

LYME DISEASE ON CHILDREN – CLINICAL , DIAGNOSTICAL AND THERAPEUTICAL ASPECTS

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Abstract

Lyme disease is an infectious disease transmitted by a spirochete called *Borrelia burgdorferi*, with the tick as its vector , inoculating its self in the human blood through its bite. The most important risk factors are: age – respectively children and teenagers – and diverse outdoor activities in tick populated areas. In the beginning of the disease , symptomatology is represented by the infectious syndrome manifested through fever, chills , general state of illness , eruptive syndrome characterized by migratory erythema , ganglionic syndrome with recurrent adenopathy , respiratory syndrome with dry cough , dyspnea and minimum expectoration , neurasthenic syndrome with dizziness , asthenia and moderate headache. Depending on the clinical and paraclinical track down the tick bite can result to acute infection, as the C.C case shows below in this study or can result to persistent chronic infection with *B.B. spirochete* as the C.G case shows below in the second part of this study. The acute infection with Lyme case on children , serologically confirmed through high IgM and normal IgG, can be considered as included in the 1 month treatment with antiinflammatory antibiotic. The Lyme disease case known for 4 years , with high IgG and , paradoxically in spite of the old clinical symptomatology , also high IgM , is considered a chronic infection with *B.B.* and is treated with the association of two or more antibiotics (ceftriaxone , amoxicilina , claritromicina , doxicilina) , in long and repeated treatment. The evolution ground of the disease , respectively a young body , with no other organical diseases compared to an adult that shows other associated pathologies , it is important to mark in the remittance of the disease the persistence , aggravation or damaging of new organs or systems. If false results are to be feared , then it is the negative result that holds the greatest peril for the patient.

Keywords: tick, vector, host, boreliosis, erythema, macula, papula, myalgia, paresthesia

INTRODUCTION

Presentation of the debut features and clinical evolution, presentation of suspicions in internment diagnose and reaction promptitude in the treatment of the child with Lyme disease in comparison to the adult , in the Ward of Infectious Diseases of the Pneumoftiziologie Hospital of Oradea , between 11.09-18.09.2009 and respectively 17.06-01.07.2009 presentation of the two cases.

MATERIAL AND METHOD

Information on these two patients have been collected from their observation sheets by observing anamnestic criteria (age , sex , source environment) , epidemiological criteria (insisting upon the way through which the disease has been contacted). Clinical examinations have been done (pursuing the most frequent clinical signs in debut symptomatology of the two patients , remission modality of the debut symptomatology

depending on the associated pathology) and also paraclinical examinations (with the dynamic pursue of appearance of IgG and IgM antibodies ,alteration of inflammatory probes ,as well as of other probes depending on the age associated pathology) on two cases of Lyme disease: one on adult and the other on a child, and reaction promptitude has been appreciated in therapy by clinical evolution ,appearance of complications and internment period.

The used data source have been the observation sheets of the two in-patients ,prescription papers to other branch services ,externment tickets and epicrasis from previous wards where the patients have been interned , results of other investigations done by the patient with the purpouse of establishing an ethiology. Centralization of the data has been made using an AMD Duron 1300 personal computer and the Microsoft Office software package. Data has been collected from the following sites: www.boala-lyme.evonet.ro,www.lymediseaseaction.org.uk/articles/pediatric,www.lymediseaseassociation.org.. , www.emedicine.ro. The biochemical methods used have been: an automated analyzer ,bacteriological examinations , SNF, cultures.

INTRODUCTION

Lyme disease is an inflammatory disease produced by tick transmitted spirochete. The name is originated in the city of Lyme ,Connecticut ,USA. Lyme is also called the „thousand faced disease” due to the fact that by affecting the entire body ,its symptoms imitate very well the symptoms of other diseases and the individual reaction to the pathogenic agent is very different from one person to another.



The spirochaeta gender ,of which borrelia burgdorferi is a part, represents a type of organisms with thin, waved shape found in sewers and still waters.

The tick is an arthropod from the Ixodidae family ,bearer of pathological microorganisms(not all ticks are bearers of Borellia burgdorferi bacteria).



The way through which the tick infects the organism by attaching itself to the blood circuit in the skin(8).



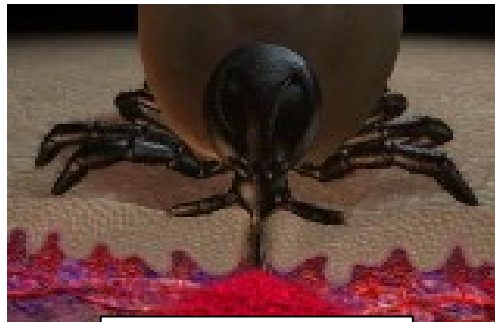
The tick before it bites (3)

The bite itself(3).



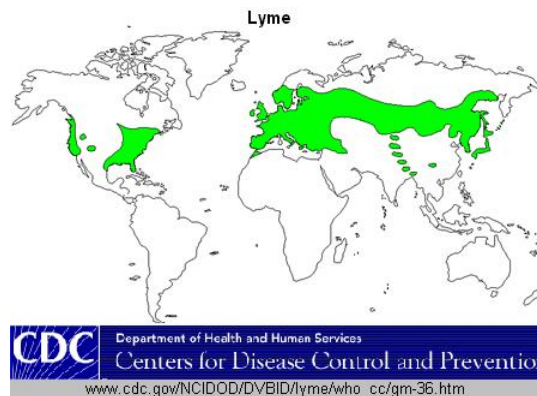
The tick secretes an anesthetic before it bites.(3)

The tick feeds and infects with B.B. bacteria(3)



The satiated tick(3)

Most patients are children and young adults. The favourite host for ticks in Europe are sheep and deers. Dogs can be occasional hosts and can develop Lyme disease. The disease can not be transmitted from human to human. No infections by transfusion have been reported.



Global spreading of the Lyme disease(9)

Infection with Lyme disease is systemic ,affect the entire organism and goes through 3 stages more or less distinctive:

Stage 1 – chronic migratory erythema (CME) – Lyme boreliosis usually begins with a specific tegumentary, extensive lesion(stage 1 – localised infection)

Stage 2 – disseminated infection – after several days to weeks ,spirochetes can spread through blood to numerous and various areas ,CME lesions spread and disseminated lesions appear with the next manifestations: cardiac clinical and paraclinical(rhythm disorder) ,neurological (acute encephalitis) ,muscular and scheletical(arthritis type).

Stage 3 – persistent infection – months to years later ,usually following the periods of latent infection ,signs of more severe complications can appear such as aggravation of cardiac lesions ,of arthritis ,of neurological suffering and also new manifstations of organic damage(eye ,liver ,lung).

CLINICAL CASE PRESENTATION

CASE 1

Patient C.C. , aged 5 , from urban environment , shows up for consult on the 11th September 2009 with the suspicion of acute tracheobrochitis. Febrile syndrome(8).

Anamnesis shows that 3 weeks ago from the moment of consult the patient has been bit by a tick.

One week after the bite , the mother indicates the appearance of a erythemtous skin lesion , ring-shaped around the umbilic , followeed after a few days by the appearance of a similar lesion on the bottom cheeks and right lower limb. At the time of the consult the mother present what the child complains of at internment:

- Infectious syndrome characterized by fever , chills , general state of illness
- Neurastenical syndrome alongside with dizziness , asthenia , headache , backhead stiffness
- Respiratory syndrome characterized by dry cough , minimum expectoration , dispneea and nasal obstruction with watery rhinorrhea , conjunctivitis
- Ganglionic syndrome: bilateral non-painfull adenopathy in the inguinal area
- Painfull syndrome: myalgia in the right lower limb muscles and arthralgia in the knee joint
- Skin syndrome: appearance of new erythematous eruptions concomitant to the extesion of the peripheral zone of the umbilical erythema



Migratory erythema on bottom cheeks(9)

Migratory erythema on lower limb (9)

had a diarrheic episode but with no link to the present symptomatology.

Objectivistic examination shows the following:

- ♣ Modified general state , fever with keeping of conscience
- ♣ Pale teguments , perspiration , erythematous non pruriginous maculopapular lesions , with minimum painfull sensitivity on palpation , ring shaped measuring between 2 and 5 cm , situated on the bottom cheeks diseminated also at the face level.



Migratory erythema at the face level(9)

- ♣ The pharynx mucous membrane is congested on the posterior wall, with micropapular lesions, tonsils are hypertrophic, hyperemic, violet aspect, loaded tongue
- ♣ Ganglionic syndrome: superficial bilateral axillary adenopathy, mobile ganglions, slightly sensitive to palpation measuring approx. 1-2 cm, non adherent to the deep ground; inguinal bilateral adenopathy, mobile ganglions non painful on palpation measuring 3-4 cm in diameter
- ♣ The osteoarticular system is integer, lower mobility with no signs of local inflammation
- ♣ Respiratory: stethoscopically acute disseminated pulmonary sounds can be heard in both pulmonary fields in the lower third part and harsh vesicular ripple
- ♣ Normal cardiovascular relations
- ♣ Digestive: elastic supple abdomen, with no sensibility on palpation; around the umbilicus an erythematous area can be observed
- ♣ The rest are normal relations with no signs of meningeal irritation

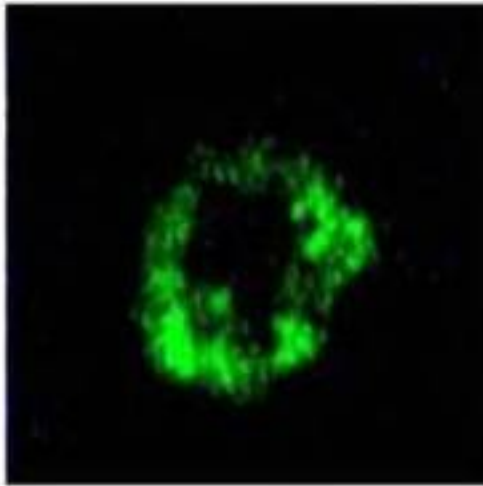
Paraclinical examinations: analysis shows the following:

- ❖ Inflammatory probes are unspecific and plead more to a viral infection
- ❖ A 1st degree dehydration syndrome is present, most likely in the fever context
- ❖ Urine results show normal parameters
- ❖ Specific coproparasitological examinations correlated to the migratory eruptions on the body are negative
- ❖ A slight reaction of the GOT=63 u/l is present

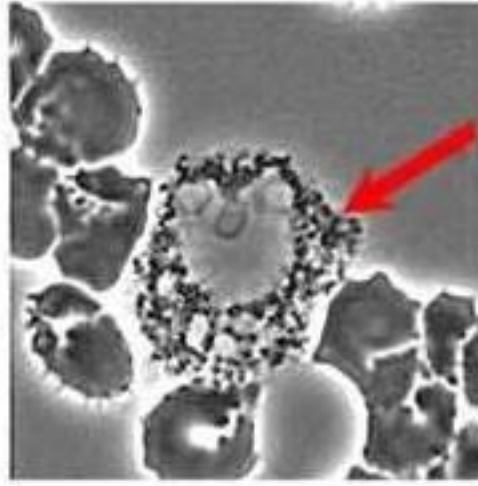
Pulmonary radiography accentuates an interstitial drawing slightly emphatic bilaterally with no specification. SNF examination is negative for cocci and fungi.

Treatment is instituted with amoxicillin antibiotic – 500 mg 3x1 per day, antiinflammatory ibuprofen 3x2,5 ml, antihistaminic and older parasitary etiology is supposed: loratidine 5 mg ½ capsule per day 5 days duration and a hepatoprotector – similarine 2x1 per day. Evolution is favorable under treatment, but in the 4th day the patient has another fever spike with 38 °C fever and a new biologic examination is decided.

Following the hemoleucogramme done on the 17th September 2009 a modification is determined between the elements in the blood pattern: leucocytes total number is normal but a raise to 6% (normal values 0-4) in the basophiles percent is observed and the neutrophils number drops to 0,85 (normal values 2-7,5).



Specific fluorescence of a deficient cell wall infected with B.B. bacteria(4)



Contrasting image of the same wall, highlighting the bacteria.(5)

After a consult done immediately after the tick bite , the patient has been asked to dose some antibodies for borrelia burgdorferi , which , after 3 weeks show the following:

- Ig G =3,52u/l;normal values >11u/ml sint considerate pozitive
- Ig M =22,08;valori normale >11 u/ml fiind considerate pozitive.

As a result , the certitude diagnose is set , the antihistaminic is excluded from treatment and the 1 month evolution under antiinflammatory antibiotic and hepatoprotector is as follows: erythematous lesions stop multiplying , the existent ones begin to pale without any perypheral spreading , the patient's general state is improved , arthralgya , myalgia , asthenia and dizziness fade away and appetite is recovered.

The particularity of the case results from the fact that the infection with borrelia burgdorferi has been discovered relatively quick while still in acute phase and antibiotic treatment has been applied forbidding the spirochete to spread and disseminate into the blood.

CASE 2

Patient C.G. aged 52 , from urban environment , known with Lyme disease in case history(7) , diagnosed in 2005 , shows up for consult at the Infectious Diseases Ward with a prescription ticket from the family doctor on the 17th June 2009 , acuzing as follows:

- Dizziness in ortostatic position , moderate headache
- Irritability , sometimes nervousness
- Depression , anxiety
- Panic attacks , various kinds of phobia
- Lower limb pain , peripheric paresthesia
- Finger numbness , sometimes formication or burning sensation
- Swallowing disorder
- Imperious urination
- Sensation of sand in eyes

- High values for IgM antiborrelia burgdorferi in disordance with normal values for IgG

From personal pathologycal case history:

- Neurovegetative dystonia
- Peripheral sensory neuropathy (non consumer of toxins)
- Vertigo syndrome
- Anxious syndrome with secondary nervousness

Objectivist examination::

- Corresponding state of nutrition , weight =85kg , Height = 1,80 m
- Warm pale teguments , with no modification in pigmentation along with cutaneous hyperesthesia on the lower limbs
- Axillary and inguinal adenopathy with mobile ganglions measuring 2-3 cm , sensitive even painfull on palpation
- Integer osteoarticular system
- Stetacustically: harsh vezicular ripple with disseminated acute sounds in both pulmonary fields
- Cardiovascular , digestive , renal: normal relations
- Nervous system; signs of peripheral polineuropathy

Paraclinical:

- Glycemia on the 17th June 2009: value of 142 g/dl; on the 21st June: 114 mg/dl; on the 29th June: 128g/dl
- Kreatinine = 1,4; Urea = 65 mg/dl
- High values for cholesterol and triglycerides
- Normal transaminase and negative VDRL
- Negative inflammatory probes , ASLO<200 , negative rheumatoid factor
- Normal parameters for hemoleucogram

Pulmonary radiography shows intense high left hilum , perihilar and lobar fibrosis , with no suspicion of active or neoplastic lesions.

IgM antiborrelia burgdorferi = 20 , 50 u/ml(knowing that the value <9u/ml is negative and the value >11u/ml is positive), IgG antiborrelia burgdorferi = 3,34(same valoric semnifications as above).

Treatment: repeated and persistent course of treatment for 21 days with ceftriaxone 2x1 g/day , associated with vitamins B1,B6 and milgamma 3x1 per day , vitamins 2x1 per day , piracetam 1/2-1/2-0 and diclofenac 50 mg 2x1 tablets per day , prozalex 0-1-1.

Until the current state the patient has been supervised and treated after which he has been sent to another speciality clinic and the present clinical and paraclinical evaluations could not be correlated with those preexistent. He has been externed with the following diagnostic:

- Chronic Lyme disease in acute spike
- Sensitive peripheral neuropathy
- Anxious syndrome with secondary nervousness
- Vertigo syndrome
- Neurovegetative disthonia

DISCUSSIONS

In most cases on children , as well as the presented case , Lyme disease is not recognised in its debut and it can be easily mistaken with many other diseases , it is not treated or it is diagnosticated wrong.

Risk factors can be: holding pets that go in and out of the house: dogs, cats; outdoor activities: horse riding , hunting , fishing; any other activity in the woods or open fields or in high grass including golf and football fields; activities in any deers frequented area.(1)

Anyone can be infected in any warm day of any month of any year.(1)

Regarding the treatment of Lyme disease , the medical world is divided in two big parts: some doctors consider that one month of antibiotic treatment is enough , while others consider that a sustained treatment is necessary untill the complete elimination of all the symptoms.

Symptoms that persist after finishing the one month treatment is known as a so called post-Lyme syndrome and nonsteroid antiinflammatory drugs are prescribed such as Diclofenac , Aspirin , Ketoprofen.(2)

In the second opinion the long term treatment is based upon medical backtracking which proves that in chronic cases (untreated infection , older than 6 months from the moment of the tick bite) sustained treatment is necessary in repeated courses of antibiotics untill the total eradication of the bacteria. Complex treatment diagrams are prescribed , with two or more antibiotics (ceftriaxone , amoxiciline , claritromicine , doxyciline etc.) in association with an antiparasitical (Metronidazol , Tinidazol etc.) drug that destroys the vegetative shape of the bacteria.(5)

The most frequent ways of clinical debut met on a child are these types:

- ❖ Moderate headache with no certain cause
- ❖ Flu-like symptoms similar to virosis
- ❖ Cyclic or persistent fever
- ❖ Frequent association of viral , bacterial and fungal over-infections
- ❖ Presence of inflammatory recurrence of the laterocervical , axillar and inguinal limf nodes
- ❖ There are ways of debut with neurological manifestation also o child such as: irritability , emotional instability , depression , withdrawal , anxiety , fobia , hallucinations , psychosis . personality disorder
- ❖ Difficulty in concentration and school focus with fast distraction of attention are often diagnosed with learning disabilities, ADD (attention distracting disease) or ADHD (Attention Deficit Hyperactivity Disorder)
- ❖ Difficulties in short term memory
- ❖ Less than half of the patients can report a tick bite in case history , and even less can report a migratory erythema

In the adult case of chronic Lyme infection the main clinical manifestation are:

- Hypersensibility type disorder to stimulus: light , noise , tactile , gustatory
- Peripheric neuropathy with stiffness , distal paresthesia , very painfull neuralgia
- Balance and coordonation disorder , spasms , ataxia , vocal or motory tics
- Insomnia , nightmares , nocturnal perspiration
- Moderate headache
- Co-infections are often best diagnosed clinically due to the fact that co-incted patients are sicker , show no response to previous treatment and require longer treatment with many agents
- Co-infections must be eradicated or the Borrelia infection persists. Co-infections are a rule , not an exception

CONCLUSIONS

1. Lyme disease is trully „the great imitator” of our times , just as sifilis has been for previous generations
2. Tick bite is a clinical diagnose , the disease’s debut can be acute or insidious and multiorganic affectation is present
3. Laboratory tests ca be very difficult to interpretate due to the fact that the patient can have a negative serology despite the active infection with Borrelia
4. The one month treatment is enough and can be justified if treatment has been set immediately after the tick bite
5. The untreated infection , older than 6 months from the moment of the bite requires a sustained treatment with repeated courses of antibiotics until the complete eradication of the bacteria and of antiparasitcal drugs for the destruction of the vegetative form
6. If false results are to be feared , then it is the negative result that holds the greatest peril for the patient(1).

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