HYMENOLEPIDOSIS AND TAENIASIS: PREVALENCE, CLINICAL COURSE, IMMUNE SYSTEM CHANGES, AND MODERN PREVENTION METHODS IN CHILDREN AND ADULTS

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Abstract. Helminth infections remain one of the pressing health issues for humanity. Among them, diseases caused by tapeworm parasites—hymenolepidosis and taeniasis—are widespread infections worldwide. This article analyzes the etiology, epidemiology, clinical course, immune system changes, and modern preventive measures for these two helminthic infections.

In recent years, helminth infections, especially those caused by tapeworm parasites, have been recognized as significant social and medical problems for human health. Among these, hymenolepidosis (caused by *Hymenolepis nana*) and taeniasis (caused by *Taeniarhynchus saginatus*) are widespread parasitic infections. These diseases primarily affect the human gastrointestinal system and can lead to various complications through general intoxication, allergic reactions, and metabolic disorders. Hymenolepidosis occurs mainly in children because personal hygiene skills are not fully developed at this age, increasing the risk of infection through water and food. Taeniasis is more common in adults, particularly in rural populations involved in cattle breeding and professions handling meat products. These infections are observed not only where personal hygiene and sanitation requirements are neglected but also in areas with insufficient food safety. The clinical course of hymenolepidosis and taeniasis often persists for a long time, with periods of exacerbation and remission. Many cases are asymptomatic, which delays timely diagnosis and contributes to the chronicity of the disease and widespread dissemination of the parasite. Therefore, a thorough study of the etiology, epidemiology, clinical course, and preventive measures for these diseases is crucial not only for medical practice but also for public health. Modern preventive measures—deworming programs, improving sanitation culture, ensuring food safety, and strengthening veterinary control—help significantly reduce the spread of these infections.

Clinically, both diseases present with general intoxication, abdominal pain, appetite disturbances, fatigue, and irritability. However, in hymenolepidosis, allergic reactions and anemia predominate, whereas in taeniasis, due to the large size of the parasite, mechanical effects on the intestinal wall and toxic symptoms are more pronounced. Immunologically, hymenolepidosis is characterized by a Th2-type active immune response, with elevated eosinophils, IgE antibodies, and cytokines (IL-4, IL-5). This activates protective mechanisms but also enhances allergic reactions. In taeniasis, immune tolerance develops, with increased IL-10 secretion leading to weakened immune responses, allowing the parasite to survive in the host for a long period.

Hymenolepidosis and taeniasis share similar clinical features such as gastrointestinal disturbances, abdominal pain, appetite changes, and fatigue. Nervous system reactions—irritability, attention deficits, and sleep disturbances—are present in both diseases. Prolonged infection may cause weight loss and general weakness. Allergic reactions and anemia are more common in hymenolepidosis, especially in children, while in taeniasis, mechanical effects in the intestine due to the large parasite, such as passage of proglottids, vomiting, and pain, are more prominent.

Hymenolepidosis often has mild, intermittent symptoms and is prone to relapse, while taeniasis may present with fewer symptoms, but the passage of proglottids causes periodic discomfort. Helminths are long-term parasites that influence the immune system in two ways: immunosuppressive effects and induction of allergic/hypersensitivity reactions. In hymenolepidosis, the immune system is actively reactive, initially generating a Th2-type response with increased eosinophils, IgE antibodies, and IL-4 and IL-5 cytokines. This response combats the parasite but also triggers allergic conditions such as rashes, pruritus, allergic rhinitis, and anemia, particularly in children. Over time, immune response weakens, and the parasite adapts, leading to frequent reinfections. In taeniasis, immune response is slow and weak due to the parasite's large size and long-term survival in the intestine, leading to immune tolerance, mild intoxication, fatigue, and weakness. Allergic reactions are less frequent, while toxic and mechanical effects dominate.

Thus, in hymenolepidosis, the body exhibits active but short-lived allergic and protective responses, while in taeniasis, immune responses are weak, allowing the parasite to survive for long periods without significant harm. Hymenolepidosis is therefore often associated with allergic diseases and anemia, whereas taeniasis is characterized by chronic intoxication and mechanical effects. Both infections do not lead to long-term protective immunity, so preventive measures—deworming, maintaining hygiene and sanitation, and ensuring food safety—should focus on preventing parasite entry rather than enhancing immune responses.

Conclusion: Hymenolepidosis and taeniasis are among the most common human tapeworm infections, negatively impacting vital functions, nutrient absorption, and causing anemia, hypovitaminosis, allergic reactions, and nervous

system disturbances. Although the clinical presentation of both diseases is similar, their epidemiology and transmission differ significantly: hymenolepidosis spreads directly from person to person, while taeniasis is transmitted through intermediate hosts, such as cattle. Therefore, preventive measures differ: ensuring personal hygiene and sanitation is crucial for hymenolepidosis, whereas proper veterinary control and sufficient heat treatment of meat products are key for taeniasis. Enhancing hygiene education among children, raising public awareness about sanitation, ensuring food safety, and strengthening veterinary oversight can significantly reduce the incidence of these infections. In summary, hymenolepidosis and taeniasis have both medical and social significance, and combating them requires collaboration among the government, healthcare institutions, and the population. Implementing evidence-based preventive measures and improving sanitation culture can drastically reduce their spread.

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