Medicon Medical Sciences
Volume 4 Issue 3 March 2023
E-Book

Risks and Complications in Parasitic Infections

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Received: February 16, 2023; **Published:** February 28, 2023

Introduction

Some readers will think that studying these issues can be useful for stomatologists, but parasitic diseases play a preponderant role in the causes of global morbidity. As an important subgroup of these diseases, it is worth highlighting the tropical parasitosis.

That, although they are not frequent, when they occur they make dental procedures very difficult.

A series of important aspects have made it not strange to diagnose these diseases in several countries. Among these we highlight: for us health professionals, the increase in international contracts, the extension of migratory movements from countries with a tropical climate to Western countries, the growing number of these areas as tourist destinations for citizens of the so-called first Western world, the success and boom in the use of immunosuppressive substances and the spread of infection by the human immunodeficiency virus (HIV).

It is rare, but it may be the case that a patient with facial or oral myiasis attends his office or emergency room. In the modest experience of the author, he has had the opportunity to see some cases (see Figure 1) of patients with facial myiasis.

Figure 1: Patient with myiasis in the facial region, specifically the left submandibular region. Courtesy of Dr. Otto Aleman Miranda.

The word Myiasis refers to the infestation of the tissues of vertebrate animals by larvae of flies of various species. This infection is rapidly evolving and aggressive. Once the eggs are deposited and the larvae settle, an inflammatory reaction occurs in the surrounding tissues accompanied by painful symptoms, stench, and general malaise.

More than 80 species of diptera are known, the most common being: Cochliomya hominivorax, Dermatobia hominis and Oestrus bovis. The flies lay about 500 eggs on injured or necrotic tissue, which mature in less than a week and complete their cycle in 2 weeks. The larvae obtain their nutrition through the tissues, infiltrate and dig tunnels, separating the mucoperiosteum from the bone, and can cause severe tissue destruction.

Oral myiasis is an extremely rare condition, as it is in the facial region and nostrils.

Figure 2: Parasitic specimens (worms) in the fanny pack. Courtesy of Dr. Otto Aleman Miranda.

Stomatologists must have a clear and coherent thought as possible, they cannot miss the smallest detail when carrying out the anamnesis and physical examination, since the success of the diagnosis, therapy or conduct to follow will depend on it. because on many occasions the criteria or advice of a professional with more experience in the field or a colleague from another specialty will be needed, so we must be open to exchange, since the same thing is learned from a tenured professor as from a student or even from the same patients.

Among the tropical diseases that are considered forgotten, those produced by ectoparasites are in resurgence according to various reports. Pediculosis, fungiasis, scabies, ascariasis and myiasis are some of which are presenting this pattern in Cuba. Given the increase in the incidence of these diseases, it is important that not only the doctor have knowledge of their epidemiological, clinical, diagnostic, therapeutic and preventive aspects, but also the dental professional, since in the oral cavity and in the maxillofacial region in general, the presence of some of these tropical pathologies can also be observed.

The clinical diagnosis is based on the patient's history, the finding of the specimens (images 1 and 2) and the parasitic diagnosis in the identification of the larvae, which is of great importance, given that some species show more destructive action than others on the tissues.

It is possible that, when sleeping, mouth breathing and precarious oral hygiene conditions, facilitate the introduction of the diptera into the oropharynx attracted by the inflamed mucosa and oral sepsis, as well as in other regions, carrying out oviposition, and then withdrawn without for the patient to notice. Diagnosis is not difficult if complete specimens are available, in this case it is Cochiliomyia hominivora, commonly known as screwworm.

A differential diagnosis should be made with the larvae of Dermatobia hominis, which are endemic to South and Central America, and which are larvae that frequently appear in this region, as well as other conditions, such as furunculoid myiasis when it is located on the face. or scalp, since it can cause inflammation similar to local trauma produced by hymenoptera insect bites.

A common characteristic of patients who come with this diagnosis is that they are often elderly, live alone, and are malnourished. They do not have adequate hygiene, sometimes added to this situation is the low school level and few economic resources.

Myiasis can be classified according to the parasite-host relationship in

- Specific or obligatory (when the larva develops in living tissues),
- Semi specific or facultative (the larva develops in dead organic matter).
- Accidental (larvae are ingested).

On multiple occasions, maxillofacial surgeons have to remove a subcutaneous nodule or biopsy an inflammatory lesion. Given the possible parasitic origin of such discomfort, since they can be subcutaneous helminths, it is important to know the different etiologies. Hence the need to exquisitely question patients to find out styles, ways and conditions of life, socioeconomic-cultural level, with the latter we want to cover religious beliefs, or superstitions, etc.

These cases are infrequent in our daily work, so one must be theoretically prepared to deal with these parasitism.

In this chapter we present a series of diseases, to which we could be exposed in various ways, since when working with the population, whether in the native country or abroad, we are going to face all kinds of people, cultures and idiosyncrasies, so we must be intellectually and psychologically prepared to provide quality services, take care of the health of our patients and our own, which is essential, in order to provide care effectively.

The stomatologist should not see his patient as a purely oral cavity patient, but as a biopsychosocial being. Next, we present some parasitism that we can run the risk of contracting due to ignorance or recklessness, and it is good to generally master their behavior and general characteristics.

This subject is little treated in the stomatology career, given its infrequency in daily consultations. But in this treatise we will address several of the parasitosis, although others remain to be mentioned.

The fundamental importance will lie in the fact that all these conditions bring with them sequelae or complications in different systems of the organism, bringing with them multiple imbalances. As you will see later, they can range from a constant fever, to inflammation of the liver, spleen, diarrhea, etc.

Signs and symptoms that can have a negative impact on the different stomatological procedures. Hence the importance of carrying out an adequate questioning, because when a patient presents with a history of a parasitosis, it is necessary to be sure that he did not have systemic sequelae.

It is not the objective of the work to delve into the treatments of parasitic diseases, but to mention in a general way the complications that they bring with them. So that students and professionals are oriented, and know when to postpone a surgical or other treatment, to carry out a better study of the patient.

Amoebiasis

Entamoeba histolytica infects man through a fecal-oral or sexual transmission mechanism; It usually parasitizes the colon, where it can remain asymptomatic or manifest as colitis. After intestinal invasion, it can affect other organs, predominantly the liver. After malaria and schistosomiasis, it is the third cause of death from parasites in the world.

There are certain risk groups with a higher incidence of infection and disease. On the other hand, certain factors affect the increase in severity, highlighting the extreme ages of life, immunosuppression (use of corticosteroids, human immunodeficiency virus (HIV), pregnancy and postpartum, neoplastic diseases, malnutrition and alcoholism, among others.

Care for stomatologists, graduates, technicians and students of the career.

We care for a large number of patients every day, either in consultation or in field work, in which we greet citizens cordially shaking hands and we don't know if they are contaminated or not, or we go to a school and the same thing happens with children who have gone to the bathroom and we do not know if they have been properly sanitized, that is why hand washing is of great importance before caring for any patient and afterwards. Another example is when we are going to carry out the investigation, as is recognized throughout the world, the patients are very hospitable to the health professionals, and in any house, when a doctor arrives, they always want to offer them something to drink, be it soda, water , or something to eat. So we must think about how we could politely reject what they

offer us, on many occasions with so much love, without hurting people's feelings, but we don't know if the water was boiled, if it has sodium hypochlorite, if the food is well cooked or where it was cooked, and that's why it's better to be safe than sorry.

Clinical manifestations

Symptoms range from mild diarrhea to severe dysentery, accompanied by tender abdominal pain and bloody stools. Fever appears in 36-38% of cases and weight loss is common. Tender hepatomegaly may be detected.

Amebic liver abscess is the most common extraintestinal form. It is 10 times more frequent in men than in women and is rare in children. The lesions are usually single. Approximately 80 % of patients present symptoms relatively abruptly (between 2-4 weeks) in the form of high fever accompanied by chills, night sweats and abdominal pain in the right hypochondrium. In 15-35 % there are concomitant gastrointestinal symptoms: diarrhea (or constipation), nausea and abdominal distension.

Diagnosis

The presentation of any of the above clinical forms, in a patient with adequate epidemiological history, should make us suspect this pathology.

Malaria

Malaria is the most prevalent parasitic disease of all those that affect man. In endemic areas (90 countries) there are about 300-500 million cases and more than one million deaths per year.

Etiology

It is caused by the four protozoan species of the genus Plasmodium (P. falciparum, P. vivax, P. malariae and P. ovale) and transmitted by the bite of the female Anopheles sp. mosquito. Most of the cases that occur in the world are due to P. falciparum and P. vivax, with P. falciparum being responsible for most of the fatal cases. P. falciparum is widespread in all malarious areas: sub-Saharan Africa, where most cases occur, Southeast Asia, India, South America, and in Haiti and the Dominican Republic. It is very important to master these issues in order to prevent any infestation.

Apart from natural vector transmission, other less frequent forms of transmission have been described: blood transfusions, contact with infected needles, a section that is relevant for stomatologists who work every day with perforating instruments, and from solid organ transplantation. from an infected donor.

There is also the possibility of transplacental transmission from the infected mother to the fetus; In endemic areas, it is difficult to distinguish congenital infection, whose symptoms begin 3-4 weeks after delivery, from natural transmission through mosquito bites that occur shortly after birth. In these forms of transmission, called induced malaria, the parasites are in the infected red blood cells in their different stages of maturation, and not as sporozoites.

The parasite disrupts the red blood cell membrane, favoring hemolysis and peripheral destruction in the spleen. In addition, the release of proinflammatory cytokines that inhibit hematopoiesis, which contributes to anemia.

The parasites do not have a Krebs cycle and metabolize glucose only by anaerobic glycolysis, with the consequent development of hypoglycemia and lactic acidosis. These metabolic complications depend on the magnitude of the parasitemia, constituting an important problem in P. falciparum infections.

All these aforementioned aspects are of great interest to the stomatologist because the day he is in any country where this disease is frequent, it is necessary to inquire during the interview to see if the patient has a history of having suffered from said disease and if it left any sequelae because, as It was previously explained that it affects the red series, which is why it produces various types of

anemia, as well as that it can affect the liver, kidneys, lungs, pancreas, and spleen, organs that we well know their functions in the body.

Fever is the cardinal symptom, appearing in most cases. The possibility of malaria must be suspected before any febrile symptoms that appear during the first months after a trip to a malarious area. It is usually preceded by a nonspecific prodromal period characterized by chills, sweating, myalgias, and headaches. Subsequently, febrile paroxysms appear, the duration of which varies from 6 to 12 hours and which goes through several stages.

In the first, chills appear and there may be evidence of peripheral vasoconstriction. In the second, which lasts several hours, fever (39-40°C) appears, which does not subside with antipyretics, and is usually accompanied by severe headaches, vomiting, and impaired level of consciousness.

Subsequently, the patient enters a third phase, with intense diaphoresis, which ends with the attack. This sequence of symptoms alternates with asymptomatic periods and is repeated according to the length of the parasite's replication cycle (tertian or quartan). Along with fever, the finding of splenomegaly and the appearance of thrombocytopenia and anemia with normal or decreased leukocyte counts are characteristic. Other symptoms that usually appear, along with the findings on examination and the most characteristic laboratory abnormalities.

Specific clinical and therapeutic aspects depending on the characteristics of the host

Pregnant

Malaria in pregnant women markedly increases maternal and perinatal morbidity and mortality. Up to 60 % of pregnancies have fetal repercussions and maternal mortality reaches up to 10 %.

Pregnant women with P. falciparum infection rapidly develop the clinical symptoms of severe malaria, as they lose their semi-immune state, being particularly susceptible to respiratory complications (pulmonary edema and respiratory distress) and hypoglycemia.

Anemia is another common complication, occurring in 60 % of malaria cases that occur in pregnancy.

In children it can be serious and deadly.

Toxoplasmosis

Toxoplasma gondii is an intracellular protozoan, belonging to the subphylum Apicomplexa (class sporozoa), which parasitizes the nucleated cells of warm-blooded vertebrates.

Its distribution is worldwide, and it is estimated that 25% of the population is chronically infected, reaching 50-80% in Europe.

The infection is usually subclinical in most cases. The true importance of Toxoplasma gondii infection lies in the affectation of people with cellular immunosuppression (infection by human immunodeficiency virus [HIV], cancer chemotherapy and transplant patients) and the first infection during pregnancy.

Pathogeny

Cats are the definitive hosts of Toxoplasma gondii, while all other animals, including humans, are intermediate hosts.

Infection in humans can be caused by

1. Sporulated oocysts. Present in the environment, they can be transported by hands, flies, cockroaches, etc. It can also be acquired by eating contaminated vegetables and other food products. In this form of transmission, the cat plays a fundamental role.
2. Tissue cysts. They are acquired by eating raw or undercooked meat. Although pork has been the most associated with this route

of transmission, tissue cysts can be present in chicken, lamb, and game such as venison and deer.

3. Tachyzoites. This is the form of the parasite responsible for fetal-maternal transmission. It would also cause infection by much less frequent mechanisms such as transfusion of blood products, organ transplantation and accidents with contaminated material.

Interhuman transmission through secretions or excretions has not been described to date.

Another important factor is the hygienic-dietary behavior of the population and the preference for cats as pets.

These parameters are important when providing care in the emergency room when patients with cat scratches and/or bites arrive.

Clinical manifestations

It can be asymptomatic in a good percentage. In the rest of the cases, the most common presentation is in the form of painless bilateral cervical adenopathies.

These are usually less than 3 cm in diameter, elastic and non-fluctuating in consistency. Although there are authors who differ, stating that firm and painful adenopathies can be present without periadenitis.

Lymphadenopathy in other lymph node territories (including intra-abdominal or generalized), fever, headache, sore throat, myalgia, diffuse nonpruritic maculopapular erythema, and hepatosplenomegaly.

On very rare occasions, a picture of chronic lymphadenopathy can be observed, or potentially fatal presentations such as pneumonitis, acute respiratory distress, myopericarditis, polymyositis, hepatitis and/or encephalitis.

Diagnosis

The main method of diagnosis of Toxoplasma gondii infection is the performance of serological tests.

Treatment

Acute infection in male patients and immunocompetent non-pregnant women generally does not require treatment, except in cases of very symptomatic infection, significant organic involvement, or prolongation of symptoms for weeks or months. Treatment, as with immunosuppressed patients, with pyrimethamine plus sulfadiazine or clindamycin. The treatment is the same in both groups, except for the dose and duration, which are higher in patients with HIV infection.

Prevention

Reinforce personal, home and work hygiene measures.

Next, we mention the alterations that other parasites can cause.

Blastocystis hominis

Gastrointestinal disturbances, watery diarrhea, nausea, abdominal pain, bloating, excess gas, loss of appetite, weight loss, anal itching, fatigue.

Giardia lamblia

- Traveler's diarrhea, liquid and foul-smelling, which may alternate with loose, greasy stools.
- Fatigue, stomach cramps, and inflammation.
- Nausea, vomiting, weight loss.

- Anemia.
- In the oral cavity, mainly glossitis and mouth ulcers.

Leishmaniasis

Fever, anemia, splenomegaly, skin-mucosa involvement, erythema, vesicles, and ulcers. Affection of the mucous membranes of the oropharynx, hard palate, larynx and trachea.

Cryptosporidiosis, Isosporiasis, Microsporidiosis, diarrhea and AIDS.

The clinical context of the disease produced by these three protozoa is common: diarrhea in immunocompromised patients, especially AIDS, with decreased CD4 T lymphocyte count (generally less than 200 µl). In fact, its prevalence has become evident since the appearance of this disease, since in the healthy individual they produce a self-limited diarrheal condition, without blood or serious involvement, in travelers returning from underdeveloped areas.

The transmission mechanism is mainly fecal-oral: poorly sanitized water and food are the means of contagion. In immunocompromised patients, the condition is characterized by repeated episodes of watery diarrhea, which becomes chronic in most cases, leading to dehydration and malnutrition.

Diseases caused by helminths. Infections caused by cestodes.

Taenia saginata

Man is its only definitive host, and it usually harbors a single adult parasite, hence its name as "tape", and it never develops the larval form. The intermediate host is cattle, which is infested by ingesting the eggs from the pasture; the larvae develop in the connective tissue and man becomes infected when he eats raw or undercooked meat.

Its symptoms are highly variable, as it depends on the size of the parasite and the susceptibility of the host to the products eliminated by the helminth. The most common is the presence of abdominal pain with a feeling of hunger. It can cause constipation and, occasionally, an acute picture of abdominal pain if the appendicular lumen is obstructed by a proglottid. They rarely present allergic symptoms: hives, pruritus and asthma.

Cysticercosis

Taenia solium can infect humans both in its adult form (taeniasis transmitted by the consumption of pork) and in its larval form: cysticercosis. Humans acquire cysticercosis by ingesting T. solium eggs through person-to-person contamination, through water and food, or by self-infestation from eggs produced by an adult intestinal parasite tapeworm of the individual. Cysticercosis has a cerebral, ocular or muscular location, the most serious manifestations being those of neurocysticercosis.

Hydatid cyst

Hydatidosis is a tissue parasitization of the larval stages of Echinococcus granulosus. The biological cycle is maintained mainly thanks to the dog, the definitive host of the parasite, which eliminates the gravid proglottids, which are later ingested by humans or other animals. Its main complications are at the biliary level, being able to cause an external biliary fistula.

Liver fluke

To infest humans, the presence of an intermediate host (snails), definitive hosts (sheep, cows, goats) and the ingestion of metacercariae (encysted forms) that can be found in aquatic plants such as watercress or other contaminated vegetables (lettuce) are essential, chicory, dandelion).

It can cause significant liver damage, severe anemia, pancreatitis, jaundice, cholangitis, cholecystitis, obstruction of the bile ducts, etc.

Infections caused by nematodes

Threadworm

It is the most frequent intestinal parasitosis in children in some series, caused by Enterobius vermicularis. They live in the large intestine, mainly in the cecum. The females, at night, leave the anal margin where they deposit their eggs.

It is transmitted by the fecal-oral route, depositing the eggs on the nails and bedding.

Most cases are asymptomatic or associated with anal itching and sleep disturbance. If the scratching is very intense, it can be complicated by bleeding or bacterial superinfection. Urinary tract infections, weight loss, abdominal infection.

Ascariasis

Multiple lung and liver abscesses, subocclusive syndrome, intestinal occlusion, Loffler syndrome, biliary peritonitis, due to perforation of the common hepatic duct, and cholangitis, etc.

Anisakiasis

Anisakiasis is a zoonosis caused by Anisakis simplex. Man is an accidental host when consuming raw or undercooked fish (salted, smoked or in vinegar) that carry larvae. They begin to develop in the stomach and intestine, but die as they are not in their natural host, causing an inflammatory reaction with an abscess in the gastrointestinal tissues, predominantly eosinophilic, which can obstruct or perforate the intestinal lumen.

Severe allergic reaction up to anaphylactic shock.

Trichinosis

The clinical manifestations of the enteral phase (2-10 days after ingestion, mainly in pork meat) consist of nausea and diarrhea with abdominal pain, a consequence of inflammation of the intestinal mucosa. They may also present polyarthralgia, pneumonia, glomerulonephritis, encephalitis and myocarditis, with cardiac and neurological complications being the most serious forms of disease.

Ectoparasites

Scabies is a mite that causes scabies. They burrow into the horny layer of the skin to lay eggs. The contagion is by intimate contact (sexual act or sharing bedding) (see Figure 3).

The immune response influences the clinical expression of the disease, being greater in immunosuppressed subjects. They are located mainly in interdigital folds, the front face of the wrists, armpits and thighs, sparing the palms, soles and frequently the face. In immunocompromised patients, the high concentration of mites produces large, very itchy, crusty, hyperkeratotic lesions (Norwegian scabies).

They may have skin ulcers, sepsis, heart disease, chronic renal failure.

The professional who is going to care for this type of patient must take all hygienic and sanitary measures to avoid contamination, such as the use of gloves, long-sleeved gowns, etc., and once the procedure is finished, remove the means of protection and change them for others. new to be able to continue caring for other patients, always after disinfecting the entire dental set, which is why these patients, if their disease is known in advance and for urgent reasons, treatment cannot be delayed, it is better to make an appointment for them at the end of the consultation and thus it is not delayed or we make them feel embarrassed in front of the other patients.

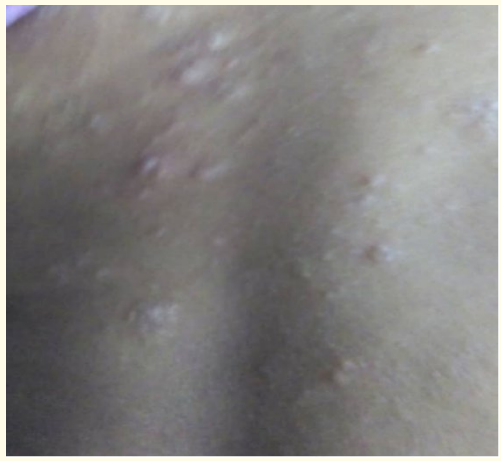

Figure 3: Pediatric patient diagnosed with scabies. Courtesy of Dr. Otto Aleman Miranda.

Lice (scalp pediculosis caused by Pediculus capitis) live attached to the hair of the scalp, which harbors about two dozen adults and nymphs and thousands of eggs. They are highly contagious by contact, which is why outbreaks frequently occur in schools or people who share a bed.

His clinic consists solely of itching and scratching lesions. It is diagnosed by the epidemiological context and the observation of nits (especially in the retroauricular region and nape). Here the same measures are followed as in the previous case and the dentist cannot miss the sanitary cap.

So far, although there are still many parasites to mention, they already have a good idea of how procedures in dentistry can be affected when a patient with a parasitosis presents, or who suffered from it previously.

It is important in these cases to carry out a thorough questioning and physical examination, and to seek the criteria of your family doctor. In case of not having a specialist for follow-up due to the parasitic disease, we guide them towards which specialties they can contact, for example, dermatologists, gastroenterologists, and/or specialists in infectious diseases.

Until they are sure that the patient is fully recovered from the noxious agent, and/or from the sequelae it caused, they should not carry out any surgical procedure, however minimal. It is our modest recommendation.

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