There was the history of cholecystectomies in 150 patients. These patients were primarily evaluated as a separate subgroup, but after comparability to main group was confirmed, these patients were added to the main group. Finally, the total number of patients included in this study was 2102 patients.

All results were statistically analysed using the chi-quadrant and Fischer tests. The statistical approach was in correlation to standard recommendations [7].

RESULTS

The frequency of Ch.l. in various age group is shown in Table 1. In the group of 1952 patients we found 336 cases of Ch.l., e.g. 17.27 %. With the inclusion of the post cholecystectomy subgroup of 150 cases the prevalence of cholecystolithiasis was 23.12 %. The break down of results to the diferent aspects of the questionnare was as follows:

Clinical symptoms: Ch.l. was found in 8.19 % in the group without symptoms, in 17.67 % in the group with atypical symptoms and in 75.0 % in the group with typical symptoms, e.g. single or multiple biliary colic.

Family history: In our group, 15.52 % patients had a maternal history of clinically expressed Ch.l., determined by cholecystectomy, cholecystography or ultrasound, compared to 3.18 % patients with positive paternal history of Ch.l. ($p<0.05$).

Age: The connection between age Ch.l. had an increasing tendency, as is shown in Table 1. The frequency of Ch.l. started from 0.24 % in the age group of 15 to 18 years up to 62.5 % in patients 80+ years old ($p<0.05$).

Weight: Ch.l. was found in 28.92 % of obese women, opposite to 11.31 % of women with normal weight ($p<0.05$).

Pregnancies: Women with no pregnancies had Ch.l. in 6.7%, with one pregnancy 21.8 % and with two or more pregnancies in 23.33 %, respectively.

Table 1 Prevalence of ch.l. by age

Age in years	The prevalence of ch.l. in %					
	With cholecystectomies		Without cholecystectomies		Total	
	Number	%	Number	%	Number	%
15 - 18	0	0.00	410	0.24	410	0.24
19 - 24	1	1.07	179	6.70	180	7.77
25 - 29	3	1.47	185	9.70	188	11.17
30 - 39	10	3.57	237	11.40	247	14.97
40 - 49	15	6.08	187	18.18	202	24.26
50 - 59	41	10.16	270	22.96	311	33.12
60 - 69	47	8.84	264	29.08	311	37.92
70 - 79	27	4.58	162	49.91	189	54.49
over 80	6	12.59	58	58.62	64	62.50
Total	**150**	**5.85**	**1952**	**17.27**	**2102**	**23.12**

Table 2 Prevalence of cholithiasis due to evaluated parameters

*Symptoms and number of persons		NEGAT. - 989			ATYP. - 815			TYP. - 148		
**USG findings and number of persons		0 / 908	1 / 35	≥2 /46	0 / 671	1 /65	≥2/ 79	0 / 37	1 / 43	≥2/ 68
Family	Mother	133	4	5	114	5	12	11	8	12
	Father	29	-	-	25	1	1	1	2	3
	Siblings	45	2	2	57	5	10	6	7	14
Obesity	No	697	16	24	431	26	41	25	16	24
	Yes	211	19	22	240	39	38	12	27	44
Pregnancy	0	487	5	9	156	7	12	9	4	10
	1	67	4	7	76	7	8	4	5	10
	2 and more	354	26	30	439	51	59	24	34	48
Diabetes mellitus	No	871	29	38	615	55	66	36	33	60
	Yes	37	6	8	56	10	13	1	10	8
Contracep-tion	No	883	34	46	644	65	77	30	41	63
	Yes	25	1	-	27	-	2	7	2	5
Smoking	No	816	33	41	570	59	73	30	42	62
	Yes	92	2	5	101	6	6	7	1	6
Caffeine	<1 daily	604	20	32	371	45	63	11	25	35
	≥1 daily	304	15	14	300	20	16	26	18	33
Kind of work	Mental	583	5	8	251	14	15	23	13	20
	Manual	325	30	38	420	51	64	14	30	48

Legend: *Symptoms: NEGAT – without symptoms, ATYP – atypical symptoms, TYP – typical symptoms (biliary colic) , **USG findings: 0- no gallstones, 1 – one gallstone, ≥2 – two and more gallstones

Table 3 Overview of epidemiologic studies of gallstones disease

	Number of studies	Autopsy	Clinical	Ultrasonography	Radiologic
Australia	3	3	-	-	-
Africa	18	8	9	1	-
Asia	20	12	5	2	1
Americas	21	11	4	1	5
Europe	59	47	-	10	2
Total	**121**	**81**	**18**	**14**	**8**

We found a significant difference between the groups with no pregnancy and those with a single pregnancy ($p<0.05$), while differences between the single and multiple pregnancy groups were not significant.

Diabetes mellitus: Ch.l. was found in 36.91 % of patients with diabetes mellitus compared to 15.55 % of those without diabetes ($p<0.05$).

Hormonal contraception: There were 69 women who used hormonal contraception continuously for 6 or more months. Ch.l. was present in 14.49 % of this group compared to 17.31 % of the non-using group. The over-all frequency of Ch.l. in the age group of 19 –49 years (817 patients) was 14.8 %.

Smoking: Smokers of more than 5 cigarettes per day had Ch.l. in 11.5 %, non-smokers in 17.96 %, respectively.

Caffeine use: Regular coffee drinkers (one or more cups per day) had Ch.l. in 15.54 %, while occasional coffee drinkers in 18.24 %, respectively ($p<0.05$).

Nature of work: Only women over the age of 19 were evaluated. Ch.l. was found in 18.7 % of office workers, compared to 25.58 % of manual workers ($p<0.05$).

Postcholecystectomy group: The comparison of the post cholecystectomy group to the basic group produced only one statistically significant factor: This group demonstrated a higher prevalence of maternal Ch.l.: 24.67 % vs. 15.52 % in the non-cholecystectomy group ($p<0.05$).

DISCUSSION

Interest in ch.l. epidemiology is documented by a sample of 121 studies in the research studies through 1992. Distribution by continents and methods of investigation are shown in Table 3 [8, 9].

The highest prevalence of Ch.l. was found in Pima Indians, women exceeding men in 48.6 % in 34.2 %, respectively [10]. The lowest over-all prevalence based on autopsy studies was reported from Africa: 0.1 % [11].

Main component of gallstones, as commonly described in studies, is cholesterol. One study from Slovakia confirmed this fact: 92 % of investigated post-cholecystectomy gallstones were primarily composed of cholesterol [12].

Morbidity rate after non-complicated cholecystectomy in the former Czecho-Slovak Republic was 0.67 %. This ratio was increasing in case of additional cholecystitis to 1.08 %, and in case of procedures done on the common bile duct to 2.64% [13].

Regarding other parameters our results were comparable to the results from the following studies:

- maternal genetic disposition [14, 15],
- age [16],
- obesity – particularly in younger and middle age women [17],
- pregnancy – particularly in younger women and those having had multiple pregnancies [16],
- diabetes mellitus [18],
- manual labor [19].

Maternal history of Ch.l., age and obesity influenced the clinical expression of Ch.l. Diabetes mellitus and single pregnancy were not significant risk factors of a higher prevalence of biliary colic or dyspepsia, compared to women with multiple pregnancies or pregnancy at a young age. Obesity was a risk factor in younger and middle aged women.

It appears, that caffeine, in fact can reduce the formation of gallstones. This may be an indication that caffeine could be a protective factor against gallstone formation. Further research and careful analysis must be done to confirm this possibility.

Finally we can state, that the prevalence of Ch.l. in the Slovak Republic, as shown in this sonographic study, is in keeping with those sectional studies confirms the autopsy results from the former Czecho-Slovak Republic, resp. the Czech part of it: 38.5 % resp. 39 % in women from 50 to 59 years of age [3, 4].

Our results are also comparable to findings in other parts Europe. Risk factors evaluated in our study conform with the results published in literature. The role of caffeine is not clear and should be investigated further.

CONCLUSIONS

The prevalence of gallstones in the group of 2 102 females, age 15 – 80+ years, was 23.12 %.

The significant risk factors for cholelithiasis were: Age, maternal history, pregnancy, diabetes mellitus, obesity in younger and middle age patients and manual work. Hormonal contraception and smoking were no risk factors. Caffeine could have protective effect on the development of cholelithiasis. All these results are comparable with studies from other parts of Europe.

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