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Determination of *Helicobacter pylori* by ELISA: single-center experience

Identifying the causes of helicobacteriosis, their timely diagnosis, and the choice of the correct treatment tactic will help improve the population health and increase life expectancy. This article is devoted to studying the presence of *Helicobacter pylori* antigens in the blood plasma of patients living in the Zhezkazgan city. The aim of the project is to determine the distribution of *Helicobacter pylori* by ELISA method. The result of our research shows that the presence of antibodies to *Helicobacter pylori* was found in 20 blood plasma samples from 45 analyzed, which is 44.45 % from overall samples number. The majority of positive results among Zhezkazgan city residents were detected in female samples (54.5 %), then in male (34.7 %) while in two previous studies the prevalence of positive results was in men or identical percentages in men and women. The most of positive results were detected in the residents at the age from 0 to 18 (50 %) and at the age who over 60 (66.6 %). The results identified that in Zhezkazgan city the Helicobacter pylori infection prevailed in the category of preschoolers and scholars and also among the old people, while the working population has the lower positive results (39.2 %).

Keywords: Helicobacter pylori, distribution, ELISA, antibody.

Introduction

Conducting a study on the presence of infectious disease pathogens such as *Helicobacter pylori* (*HP*) in Kazakhstan is becoming an increasingly relevant topic. *HP* pathogen is one of the most serious problems of gastroenterology due to the fact, that the prevalence of *HP* infection is progressively increasing, the disease is increasingly detected in people of young working age, as well as the fact that the microorganism is recognized as a first-order carcinogen. Consequently, the development of algorithms for early and accurate diagnosis of *HP* pathogens will improve the quality of treatment and follow-up of this category of patients. As well, more and more attention is being paid to the problem of re-infection, in connection with which it is necessary to clarify the timing of the control tests for *HP* to differentiate the re-infection and the failure of eradication therapy. *HP* is a helical gram-negative, microaerophilic bacterium that infects the areas of the stomach and duodenum [1–3]. For the last twenty five years, *HP* has been at the center of attention of scientists and gastroenterologists of the world. According to A.S. Bazhikova Kazakhstan belongs to countries with a high level of infection with *HP* — from 67.5 to 92 %, therefore, the solution of the issues of prevention and eradication of *HP* infection. It is an urgent medical and biological task for the country. For comparison, in Russia, the infection of the adult population ranges from 50 to 80 %, and in some regions it approaches 100 %. In Almaty, among adults with chronic gastritis, *HP* infection was 70 %, among adolescents — 60 %, *HP*-associated peptic ulcer disease in adults was found in 90 %, in adolescents — 98 %, *HP* etiology had 90 % of cases of duodenal ulcer disease intestines and 70 % of gastric ulcer. If in the southern region CagA-positive strains of *HP* were detected in 49.5 %, in the western region, Cag-A infected with *HP* were detected in 83 % of patients [4]. Unfortunately, there is no data on the frequency of infection with cytotoxic strains among ethnic populations

and indigenous people of Kazakhstan. The aim of the project is to determine the distribution of *HP* in Zhezkazgan city by ELISA method.

Research materials and methods

For detection of *Helicobacter pylori* by ELISA method human blood plasma of residents who applied to the "Zhezkazgan medical center" were used. Blood plasma samples were isolated by centrifuging 2300 rpm for 15 minutes. ELISA was carried out by using "Helicobacter pylori-CagA-antibodies-ELISA-BEST" reagent set (Vector-best, Russia). Optical density was measured on a spectrophotometer (BIO-RAD). The results of the analysis were checked through the analyzer and sent to the laboratory information system.

Research results and their discussion

In order to study the prevalence of Helicobacter pylori in the Zhezkazgan city, we determined the presence of antibodies to these pathogens in the blood plasma of residents who applied to the "Zhezkazgan Medical Center" within 2 months from March 4 to April 27, 2019.A total number of tested samples for *HP* were 45, from which 23 belong to men and 22 to women. The average age was 33.9±18 years old. 14 people of 45 tested were at the age from 0 to 19, 28 — at the age from 19 to 60 and 3 — at the age of over 60 years old (Table 1).

Table 1

Patients' characteristics and results of the analysis

№	Age	Sex	Helicobacter pylori	№	Age	Sex	Helicobacter pylori
1	67	F	+	24	57	M	–
2	44	M	+	25	40	F	–
3	12	M	+	26	65	M	+
4	29	F	+	27	12	M	–
5	4	F	+	28	51	F	–
6	46	F	+	29	31	F	–
7	44	F	+	30	54	M	–
8	20	F	–	31	20	M	–
9	32	M	+	32	15	F	+
10	49	F	+	33	47	M	–
11	27	M	–	34	14	F	–
12	18	F	–	35	27	M	–
13	49	M	–	36	16	F	+
14	16	F	–	37	14	M	+
15	47	F	–	38	54	M	–
16	40	F	+	39	55	M	–
17	15	M	–	40	70	F	–
18	13	F	+	41	12	M	–
19	25	M	–	42	16	F	–
20	37	M	+	43	59	F	+
21	34	M	+	44	51	M	–
22	21	F	–	45	45	M	+
23	11	M	+				

Helicobacter pylori was found in 20 plasma samples from 45 analyzed, which are 44,45 % from overall samples number. This was 23 cases per 100,000 people. Our result was similar with the analogical study in the southern region of Kazakhstan where positive results were detected in 49.5 % of tested samples, while in the western region of Kazakhstan positive results were detected in 83 % of samples [4]. In Atyrau city *HP* was detected in all patients (100 %) who applied to medical center № 1 [5].

Further studies suggested determining the prevalence of this pathogen among men and women.

The positive results on the presence of *HP* infection was determined in 8 men blood of 23 tested (34,7 %) and in12 women blood of 22 tested (54,5 %). According to our result the majority of positive results were detected in female samples.

Our result were different from the result received from the study conducted in the southern region of our country where the prevalence of Helicobacter pylori showed the similar percentages of positive result among

males and females for 2001 and the prevalence of positive result in middle-aged men (41.0 % of cases) than in women of the same age (24.5 %) for 2011 [6].

Further results suggested the determination of the prevalence of this pathogenin the different age categories. We divided all residents in three age categories: children, workers, and old people.It has been tested 14 people at the age from 0 to 18 years, 28 people at the age from 19 to 60 years and 3 people over 60 years old.The results are presented in figure.

Our study showed that 7 of all tested samples were with positive results in the residents at the age category from 0 to 18 which is 50 %, 11 positive results — at the age category from 19 to 60 which is 39.2 % and 2 positive results — over 60 years old which is 66.6 %.

The results received in our study were different from the result of the study conducted in the southern region of Kazakhstan where the prevalence of *HP* was found in the age group from 10 to 19 years (67 %) and in the age group from 49 to 59 years (93 %) [6].

Our study showed that 7 of all tested samples were with positive results in the residents at the age category from 0 to 18 which is 50 %, 11 positive results — at the age category from 19 to 60 which is 39.2 % and 2 positive results — over 60 years old which is 66.6 % (Fig. 1).

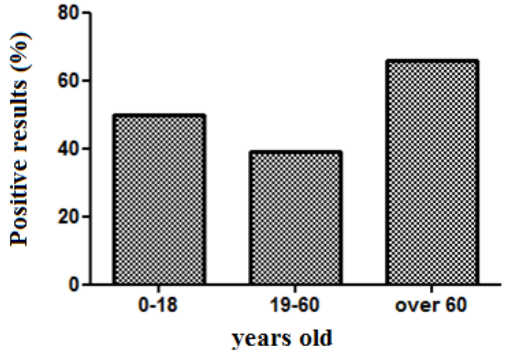

Figure 1. Positive results of Helicobacter pylori determination in different age categories

The results received in our study were different from the result of the study conducted in the southern region of Kazakhstan where the prevalence of *HP* was found in the age group from 10 to 19 years (67 %) and in the age group from 49 to 59 years (93 %) [6].

The results of our researches showed that in Zhezkazgan city the *HP* infection prevailed in the age category from 0 to 18 and among the old people, while the working population has the lower positive results.

The prevalence of this infection in children category is the big problem, because if it is left untreated, the bacteriumlives in the body indefinitely, which lead to the gastric and duodenal ulcers, gastritis, duodenitisor even stomach cancer in adult age. Incidence of Helicobacter pylori infections in children from 2 to 8 years in developing countries is 10 % per year and reaches almost 100 % of adult age [6].

In addition to age, an important factor in Helicobacter pylori is the socioeconomic position. Low socioeconomic status of the population causes the higher risk of infection.

Conclusion

So, the result of our research shows that the presence of antibodies to Helicobacter pylori was found in 20 blood plasma samples from 45 analyzed, which is 44.45 % from overall samples number. The data of our study show the similarity of total positive results with the southern region of our country.

For the detection of *Helicobacter pylori* were tested 23 men and 8 of them showed positive results (34.7 %) and 22 women and 12 of them showed positive results (54.5 %).The majority of positive results among Zhezkazgan city residents were detected in female samples, while in two previous studies the prevalence of positive results were in men or identical percentages in men and women.

Additionally, our study showed that most of positive results were detected in the residents at the age from 0 to 18 (50 %) and at the age who over 60 (66.6 %). The results identified that in Zhezkazgan city the Helicobacter pylori infection prevailed in the category of preschoolers and scholars and also among the old people, while the working population has the lower positive results.

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ИФА әдісімен *Helicobacter pylori* анықтау: бір орталықтың тәжірибесі

Хеликобактериоздың пайда болу себептерін анықтау, оларды уақтылы диагностикалау және емдеудің дұрыс тактикасын таңдау халықтың денсаулығын жақсартуға және өмір сүру ұзақтығын арттыруға көмектеседі. Мақала Жезқазған қаласында тұратын науқастардың қан плазмасында *Helicobacter pylori*-ге антиденелердің болуын зерттеуге арналған. Жобаның мақсаты ИФА әдісімен *Helicobacter pylori* таралуын анықтау болып табылады. Біздің зерттеулеріміздің нәтижелері көрсеткендей, *Helicobacter pylori* антиденелерінің болуы сарапталған 45 қан плазмасының 20 үлгісінде анықталған, бұл үлгілердің жалпы санының 44,45 %-ын құрайды. Жезқазған қаласының тұрғындары арасында оң нәтижелердің көпшілігі ерлер тобына қарағанда (34,7 %) әйелдердің сынамаларында (54,5 %) анықталды, ал алдыңғы екі зерттеулерде оң нәтижелердің басым бөлігі ер адамдарға немесе әйелдер мен еркектерде бірдей болған. Жоғары оң нәтижелер 0–18 жас аралығындағы (50 %) және 60 жастан асқан (66,6 %) тұрғындарда анықталған. Нәтижесінде Жезқазған қаласында *Helicobacter pylori* жұқпасы мектепке дейінгі балалар мен оқушылар, сондай-ақ қарт адамдар арасында басым болды, ал еңбекке қабілетті халықтың оң нәтижелері (39,2 %) төмен болды.

Кілт сөздер: Helicobacter pylori, таралуы, ИФА, антидене.

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Определение *Helicobacter pylori* методом ИФА: опыт одного центра

Выявление причин возникновения хеликобактериоза, своевременная их диагностика и выбор правильной тактики лечения способствуют улучшению здоровья населения и увеличению продолжительности жизни. Данная статья посвящена изучению наличия антител к *Helicobacter pylori* в плазме крови больных, проживающих в г. Жезказгане. Целью проекта является определение распространения *Helicobacter pylori* методом ИФА. Результаты наших исследований показали, что наличие антител к *Helicobacter pylori* было обнаружено в 20 образцах плазмы крови из 45 проанализированных, что составляет 44,45 % от общего количества образцов. Большинство положительных результатов среди жителей г. Жезказгана было выявлено в женских выборках (54,5 %), чем в мужских (34,7 %), в то время, как в двух предыдущих исследованиях, заметно преобладание положительных результатов у мужчин или наблюдались одинаковые проценты у мужчин и женщин. Наибольшие положительные результаты были выявлены у жителей в возрасте от 0 до 18 лет (50 %) и в возрасте старше 60 лет (66,6 %). Кроме того, в г. Жезказгане инфекция *Helicobacter pylori* была широко распространена в категории дошкольников и школьников, а также среди пожилых людей, в то время как у трудоспособного населения положительные результаты были ниже (39,2 %).

Ключевые слова: Helicobacter pylori, распространение, ИФА, антитела.

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