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# VARIOUS TECHNIQUES OF TICK-BORNE DISEASES TREATMENT – ANTIBIOTICS, DIET

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## Summary

Tick-borne diseases are a group of diseases whose treatment has raised some controversy because of the conflict of opinions on therapeutic methods. Guidelines for the treatment of Lyme disease and co-infections have been developed by different groups of experts, most popular of which are IDSA and ILADS groups. Their treatment regimens primarily differ in terms of duration of treatment: IDSA proposes short-term treatment, undermined by ILADS, suggesting no effectiveness and preferring duration of treatment up to several years. In both cases, treatment is associated with the intake of antibiotics that reduce the body's natural defense mechanisms and cause fungal infections. Therefore, in order to prevent negative effects of antibiotics, natural methods and diet shall be used. Lyme diet is a diet above all, antifungal, and methods based on natural herbal medicine. These methods are often undervalued and taken lightly as an "obsolete invention" of our ancestors. Meanwhile, they prove to be highly effective and contribute to the total eradication of Lyme disease which, treated with antibiotics only, can last for years taking a latent form to come back after a time.

This article provides an overview of treatments for Lyme disease and other tick-borne diseases using medicinal plants and diet.

Key words: herbal medicine, phytotherapy, diet, nutrition, Lyme disease, tick-borne diseases

## INTRODUCTION

In the opinion of the National Institute of Health, the number of registered cases of tick-borne diseases in Poland is steadily increasing every year. Due to the non-specific symptoms and diagnostic difficulties, some tick-borne diseases are reported with a long delay. Those most vulnerable to all diseases transmitted by ticks are forestry workers, people working with agricultural crops, farm animals and hunting (1).

Diagnosis of Lyme disease is made basing on the presence of at least one of the such symptoms as erythema migrans, lymphocytic borrelial lymphocytoma of the skin, arthritis, inflammation of the heart muscle, neuroborreliosis, and the occurrence of serological antibodies against *B. burgdorferi* (2).

Treatment involves the use of antibiotics, however, the time of administration and joining them, raise discussions. There are two positions on the duration of antibiotic therapy. One stand is presented by a group of IDSA experts (Infectious Diseases Society of America), and the second by those from ILADS (International Lyme and Associated Diseases Society).

### TREATMENT OF LYME DISEASE ACCORDING TO IDSA

IDSA experts are of the opinion that there is no need to carry out serological tests or routine administration

of antibiotics after being bitten by a tick. Exceptions include: a tick staying in the skin for over 36 hours, the tick was removed less than 72 hours earlier, at least 20% of ticks are infected with *Borrelia burgdorferi* in a specific area. In these situations, a single dose of 200 mg of doxycycline may be used. In the case of already present Lyme disease, IDSA recommends the use of antibiotics, such as oral doxycycline, amoxicillin and cefuroxime and intravenous ceftriaxone, cefotaxime and penicillin G. Therapy should last 10-28 days, but not longer than 4 weeks. Alternatively, treatment can be repeated if Lyme disease is advanced and gives joint or neurological symptoms. If joint symptoms persist despite repeated antibiotic therapy, and synovial fluid PCR result is negative, symptomatic treatment shall be used with administering non-steroidal anti-inflammatory drugs or topical anti-rheumatic corticosteroids. IDSA precludes the use of metronidazole, vancomycin, cholestyramine, diet, vitamin supplementation, and does not recommend combination or long-term treatment (3).

### TREATMENT OF LYME DISEASE ACCORDING TO ILADS

The International Lyme and Associated Diseases Society negates IDSA recommendations and proposes its own diagnostic and therapeutic recommendations. According to ILADS, Lyme is difficult to be treated using

a standard antibiotic therapy, as proven by a very large number of patients with chronic illnesses occurring after treatment, the so-called chronic Lyme (4). Not complete curing infections caused by *B. burgdorferi* leads to their reoccurrence, going into a chronic form and drug resistance. Therefore, it is necessary to provide an aggressive therapy which should begin at the time of the spirochete penetrating the human body. Situations in which ticks stay in the body for a few hours, are filled with blood or are not completely removed, absolutely require oral antibiotics applied for a period of 28 days (3). In the case of Lyme disease being already identified, duration of treatment depends on the response of the organism against the used therapy and cannot be determined in advance, to be, for example, 28 days (as recommended by the IDSA), but is dependent on therapeutic effects (5). Treatment makes use of oral antibiotics, such as amoxicillin, azithromycin, cefuroxime, clarithromycin, doxycycline and tetracycline. In any chronic, recurrent and resistant form of the disease, intravenous antibiotic therapy is recommended. If monotherapy is not effective, combination therapy shall be introduced (3, 6). ILADS recommends that antibiotics shall be used together with a complementary treatment by para-pharmaceutical products, such as vegetable oils (omega 6), fish oil (omega 3), vitamin B, multivitamins, magnesium, coenzyme Q10. In addition, it is important to provide proper diet (5).

#### ANTIFUNGAL DIET

Majority of patients with Lyme disease, as a result of their long disease process, suffer from poor immune, which results in increased susceptibility to fungal infections. Ringworm develops in the mouth and extended to the whole digestive system, causing ideal conditions for the development of fungi. In a normal situation, bacteria present in the gastrointestinal tract restrict increased fungal growth, but in patients with Lyme disease, as a result of prolonged treatment with antibiotics killing bacteria, fungi obtain exceptionally good conditions for growth. In order for the body to defend itself against proliferation of fungi, one should complement the physiological bacterial flora by taking *lactobacillus* preparations, daily consumption of yogurts or kefir and adherence to low-carbohydrate diet. The diet is a very important part of such a therapy because fungi feed on sugars and starch (7).

The antifungal diet should limit any products containing a large amount of sugar. Be sure to avoid sweets and hidden sugar (e.g. in ketchup, mayonnaise, mustard). Do not sweeten beverages (sugar can be replaced with aspartame or honey) or consume sweet carbonated water, juices, syrups and alcohol. Carbonated caffeine-free, water, vegetable juices, coffee and tea without sugar are allowed during the diet. Fruit should be limited, because they contain large amounts

of sugar, but in the case of fiber-rich fruits, they are allowed in very small quantities. Grapefruits, lemons, limes and avocados can be consumed in large quantities, along with such fruits as pears, apples, strawberries, melons, etc. Extremely small quantities. Such soft fruits as oranges, watermelons, bananas, grapes are completely contraindicated. Foods that can be eaten without restriction are: meat, poultry, fish, cheese, eggs, dairy products. Green vegetables and salads can also be consumed in any quantity. The only contraindicated are starchy vegetables (e.g. potatoes, beans, etc.). Antifungal diet should also avoid flour products (e.g. breads, cereal, biscuits) (8).

#### NUTRITIONAL SUPPLEMENTATION

Some of the symptoms of advanced Lyme disease are associated with cell damage and deficiency of certain essential nutrients. The greatest importance is given to such substances as vitamins B, essential fatty acids, probiotics, coenzyme Q10, alpha-lipoic acid, magnesium. Vitamins B help to eliminate neurological symptoms; essential fatty acids (EFAs) reduce symptoms of fatigue, impaired concentration, pain, dizziness, improve memory and relieve symptoms of depression. The source of essential fatty acids are vegetable oils, for example: primrose, borage, black currant grain (source of omega-6) and fish oils (source of omega-3). Coenzyme Q10 improves the heart function, increases vitality and increases the body's resistance to infections, and the alpha-lipoic acid coenzyme facilitates penetration into the mitochondria. Magnesium eliminates tremors, cramps and muscle soreness, is useful in disorders of the heart rhythm, increases energy levels and eliminates the feeling of weakness. In the case of neuroborreliosis, supplementation with L-carnitine is effective, it improves memory, mood and cognitive function, and with vitamin B12 which helps in disorders of the central and peripheral nervous system and improves the function of the immune system. Green tea is also recommended, being a powerful antioxidant – especially recommended for patients with degenerative changes in the central nervous system. In the joint form of Lyme disease, preparations of glucosamine should be administered, it is a natural building element protecting cartilage. It relieves joint pain and improves joint function (8).

#### HERBAL TREATMENT

Treatment of Lyme disease and other tick-borne diseases should also include herbal therapy. Treatments based on plants strengthening the immune system appear to be effective. Such plants include: purple coneflower (*Echinacea*) with antibacterial, anti-inflammatory, strengthening effect on the immune system; leaves and roots of hemp agrimony (*Eupatorium cannabinum*), strengthening immunity, good diuretics and diaphoretics (removing spirochete toxins); *Eupatorium perfoliatum*

– supporting immunity, stimulating the activity of B and T lymphocytes, and blocking the propagation of bacteria, viruses and protozoa. Plants and wild fruits containing considerable amounts of vitamin C also strengthen the immune system, for example: wild rose, black currant, elderberry and wild sea buckthorn. Supportive care treatment of Lyme disease also includes the use of herbal infusions for the body detoxification and backwashing toxins (e.g. infusion of nettle, yarrow, horsetail, birch leaves) (9).

## CONCLUSIONS

Treatment of Lyme disease and its concomitant co-infections is complex, intense and requires an individual approach, because each case can be somewhat different. Modifications and individual treatment model focus on the duration of treatment and drug combinations. However, generally, the procedure includes antibiotics and supportive therapy consisting of proper diet, supplementation and herbal therapy. Lyme and co-infection diet is antifungal involving consuming low-carbohydrate products. Supplementation includes receiving vitamin preparations, probiotics and such substances as coen-

zyme Q10, essential fatty acids, alpha-lipoic acid and magnesium. Among the plants supporting the fight against *Borrelia*, the following are mentioned: Echinacea, hemp agrimony, wild rose, wild elderberry, black currant, nettle, yarrow, horsetail and birch leaves. Their effect is mainly based on the excretion of toxins and strengthening the immune system in order to enhance the body's defense. □

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