Microbiology

Helicobacter pylori  Urease Activity and Spread of Candida spp in Patients with Gastric Cancer

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ABSTRACT. Nowadays, more than 50% of the world population are infected with Helicobacter pylori. It is a well-known fact that this microorganism is of a great danger for people in 20-30% cases. It is also known that the index of infection, caused by H. pylori, depends on geographic areas, ethnics and race, factors of habits, sex, age and social environment. It is especially common in economically under-privileged countries. This infection is mainly spread in the kind of gastroduodenal diseases: chronic gastritis, peptic ulcer disease, MALT-lymphoma, gastric cancer. According to certain literature the mentioned bacterium causes diseases of other visceral organs of humans.

The aim of our research was to study H. pylori urease activity, spread and coexistence of Candida spp and H. pylori in patients with gastric cancer. 24 patients with gastric cancer (GC) were involved in the study (National Cancer Center, Tbilisi). Identification of strains H. pylori, Candida spp and other gram-negative rods and gram-positive cocci were performed by established methods, on the basis of morphological, tinctorial, cultural and biochemical properties. Ages of patients ranged from 50-73 years with a male:female ratio of 1:3. Gc was more frequent in antrum (58.33±10.07%). Microorganisms were isolated both in monocultures and in associations. There were 19 H. pylori+ patients (35.84±9.78%). Candida spp were isolated in 30.18±9.35% cases. Other organisms were in a small amount (gram-negative rods, gram-positive cocci.). Correlation of H. pylori and Candida spp was higher in comparison with other species. The highest urease activity of H. pylori was revealed within 24h (42.10±10.07%). © 2012 Bull. Georg. Natl. Acad. Sci.

Key words: Helicobacter pylori, Candida spp, gastric cancer, microflora.

Microbes induce an estimated 20% of all fatal cancers in humans, suggesting the tremendous potential of controlling microbe-related processes for cancer prevention [1].

Helicobacter pylori (H. pylori) is the first formally recognized bacterial carcinogen and is one of the most successful human pathogens, as over half of the world’s population is colonized with this gram-
negative bacterium. Unless treated, colonization usually persists lifelong. *H. pylori* infection represents a key factor in the etiology of various gastrointestinal diseases, ranging from chronic active gastritis without clinical symptoms to peptic ulceration, gastric adenocarcinoma, and gastric mucosa-associated lymphoid tissue lymphoma [2-4]. Although infection may be beneficial in some cases [5,6], its pathological consequences outweigh currently projected beneficial roles. Antibiotic resistance and compliance problems significantly reduce treatment efficacy [7,8]. In developing countries, reinfection is common, and current treatment options are inadequate for control as *H. pylori* is the most frequent infection of the stomach [9].

Gastric pathology can be caused by other infectious agents, including fungi, other bacteria, parasites, and viruses. These infectious agents frequently are part of a systemic process in which the resulting gastric pathology is one of the manifestations. Other microorganisms cause primary gastric pathology. Lots of interesting facts confirm that *Candida spp* is accompanied by gastric malignancy. Analysis of relationship between selected disorders of the upper gastrointestinal tract and infection with *H.pylori* and/or *Candida spp* revealed a link between the coexistence of *H. pylori* with *Candida spp* and gastric ulcers suggesting synergism of those microorganisms in pathogenesis of the disease [10]. Study of the aggravating impact of this infection is under a great attention of the scientists.

Considering the above said, the aim of our study was to identify some cultural, biochemical characteristics of *H.pylori*, especially rapid urease test and coexistence of *Candida spp* and *H. pylori*.

24 patients with gastric cancer (GC) were included in the study. The resection materials and biopsy specimens were taken during the operation or endoscopy procedures. Identification of strains *H.pylori, Candida spp* and other gram-negative rods (G-rods) and gram-positive cocci (G+cocci) was performed by established methods on the basis of morphological, tinctorial, cultural and biochemical properties [10,11].

The age of patients ranged from 50-73 years with a male:female ratio of 1:3 (Fig.).

Gc was more frequent in antrum (58.33±10.07%) than in corpus (29.16±9.26%) in comparison with the body and proximal part of gaster (29.16±9.26% and 12.5 ±6.75%, respectively).

Microorganisms were isolated both in monocultures and in associations. There were 19 *H.pylori* patients (35.8±9.78%). *Candida spp* were isolated in 30.18±9.35% cases. Other organisms were in a small amount (gram- rods, gram+ cocci).
Correlation of \textit{H. pylori} and \textit{Candida} \textit{spp} was higher in comparison with other species. As shown in the Table 1, \textit{H. pylori} was in monoculture in 8.33±5.63%, \textit{Candida} \textit{spp} - in 4.1±54.0% cases. Other bacteria were in associations. \textit{H. pylori}+\textit{Candida} \textit{spp}+G+cocci (20.84±8.33%), \textit{H. pylori}+G+cocci (20.84±8.31%), \textit{Candida} \textit{spp}+G+cocci (12.56±6.75%), \textit{H. pylori}+\textit{Candida} \textit{spp}+G-rods (8.33±5.63%).

The highest urease activity of \textit{H. pylori} was revealed in 24h. (42.10±10.07%) in comparison with 3, 18 h and 20 minutes (26.3±18.95%, 21.05±8.31%, 10.52±6.25%, respectively) (Table 2).

Results of our study show high prevalence and coexistence of \textit{H. pylori} and \textit{Candida} \textit{spp} in patients with Gc. Correlation of \textit{H. pylori} and \textit{Candida} \textit{spp} was higher in comparison with other genera. \textit{H. pylori} urease activity was very high as well. The highest urease activity was revealed in 24h (42.10%) in comparison with 3, 18 h and 20 minutes.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
 & 20 min. & 3 h & 18 h & 24 h \\
\hline
\textit{H. pylori} & 10.52±6.25 & 26.31±18.95 & 21.05±8.31 & 42.10±10.07 \\
\hline
\end{tabular}
\caption{Urease Activity of \textit{H. pylori} (\%)}
\end{table}
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H.pylori-s, Candida spp-s, sxva gramdadebiTi kokebis da gramuaryofiTi Cxirebis Stamebis identifikacia xdeboda morfologiuri, tinqtoriuli, kulturaluri, bioqimiuri niSnebis mixedviT.

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H.pylori-s da Candida spp-s Tanaarseboba bevrad maRali iyo sxva mikroorganizmebTan SedarebiT. H.pylori- ureazuli aqtivoba yvelaze maRali iyo 24 saaTSi (42.10±10.07%).

REFERENCES


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