

**SELECTED GASTROENTEROLOGIC PROBLEMS IN THE TROPICS (PEACEKEEPING MISSIONS, WORK)**

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**ABSTRACT**

Research shows a potential threat from external environmental factors which might be the cause of upper and lower gastrointestinal diseases in tourists, or soldiers engaged in tropical peacekeeping missions. The research includes infections which due to their spread are also present in their home countries such as *Helicobacter pylori* infections, viral hepatitis as well as infections which might cause symptoms of upper and lower gastrointestinal tract diseases as a result of poor sanitary and unhygienic conditions.

Contact with diseases typical of the tropical climate, especially during longer stays, increases the chances of bringing some tropical diseases back to Poland, which can be problematic for the domestic health care service.

**Keywords:** tropics, peacekeeping missions, digestive tract diseases.

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## INTRODUCTION

Increased interest in countries of the tropical and subtropical zones, not only for tourism and economic purposes, but also for example military missions, highlights an increasing need for attention to be focused on both the psychophysical condition of people leaving their native countries for business purposes, and also to the epidemiology of diseases, including gastrointestinal diseases, due to the ease of becoming infected [1,2,3,4]. This resulted in the publication of the journal "Tropical Gastroenterology" by professors B. N. Tandon and S. Nundy.

Performing military service during peacekeeping missions in various regions of the world, and above all in countries of the tropical or subtropical zone, may involve certain health hazards [1,2,3,5]. A number of factors contribute to this. These are:

- the tropical climate
- sanitary-hygienic and epidemic condition of the service area,
- the degree of preparation for the conditions at the place of stay,
- certain individual predispositions (genetically determined) to developing specific gastrointestinal diseases which constitute risk factors.

These factors may be important in the case of diseases of particular parts of the gastrointestinal tract:

- upper gastrointestinal tract,
- lower gastrointestinal tract,
- selected liver diseases in the tropics,
- selected pancreatic diseases in the tropics.

According to Ansart et al. [5] and others [3], of those returning to their home country (tourists, immigrants, stateless persons, and travelling businessmen) after more than one-month's stay in Africa and Asia, the average period of stay was 36.9 days.

In the whole group of returnees including 622 patients, the most common conditions were skin diseases 23.4%, gastrointestinal infections 19.1%, respiratory infections 11.5%, malaria 8.8%, schistosomiasis 7.2%, hepatitis 4.1%, urinary tract infections 3.5%, sexually transmitted infections 3.5%, tuberculosis 2.7%, dengue fever 2.5%, and other diseases 13.8%. Malaria and infections in the study material occurred in 21% of those examined and in 23% in people who had previously experienced a traveller's fever. In 1/3 of the subjects these diseases were associated with malaria, schistosomiasis, amoebiasis and dengue fever. In the case of people with chronic diseases going to work in the tropics in the absence of proper selection and non-compliance with hygienic lifestyles, it is possible that the symptoms of an underlying disease that has thus far been asymptomatic may become exacerbated.

In the case of individuals performing military service in the tropics as part of peacekeeping missions the stay ranges from 6 to 9 months, hence there is a high risk of exposure to tropical diseases, especially endemic ones, most of which involve symptoms from the gastrointestinal tract (malaria, bacterial infections, viruses, parasites) and the respiratory system [3,6].

## UPPER GASTROINTESTINAL DISEASES (UGD)

The performance of military service in closed groups with poor sanitary conditions, low levels of hygiene and the possibility that the drinking water is contaminated, are all factors conducive to an occurrence of *Helicobacter pylori* infection (*H. pylori*) [7,8,9,10]. Such a situation can be present not only during the performance of military service on ships, but also in groups of soldiers performing inland military service outside their own country as part of a peacekeeping mission. There are not many works dealing with the epidemiology of *Helicobacter pylori* in the army [9,10,11]. It is assumed that in tropical countries with a low socio-economic status (developing countries), the incidence of infection in people with upper gastrointestinal diseases can reach up to 95%, whereas in developed countries up to 50% [4]. This mainly applies to children and young people [4,9].

The predisposing factors include:

- overpopulation,
- poor housing conditions,
- water pollution,
- sleeping in a shared bed,
- large number of people living in a shared room,
- climate.

The infection occurs in early childhood and is believed to be transmitted through the faecal-oral route by the spread of infected secretions [4,7,8,10]. The causative agent is a Gram negative, curved spiral bacterium with no more than 3 mild coils, terminated with 2 – 6 individual flagella, ending with characteristic bulges.

It is also assumed that a certain percentage of people qualified for military service in the tropics are infected with *Helicobacter pylori*. In these people, the infection may be asymptomatic or nearly asymptomatic. This is confirmed by studies of numerous authors who dealt with the epidemiology of *H. pylori* infection in soldiers performing military service in various regions of the world, both in the Navy and in the Air Forces [7,8,9,10,11].

The authors demonstrated a higher incidence of *H. pylori* infection after 5, 6, 8, 10 months of military service in various regions of the world and various military units in relation to its commencement. This increase was most often observed in units with difficult service conditions, e.g. on submarines [9]. These studies were based on the detection of the IgG immunoglobulin, a specific anti-*H. pylori* antibody.

The object of interest was the incidence of *H. pylori* infections in assault groups stationed outside their own country [12]. He examined 130 asymptomatic Irish soldiers before and after a six-month stay (peacekeeping mission) in Lebanon, the incidence of *H. pylori* infection was based on a serological test. A positive serological test confirmed *H. pylori* presence in 31.5% soldiers prior to the commencement of the mission and in 28.5% following 6 months of service. This author believes that a significant impact on the increase in the number of *H. pylori* infections is due not so much to difficult service conditions as it is to the age of the service men and women. According to Hyams [11], an occurrence of symptoms of the so-called Gulf-War Syndrome in Iraq

war participants may be associated with an occurrence of the *H. pylori* infection.

References in literature [11,12,13] regarding the incidence of *H. pylori* infections in various conditions of military service concern healthy people in whom an *H. pylori* infection was found during screening tests, these tests then being repeated after many months of military service outside of the soldiers' own country.

Own research [9] carried out on material sampled from 1171 seafarers and general service soldiers, aged 18 – 21 years, who were hospitalised in the years 1994 – 2001 due to ailments of the upper gastrointestinal tract, showed that the average incidence of *H. pylori* infections based on a trauma test in the whole group amounted to 36.7%. The highest incidence was noted in patients with diagnosed gastritis, duodenitis, functional dyspepsia and then in duodenal ulcers. *H. pylori* infections were more frequent in seafarers performing military service on ships as compared to seamen of shore units and soldiers of land forces. It seems, however, that the conditions of service on ships do not affect the profile of UG diseases, while they affect the incidence of *H. Pylori* infections [9].

The procedure of choice when such ailments occur (and there is a confirmation of the presence of an *H. pylori* infection with a positive test) is to implement a conservative treatment regime, whilst eliminating the risk factors, as well as attempting to treat the condition with medicines from the group of proton pump inhibitors. In the case of stomach and duodenal ulcerations being detected in the gastrofiberscopy, treatment is via the implementation of a scheme aimed at the eradication of *H. pylori* with the use of three drugs, and in the absence of improvement the implementation of a four-drug regimen or recently used modifications of these schemes [14].

## LOWER GASTROINTESTINAL DISEASES (LGD)

Diseases of the lower gastrointestinal tract (LGD) are primarily infectious and parasitic diseases [15]. Among them the most important conditions are malabsorption and diarrhoea.

The tropical malabsorption syndrome includes small intestine diseases accompanied by an impairment of functions expressed by the malabsorption syndrome. This applies to nutrients, water and electrolytes, iron calcium, as well as water-soluble vitamins [15]. In the tropics, the causes of the malabsorption syndrome may be: tropical sprue and small intestine infections.

Tropical sprue is a disorder of absorption that is endemic in some tropical areas, but as well as affecting the residents of these locations, visitors to these places are also susceptible. It is most often encountered in the Caribbean, southern India and South-East Asia. The aetiology of the disease is not completely clear. Factors taken into account include infections, nutritional deficiencies and the presence of a toxin produced by micro-organisms. Protozoa infections are often the cause of a disease that leads to immunodeficiency in an immunocompetent host.

Helminths parasitising in the intestine periodically cause malabsorption through exudative enteropathy. The disease is characterised by loss of appetite, diarrhoea, weight loss, iron deficiency anaemia, foliants and vitamin B12 deficiency. For the diagnosis it is

necessary to demonstrate absorption disorders at least with regard to two nutrients [15].

According to Farthing [16], megaloblastic anaemia, fat, d-xylose and vitamin B12 absorption disorders have been noted in additional studies, as were the prolonged PTT due to vitamin K deficiency, decrease in K, Na, Cl concentrations, trace element deficiencies, decrease in albumin concentrations due to intestinal loss, decrease in the concentration of cholesterol, carotenes and vitamin A due to fatty diarrhoea. In turn, radiographic examination of the gastrointestinal tract reveals the presence of widened bowel loops, thickening of the folds of mucous membranes, lack of mucosal structure as well as segmentation and flocculation of barite.

Endoscopic examination shows the ribbing of circular folds and a mosaic-like image of the mucous membrane. A more severe form involves an occurrence of villi atrophies. In the histopathological examination of mucosal segment, changes described as tropical jejunitis are observed, however often the microscopic image is not characteristic. Treatment consists of an implementation of a gluten-free diet, supplementation of deficient states by the oral route, in more severe cases parenteral supplementation and symptomatic treatment suited to the patient's the needs.

## DIARRHOEA

Diarrhoea is a set of symptoms characterised by an increased frequency of evacuation or an increased water content in the stool, which may accompany various conditions. It is most often infectious, and occurs in travellers, especially those travelling to countries with poor sanitary and hygienic standards. Among the countries of an increased risk of travellers' diarrhoea we find: Africa, Latin America, South-East Asia and the Middle East. Its incidence may range from 20 to 56% [15].

Diarrhoea is diagnosed in patients who give loose stool more than three times a day. In the occurrence of symptoms of a disease, the most common mechanisms include: osmotic, secretory, exudative and accelerated intestinal passage. Among the causes, however, an important role is played by:

- infectious agents (bacteria, viruses, parasites, unidentified factors),
- stomach causes (dumping syndrome),
- small intestine diseases (celiac disease, lymphoma, Whipple's disease, infection with *Giardia lamblia* protozoan of the small intestine),
- abnormal intestinal peristalsis occurring in some diseases, especially with concurrent bacterial infection (scleroderma, amyloidosis, diabetes, hyperthyroidism),
- intestinal diseases (adenocarcinoma), inflammatory bowel diseases (ulcerative colitis, Crohn's disease), irritable bowel syndrome in the diarrhoeal phase, functional diarrhoea, AIDS dependent infections,
- pancreatic causes (pancreatic islets tumours producing gastrin and VIP),
- drugs (alkalising, antibiotics, laxatives, digitalis, colchicine, sorbitol, fructose and other)
- metabolic causes (hyperthyroidism, hyperparathyroidism, Addison's disease, carcinoid).

Enterotoxin-producing bacteria and some viruses are responsible for approximately 80% of cases. The latter are the most common cause of travellers'

Signs and symptoms appear relatively early and are characterised by the presence of spasmodic abdominal pains, nausea, vomiting, diarrhoea and abdominal pain may occur in various combinations, and so can headaches and muscle pain in the case of viral aetiology. The physical examination reveals abdominal tenderness.

A very important significance is attached to the prevention of diarrhoea by avoiding food and water from an unknown source, washing and peeling of fruit, consuming hot drinks and meals, drinking water from a reliable source, antibiotic prophylaxis. At the moment of diagnosis of the causative agent, causal treatment is used (antibacterial treatment depending on the aetiological factor, peristalsis slowing drugs, probiotics and symptomatic treatment).

#### **AMOEBIASIS**

This belongs to a group of colon infections that are widespread around the world and which are caused by an invasion of *Entamoeba histolytica* amoeba [17]. According to the WHO, 35-50 million people in developing countries suffer from amoebic colitis and the parenteral forms, with mortality being estimated at 0.1%. In Poland, Amoebiasis is classified as an imported disease. There are two forms of *E. Histolytica*: trophozoites and cysts. The infection is most often caused by the faeco-oral route.

The vegetative form (trophozoite) invades the walls of the large intestine, feeds on tissue scraps and bacteria, and permeates inside. They are excreted in the faeces where they can encyst or die. Cysts are more resistant to external environmental conditions and can spread from one person to another indirectly through food or water – this occurring more often in places of inadequate sanitation.

The amoeba infiltrates the crypts of the colon glands and move to the submucosa, then spread sideways to form a bottle-like ulceration. In approximately 40% of patients with amoebiasis, parasites can enter portal vessels, and by forming blockages in the liver, produce single or multiple abscesses sometimes reaching 10 cm in diameter [18].

The disease may occur as an asymptomatic infection, amoebic colitis or a local infection limited to the caecum or an ascending colon imitating a tumour or ulceration, and assuming a parenteral form. The diagnosis is based on the clinical image confirmed by the detection of *E. histolytica* in the faeces or tissues. In the case of parenteral amoebiasis the diagnosis is more difficult. It requires the performance of serological tests detecting specific antibodies, an ultrasound or CT examination, and sampling of material from an abscess by means of aspiration biopsy. The treatment of choice is the administration of metronidazole or tinidazole. In the case of an abscess, the treatment consists of its evacuation.

#### **MALARIA**

Malaria occurs in the zone between 30 degrees north latitude and 60 degrees south latitude. Malaria is caused by five types of different plasmodium parasites. The disease may occur in three phases (cold phase, hot phase and phase of regression of symptoms) and result in

multiorgan disease image. Symptoms from the digestive tract may include nausea, vomiting, jaundice, hepatosplenomegaly, as well as symptoms reminiscent of acute gastroenteritis. The basic mechanism responsible for the occurrence of symptoms consists in the breakdown of infected erythrocytes, which is the cause of changes in antigenicity, hypersplenism, as well as a generalised inflammatory response due to cytokine activation [19,20].

#### **VIRAL HEPATITIS**

Acute viral hepatitis is characterised by an occurrence of clinical, biochemical and pathomorphological symptoms, following liver (hepatocyte) damage by a viral infection [20,21,22,23]. We currently distinguish five types of hepatotropic viruses (A,B,C,D,E) that are widespread in the world, especially in developing countries. Viral infections A and E are transmitted through the intestinal tract and do not lead to chronic hepatitis. However, infections B, C and D are transmitted parenterally (through damaged skin or mucosa).

#### **VIRAL HEPATITIS A**

Viral hepatitis A is caused by viruses belonging to the Enteroviruses of the Picornaviridae genus. The infection occurs by ingestion. The disease can be sporadic or occur in groups, for example in the event of having consumed contaminated food. The infectious material includes: faeces, saliva and blood. The virus is excreted in the faeces after an incubation period of about 2 weeks following the infection. Viral hepatitis A infection accounts for about 50% of all world illnesses due to viral hepatitis. Moderate to high incidences of hepatitis A (HAV) occur in the countries of Africa, South-East Asia, and Central America.

The clinical picture of type A viral hepatitis can vary widely from asymptomatic to fulminant hepatitis. However, the most common form is hepatitis without jaundice, but with minor symptoms from the gastrointestinal tract. The symptoms include nausea, vomiting, abdominal pain and pain in the muscles and joints. In the form with intrahepatic cholestasis, there is an increase in liver enzymes. The prognosis in the case of HAV is good.

In prevention, strict requirements of individual and group hygiene apply. The higher the sanitary and hygienic standards, the lower the percentage of HAV-seropositive persons [21]. In later studies it was also shown that there is a positive correlation between the incidence of *H. pylori* infection, the presence of HAV infection, and the sanitary-hygienic state of a given region [13]. A high significance in HAV prevention is attributed to the storage of foodstuffs. Active prophylaxis consists in the use of vaccines, control of water intake points, public sanitary facilities, proper disposal of wastewater and sewage and use of anti-HAV and anti-HBV combined vaccines.

Taking active preventive measures is recommended for travellers or people performing military service in endemic areas, children and adolescents staying in a high-incidence environment as well as people employed in the production and distribution of food.

**ACUTE VIRAL HEPATITIS B – HEPATITIS VIRALIS B (HBV)**

Acute viral hepatitis B belongs to the best-known and at the same time the most complex viral agents. The only reservoir of HBV is man. Three routes of infection are possible: parenteral, sexual and perinatal [23]. The worldwide incidence of anti-hepatitis C antibodies is relatively constant and ranges from 0.5% to 2%. It is observed in the countries of South-East Asia, Australia, North America, Chile and Argentina.

In countries with a high risk of HBV 8-20% of the population have a positive surface antigen (HBsAg). In the development of the disease certain importance is attributed to the risk factors, although they do not occur in all patients. These include: a close contact with an HBV patient, performance of invasive procedures, addiction to intravenous drugs, multiple sexual partners, homosexuality and contact with infectious material [22,24].

The infectious virus particle (Data) consists of the core part and the surrounding coat. The core part contains double-stranded circular DNA and DNA polymerase, they are replicated within the nuclei of infected hepatocytes. At least 4 separate systems are associated with HBV infection. These are the surface antigen (HBsAg), core antigen (HBcAg), antigen e and the presence of the hepatitis D virus (delta).

Clinical symptoms are not significantly different from those observed in HAV, but they tend to build up more slowly. The course is generally more severe, especially in the form with jaundice. In older people, the disease may be recurrent. In the diagnosis, special significance is placed on serological tests, and in patients with a severe course of the diseases, also on morphological tests [22,23].

Treatment of moderate form of the disease is similar as in the case of HAV. The basis for prevention is strict adherence to specific and non-specific prophylactic requirements consisting in the prevention of infections, proper handling of infectious material and vaccination with the HBV vaccine.

**ACUTE VIRAL HEPATITIS – HEPATITIS VIRALIS C (HCV)**

Hepatitis C virus belongs to the Flaviviridae family. It is characterised by a high degree of genetic variability caused by imprecise control of the reading of the genetic code during the replication process. In the world, the incidence of anti-hepatitis C antibodies ranges from 0.5 - 2%. The clinical picture of the disease is similar to infection with HAV and HBC viruses.

In the physical examination an enlarged liver can be observed. Serological, virological and morphological tests are important in the diagnosis.

The treatment is based on the use of antiviral drugs, as well as interferon to increase the chance of elimination of the virus in the acute phase of the disease. Prevention is based on the observance of the general principles for the prevention of infections [22]. Currently, there is no HCV vaccine.

**ACUTE VIRAL HEPATITIS D – HEPATITIS VIRALIS D (HDV)**

Viral hepatitis D occurs in people who are infected with HBV and in whom HBsAg is detected.

Molecular reactions of these two viruses indicate the possibility of suppression of HBV replication by HDV.

HDV is found in all regions of the world, and its endemic areas include: the Mediterranean basin, some African countries, regions of Central and South-East Asia and northern areas of South America [24]. The routes of the HDV virus spread are the same as for HBV. The duration of incubation period varies and may last up to 180 days. The disease may occur as acute, hyperacute, subacute and chronic hepatitis. There is no specific treatment for hepatitis caused by the HDV infection, the only known method of prevention against HDV is vaccination against HBV.

**ACUTE VIRAL HEPATITIS E**

The disease is caused by the presence of the HEV infection. The aetiological factor belongs to the Caliciviridae viruses. The primary site of virus replication is the digestive tract. The disease is endemic in the Central and South-East Asian countries. The risk factor is travelling and staying in endemic areas. The clinical picture and course of the disease do not differ from HAV. Prevention is based on maintaining high hygiene standards.

**SCHISTOSOMIASIS**

A parasitic disease caused by trematodes from the Schistosoma spp. family. It occurs in tropical and subtropical climates. The disease may occur without a fever, and after lingering for a few years, transfers into a chronic form. In the course of chronic Schistosomiasis, the disease may take the form of colon polyposis with bloody diarrhoea, or in the form of portal hypertension with haemorrhages, splenomegaly and visible symptoms of hypersplenism [24].

**DENGUE DISEASE**

Dengue disease caused by dengue viruses transmitted by several species of Aedes mosquitoes, particularly in Egypt. People infected with the virus may show mild symptoms (80%), however, 5% have life-threatening symptoms.

Gastrointestinal symptoms include: worsening stomach pain, enlarged liver and mucosal bleeding from the gastrointestinal tract [25].

The problems presented in the work relate not only to diseases typical of the tropics, but also certain diseases with which travelling people deal with in their own country. Proper preparation, knowledge of hazards in one's destination, as well as observance of specific rules contained in separate regulations may reduce the risk of disease. Nevertheless, as previous works have shown, the risk cannot be completely eliminated. According to the authors cited earlier [5,3], tropical diseases are an important reason for consultations among the returnees from the tropics. It is also believed that immigrants mixed in amongst groups of returning travellers represent a significant risk of an occurrence of common tropical diseases, with particular significance being attributed to dengue fever and schistosomiasis.

**TROPICAL CHRONIC PANCREATITIS**

It mainly concerns young people and occurs especially among malnourished individuals. It is assumed that malnutrition, cyanide poisoning and deficiency of micronutrients is involved in the aetiology of this disease, and the influence of free oxygen radicals is also postulated. Genetic factors (mutations of the CFTR gene – transmembrane conductance regulator gene), autoimmune diseases as well as lifestyle changes are also taken into account. The disease is observed in many countries, e.g. Uganda, Nigeria, Congo, Malawi, Zambia, Ghana, Tunisia, Madagascar, Sri Lanka, Malaysia, Thailand, India, Bangladesh and Brazil [26,27,28].

It is characterised by an occurrence of abdominal pain in young people, pancreatic lithiasis and

diabetes in adults. It also involves a high probability of malignant metaplasia and other complications within the pancreas. Moreover, progressive pancreatic fibrosis is a characteristic feature of chronic tropical pancreatitis. In some patients, the lesions affect pancreatic islets causing hypertrophy, and diabetes with refractory acidosis may also occur.

The growth of foreign tourism to tropical countries, as well as the participation of Polish soldiers in peacekeeping missions around the world, greatly increase the likelihood of a number of infectious and tropical diseases being brought to the country, which constitute a serious health risk for the countries in which these travellers are in permanent residence.

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