SYSTEMIC LUPUS ERYTHEMATOSUS

What is it?

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease that can affect various organs of the body, especially the skin, joints, blood and kidneys. SLE is a chronic disease which means that it can last for a long time . Autoimmune means that there is a disorder of the immune system which instead of protecting the body from bacteria and viruses, attacks patient's own tissues.

The name systemic lupus erythematosus dates back to the early 20th century. Systemic means affecting many organs of the body. The word lupus is derived from the Latin word for wolf, and refers to the characteristic butterfly like rash on the face which reminded doctors of the white markings present on a wolf's face. Erythematosus in Greek means red, and refers to the redness of the skin rash.

How common is it?

SLE is a rare disease that affects about 5 in a million children per year. Onset of SLE is rare before 5 years of age and uncommon before adolescence.

Women of child-bearing age (15 to 45) are most often affected, and in that particular age group, the ratio of affected females to males is nine to one. In younger children, before puberty, the proportion of affected males is higher

SLE is recognized worldwide. The disease appears to be more common in children of African American, Hispanic, Asian, and Native American origin.

What are the causes of the disease?

The exact cause of SLE is not known. What is known is that SLE is an autoimmune disease, where the immune system loses its ability to tell the difference between a foreign intruder and a person's own tissues and cells. The immune system makes a mistake and produces auto-antibodies that identify the person's own normal cells as foreign, and then eliminates them. The result is an autoimmune reaction which causes the inflammation that affects the specific organs (joints, kidneys, skin, etc) in SLE. Inflamed means that affected body parts become hot, red, swollen and sometimes tender. If the signs of inflammation are long lasting, as they can be in SLE, then damage to the tissues can occur and normal function is impaired. This is why the treatment of SLE is aimed at reducing the inflammation.

Multiple inherited risk factors combined with random environmental factors are thought to be responsible for the abnormal immune response . It is known that SLE can be triggered by a number of factors including hormonal imbalance at puberty and environmental factors such as sun exposure, some viral infections and certain medications.

Is it inherited? Can it be prevented?

SLE is not a hereditary disease since it cannot be transmitted directly from parents to their children. Nevertheless children inherit some yet unknown genetic factors from their parents that may predispose them to develop SLE. They are not necessarily pre-destined to develop SLE, but they may be more susceptible.

It is not unusual for a child with SLE to have in his or her family a relative with an autoimmune disease, however, it is very rare to have two children affected with SLE in the same family.

Why has my child got this disease? Can it be prevented?

The cause of SLE is unknown, but it is likely that a combination of genetic predisposition and exposure to certain environmental triggers may all be necessary to induce the disease. The respective roles of genetic and environmental factors in triggering SLE remain to be determined.

SLE can not be prevented, however the affected child should avoid contact with certain situations that may trigger the onset of the disease or cause the disease to flare (e.g. sun exposure without using sunscreens, some viral infections, stress, hormones and certain medications).

Is it contagious?
SLE is not contagious, it cannot be passed from person to person like an infection.

What are the main symptoms?
The disease usually begins slowly with new symptoms appearing over a period of several weeks, months or even years. Non-specific complaints of fatigue and malaise are the most common initial symptoms of SLE in children. Many children with SLE have intermittent or sustained fever, weight loss and loss of appetite.
With time, many children develop specific symptoms that are caused by involvement of one or several organs of the body. The skin and mucosal involvement are very common and may include a variety of different looking skin rashes, photosensitivity (where exposure to sunlight triggers a rash), and ulcers on the inside of the nose or mouth. The typical 'butterfly' rash across the nose and cheeks occurs in one-third to one half of affected children. Sometimes more hair falls out than the usual amount (alopecia) or the hands turn red, white and blue when exposed to the cold (Raynaud's). The symptoms can include also swollen and stiff joints, muscle pain, anaemia, easy bruising, headaches, seizures and chest pain. Kidney involvement is present to some degree in most children with SLE and is a major determinant of the long-term outcome of this disease.
The most common symptoms of major kidney involvement are high blood pressure blood in urine and swelling, particularly in the feet, legs and eyelids.

Is the disease the same in every child?
Symptoms of SLE can vary widely between individual cases so that each child's profile or list of symptoms is different. All of the symptoms described previously can occur either at the beginning of SLE or at any time during the course of the disease.

Is the disease in children different from the disease in adults?
In general, SLE in children and adolescents is similar as in adults. However, the disease changes more rapidly in children, and in general appears more severe than in adults.

How is it diagnosed?
The diagnosis of SLE is made based on a combination of symptoms (such as pain), signs (such as fever) and test results and after other illnesses have been ruled out. To help distinguish SLE from other diseases, physicians of the American Rheumatism Association have established a list of 11 criteria which, when combined, point to SLE.
These criteria represent some of the more common symptoms/abnormalities observed in patients with SLE. To make a formal diagnosis of SLE, the patient must have had at least 4 out of these 11 characteristics at any time since the beginning of the disease. Experienced doctors can however make a diagnosis of SLE also if less than 4 criteria are present. The criteria are:
1) The 'butterfly' rash that is a red rash occurring over the cheeks and over the bridge of the nose.
2) Photosensitivity is an excessive skin reaction to sunlight. Usually, only the exposed skin is involved while skin that is covered by clothing is spared.
3) Discoid-lupus is a scaly, raised, coin-shaped rash that appears on the face, scalp, ears, chest or arms. When these lesions heal they can leave a scar. Discoid lesions are more common in black children than in other racial groups.
4) Mucosal ulcers are small sores that occur in the mouth or nose. They are usually painless but nose ulcers may cause nosebleeds.
5) Arthritis affects the majority of children with SLE. It causes pain and swelling in the joints of the hands, wrists, elbows, knees or other joints in the arms and legs. The pain may be migratory, meaning that it goes from one joint to another, and it may occur in the same joint on both sides of the body. Arthritis in SLE usually does not result in permanent changes (deformities).

6) Pleuritis is inflammation of the pleura, the lining of the lungs, and **pericarditis** is inflammation of the pericardium, the lining of the heart. Inflammation of these delicate tissues may cause fluid collection around the heart or lungs. Pleuritis cause a particular type of chest pain that gets worse when breathing.
7) Kidney involvement is present in nearly all children with SLE and ranges from very mild to very serious. At the beginning it is usually asymptomatic and can be detected only by urine analysis and blood tests of kidney function. Children with significant kidney damage may have blood in their urine and swelling, particularly in the feet and legs.
8) Central nervous system involvement includes headache, seizures and neuropsychiatric manifestations such as difficulty concentrating and remembering, mood changes, depression and psychosis (a serious mental condition where thinking and behaviour are disturbed).
9) Disorders of the blood cells are caused by auto antibodies that attack the blood cells. The process of destruction of red blood cells (which carry oxygen from the lungs to other parts of the body) is called haemolysis and may cause haemolytic anaemia. This destruction may be slow and relatively mild or may be very quick and cause an emergency.
A decrease in the white blood cells is called leukopenia and is usually not dangerous in SLE.
A decrease in the platelet counts is called thrombocytopenia. Children with decreased platelet count may have easy bruising of the skin and bleeding in various parts of the body such as the digestive tract, the urinary tract, the uterus or the brain.
10) Immunologic disorders refer to autoantibodies found in the blood which point to SLE:
a) Anti-native DNA antibodies are autoantibodies directed against the genetic material in the cell. They are found primarily in SLE. This test is repeated often because the amount of anti-native DNA antibodies seems to increase when SLE is active and the test can help the physician measure the degree of disease activity.
b) Anti-Sm antibodies refer to the name of the first patient in whose blood they were found (her name was Smith). These autoantibodies are found almost exclusively in SLE, and often help to confirm the diagnosis.
c) Positive finding of antiphospholipid antibodies (appendix 1)
11) Antinuclear antibodies (ANA) are autoantibodies directed against cell nuclei. They are found in the blood in almost every patient with SLE. However, a positive ANA test, by itself, is not proof of SLE since the test may also be positive in diseases other than SLE and can even be weakly positive in about 5 percent of healthy children.

What is the importance of tests?
Laboratory tests can help diagnose SLE and decide which, if any, internal organs are involved. Regular blood and urine tests are important for monitoring the activity and severity of the disease, and to determine how well the medications are tolerated. There are several laboratory tests that have to be performed in SLE:
1) Routine clinical tests that indicate the presence of an active systemic disease with multiple organ involvement:
Sedimentation rate (ESR) and C-reactive protein (CRP), both are elevated in inflammation. CRP can be normal in SLE, while ESR is elevated. Increased CRP can indicate additional infectious complication.
Full blood count which may reveal anaemia and low platelet and white cell counts
Serum protein, electrophoresis which may reveal increased gammaglobulin (increased inflammation) and decreased albumin (kidney involvement).
Routine chemistry panels which may reveal kidney involvement (increases in serum blood urea nitrogen and creatinine, changes in electrolyte concentrations), abnormalities of liver function tests and increased muscle enzymes if muscle involvement is present.
Urine tests are very important at the time of diagnosis of SLE and during the follow-up to determine kidney involvement. They are best performed in regular time intervals, even when the disease seems to be in remission. Urine analysis can show various signs of inflammation in the kidney such

as red blood cells or the presence of an excessive amount of protein. Sometimes, children with SLE may be asked to collect urine for 24 hours. In this way, early involvement of the kidneys can be discovered.

2) Immunological tests:

Antinuclear antibodies (ANA) (see diagnosis)
Anti-native DNA antibodies (see diagnosis)
Anti-Sm antibodies (see diagnosis)
Antiphospholipid antibodies (appendix 1)
Laboratory tests which measure complement levels in the blood. Complement is a collective term for a group of blood proteins which destroy bacteria and regulate the inflammatory and immune responses. Certain complement proteins (C3 and C4) may be consumed in immune reactions and low levels of these proteins signify the presence of active disease, especially kidney disease.

Many other tests are now available to look at the effects of SLE on different parts of the body. A biopsy (the removal of a small piece of tissue) of kidney is often performed. A kidney biopsy provides valuable information on the type, the degree and the age of SLE lesions and is very helpful in choosing the right treatment. A skin biopsy may sometimes help to make a diagnosis of skin vasculitis, of discoid lupus or of the nature of various skin rashes. Other tests include chest x-rays (for heart and lungs), ECG and echogram for the heart, pulmonary functions for the lungs, electroencephalography (EEG), magnetic resonance (MR), or other scans for the brain, and possibly various tissue biopsies.

Can it be treated/cured?

At present there is no cure for SLE, but the vast majority of children with SLE can be treated successfully. The treatment is aimed at preventing complications, as well as treating the symptoms and signs of the disease.
When SLE is first diagnosed it is usually very active. At this stage it may require high doses of medications to control the disease and prevent organ damage. In many children, the treatment brings SLE flares under control and the disease may go into remission when little or no treatment is needed.

What are the treatments?

The majority of symptoms of SLE are due to inflammation and so the treatment is aimed at reducing that inflammation. Four groups of medications are almost universally used to treat children with SLE:
Nonsteroidal anti-inflammatory drugs (NSAIDs) are used to control the pain of arthritis. They are usually prescribed for a short time only, with instructions to decrease the dose as the arthritis improves. There are many different drugs in this family of medications, including aspirin. Aspirin is nowadays rarely used for its anti-inflammatory effect; however, it is widely used in children with elevated antiphospholipid antibodies to prevent blood clotting
Antimalarial drugs such as hydroxychloroquine are very useful in treating sun sensitive skin rashes such as the discoid or the subacute types of SLE rashes. It may take months before these drugs demonstrate a beneficial effect. There is no known relationship between SLE and malaria.
Glucocorticosteroids such as prednisone or prednisolone are used to reduce inflammation and suppress activity of the immune system. They are the main therapy for SLE. Initial disease control usually cannot be achieved without daily glucocorticosteroids administration for a period of several weeks or months, and most children require these drugs for many years. The initial dose of glucocorticosteroids and the frequency of its administration depend on the severity of the disease and the organ systems affected. High-dose oral or intravenous glucocorticosteroids are usually employed for treatment of severe haemolytic anaemia, central nervous system disease and the more severe types of kidney involvement. Children experience a marked sense of well-being and increased energy within days of initiating glucocorticosteroids.

After the initial manifestations of the disease are controlled, glucocorticosteroids are reduced to the lowest possible level that will maintain the well-being of the child. Tapering of glucocorticosteroids dose has to be gradual, with frequent monitoring to make certain that clinical and laboratory measures of disease activity are suppressed.
At times, adolescents may be tempted to stop taking glucocorticosteroids or to reduce or increase their dose; perhaps they are fed up with the side effects or perhaps they are feeling better or worse. It is important that children and their parents understand how glucocorticosteroids work and why stopping or changing the medication without medical supervision is dangerous.
Certain glucocorticosteroids (cortisone) are normally produced by the body. When treatment is started, the body responds by stopping its own production of cortisone and the adrenal glands that produce it get sluggish and lazy. If glucocorticosteroids are used for a period of time and then suddenly stopped, the body may not be able to start producing enough cortisone for some time. The result could be a life-threatening lack of cortisone (adrenal insufficiency). Additionally, too-rapid reduction of the dose of glucocorticosteroid may cause the disease to flare.
Immunosuppressive agents such as azathioprine and cyclophosphamide act in a different manner from the glucocorticosteroid drugs. They suppress inflammation and also tend to decrease the immune response. These medications may be used when glucocorticosteroids alone are unable to control SLE, when glucocorticosteroids causes too many serious side-effects or when it is thought that combining the drugs may be better than using glucocorticosteroids alone.
Immunosuppresive agents do not replace glucocorticosteroids. Cyclophosphamide and azathioprine may be given as pills and are generally not used together. Intravenous pulse cyclophosphamide therapy is used in children with severe kidney involvement as well as for certain types of serious SLE problems. In this form of treatment, a large dose of cyclophosphamide is given by vein (approximately 10 to 15 times higher than the daily dose in pill form). This can be done as an outpatient or during a short stay in hospital.
Biologic drugs include agents that block the production of autoantibodies or the effect of a specific molecule. Their use in SLE is still experimental; they are administered only in protocols for research.

Research in the field of autoimmune diseases and particularly SLE is very intensive. The future aim is to determine the specific mechanisms of inflammation and autoimmunity, in order to better target therapies, without suppressing the entire immune system. Currently, there are many ongoing clinical studies involving SLE . They include testing of new therapies and research to expand the understanding of different aspects of childhood SLE.
This active ongoing research makes the future increasingly brighter for children with SLE.

What are the side effects of drug therapy?
The medications used for treating SLE are very effective, however, they may cause various side effects. (For a detailed description of side effects please see the section on drug therapy).
The NSAIDs may cause side-effects such as stomach discomfort (they should be taken after meal), easy bruising and rarely, changes in kidney or liver functions.

Antimalarial drugs may cause changes in the retina of the eye and, therefore, patients must have regular check ups from the eye specialist (ophthalmologist).

Glucocorticosteroids can cause a wide variety of side effects in both the short and the long term. The risks of these side effects are increased when high doses of glucocorticosteroids are required and when they are used for an extended period.
The major side effects of glucocorticosteroids are:
Changes in physical appearance (e.g. weight gain, puffy cheeks, excessive growth of body hair, skin changes with purple striae, acne and easy bruising). Weight gain can be controlled by a low calorie diet and by exercise.

Increased risk of infections, particularly tuberculosis and chickenpox. A child who is taking glucocorticosteroids and has been exposed to chickenpox should see a doctor as soon as possible. Immediate protection against chickenpox may be accomplished by administering preformed antibodies (passive immunization).
Stomach problems such as dyspepsia (indigestion) or heartburn. This problem may require anti-ulcer medication.
High blood pressure
Weakness of the muscles (children may have difficulty in climbing stairs or getting up from a chair)
Disturbances in glucose metabolism, particularly if there is genetic predisposition to diabetes
Changes in mood including depression and mood swings
Eye problems such as cloudiness of the lens of the eyes (cataract) and glaucoma
Thinning of bone (osteoporosis). This side effect may be decreased by exercise, by eating foods rich in calcium and by taking extra calcium and vitamin D. These preventive measures should be started as soon as a high glucocorticosteroid dose is begun.
Growth suppression.

It is important to note that most of the glucocorticosteroid side effects are reversible and will go away when the dose is decreased or when the drug is stopped.
Immunosuppressive agents also have potential serious side effects and children taking these medications should be monitored carefully by their physicians.
For description of the side effects of immunosuppressive agents, please refer to the “drug section”.

How long should treatment last for?
The treatment should last as long as the disease persists. It is generally agreed that most children with SLE are withdrawn completely from glucocorticosteroid drugs only with great difficulty during the initial years after diagnosis. Even long-term very low dose maintenance glucocorticosteroid therapy can minimize the tendency toward flares and keep the disease under control. For many patients, it may be best to maintain a low dose of glucocorticosteroids rather than risk a flare.

What about unconventional / complementary therapies?
There are no magic cures for SLE. Many unconventional therapies are proposed to patients nowadays and one has to think carefully about non-qualified medical advice and its implications. If you want to take unconventional therapy, consult your paediatric rheumatologist first. Most physicians will not be opposed to trying something harmless provided you also follow medical advice . The problem exists because many unconventional therapies require that patients stop taking their medications so as to "cleanse the body". When drugs, such as glucocorticosteroids, are needed to keep SLE under control, it is very dangerous to stop taking them if the disease is still .present

What kind of periodic check-ups are necessary?
Frequent visits are important because many conditions that may occur in SLE can be prevented, or treated more easily, if detected early. Children with SLE should have regular blood pressure checks, urinalyses, complete blood counts, blood sugar analyses, coagulation tests and checks on complement and anti-native DNA antibodies levels. Periodic blood tests are also mandatory throughout the course of the therapy with immunosuppressive agents to make certain that levels of blood cells produced by the bone marrow do not become too low. Ideally there should be only one physician in charge of supervising a child with SLE; a paediatric rheumatologists. As needed, consultation with other specialists is sought: skin care (paediatric dermatologists), blood diseases (paediatric haematologists) or kidney diseases (paediatric nephrologists). Social workers, psychologists, nutritionists, and other health care professionals are also involved in the care for children with SLE.

How long will the disease last for?
SLE is characterized by a prolonged course over many years that is punctuated by flares and remissions. It is often very difficult to predict what will be the disease course in an individual patient. The disease may flare at any time, either spontaneously or as a reaction to infection or some other identifiable event. Moreover, spontaneous remissions may occur. There is no way of predicting how long a flare will last when it comes, nor is there any way of predicting how long remission will last

What is the long-term evolution (prognosis) of the disease?
The outcome of SLE improves dramatically with the early and judicious use of glucocorticosteroids and immunosuppressive agents. Many patients with childhood onset of SLE will do very well. Nonetheless, the disease can be severe and life-threatening and may remain active throughout adolescence and into adulthood.
The prognosis of SLE in childhood depends on the severity of the internal organ involvement. Children with significant kidney or central nervous system disease require aggressive treatment. In contrast, mild rash and arthritis may be easily controlled. The prognosis for an individual child, however, is relatively unpredictable.

Is it possible to recover completely?
The disease, if diagnosed early and treated appropriately at an early stage, most commonly settles and ultimately goes into remission. However, as already mentioned, SLE is an unpredictable, chronic disease and children diagnosed with SLE normally remain under medical care with continuing medication. Often, SLE must be followed by an adult specialist when the patient reach adulthood.

How could the disease affect the child and family's daily life?
Once a child with SLE is treated s/he can lead a reasonably normal lifestyle. One exception is exposure to excessive sunlight, which may trigger or make SLE worse. A child with SLE may not be able to go to the beach for the day, or sit out in the sun by the pool.
For children 10 years and older it is important to assume a progressively greater role in taking their medications and making choices about their personal care. Children and their parents should be aware of the symptoms of SLE in order to identify a possible flare. Certain symptoms such as chronic fatigue and the lack of drive may persist for several months after a flare is over or seem to never go away.
Although these debilitating factors should be taken into account, the child ought to be encouraged as much as possible to join activities with hers/his peers

What about school?
Children with SLE can and should attend school except during periods of severe active disease. If there is no central nervous system involvement, SLE in general does not affect the ability of the child to learn and think. With central nervous system involvement problems such as difficulty concentrating and remembering, headaches and moods changes may occur. In these cases education plans have to be formulated
Overall the child ought be encouraged to participate in compatible extracurricular activities as much as the disease permits.

What about sports?
Restraints on general activity are usually unnecessary and undesirable. Regular exercise is to be encouraged in children during time of disease remission. Walking, swimming, cycling and other aerobic activities are recommended. Avoid exercising to the point of exhaustion. During a disease flare, exercise should be restrained.

What about diet?
There is no special diet that can cure SLE. Children with SLE should have healthy, balanced diet. If they take glucocorticosteroids, they should be eating foods low in salt to help prevent high blood pressure and low in sugar to help prevent diabetes and weight increase. Additionally, they should have their diet supplemented with calcium and vitamin D to help prevent osteoporosis. No other vitamin supplement is scientifically proven to be helpful in SLE.

Can climate influence the course of the disease?
It is well known that exposure to sunlight may cause the development of new skin lesions and can also lead to flares of disease activity in SLE. To prevent this problem it is recommended to use highly protective topical sunscreens on all the exposed parts of the body whenever the child is outside. Remember to apply the sunscreen at least 30 minutes before going out to allow it to penetrate the skin and dry. During a sunny day, sunscreen must be reapplied every 3 hours. Some sunscreens are water resistant, but reapplication after bathing or swimming is advisable. It is also important to wear sun protective clothing such as broad-rimmed hats and long sleeves clothes when out in the sun, even on cloudy days, as UV rays can penetrate clouds easily. Some children with SLE experience problems after they have been exposed to UV light from fluorescent lights, halogen lights or computer monitors. UV filter screens are useful for children who have problems when using a monitor.

Can the child be vaccinated?
The risk of infection is increased in a child with SLE, and prevention of infection by immunization is particularly important. If possible, the child should keep the regular schedule of immunizations. There are, however, a few exceptions:
- Children with severe, active disease should not receive any immunization.
- Children on immunosuppressive therapy and glucocorticosteroids should not receive any live virus vaccine (e.g. measles, mumps and rubella vaccine, oral poliovirus vaccine and varicella vaccine). Oral polio vaccine is contraindicated also in family members living in homes with a child on immunosuppressive therapy.
- Pneumococcal vaccine is recommended in children with SLE and splenic hypofunction.

What about sexual life, pregnancy and birth control ?
Most women with SLE can have a safe pregnancy and a healthy baby. The ideal time for pregnancy would be when the disease has remained in remission without any medication other than a small dose of glucocorticosteroids (other medications may be harmful to the baby). Women with SLE may have trouble getting pregnant because of either the disease activity or the medication. SLE is also associated with a higher risk of miscarriage, premature delivery and a congenital abnormality in the baby known as neonatal lupus (appendix 2). Women with elevated antiphospholipid antibodies (appendix 1) are considered at a high risk of a problem pregnancy.
Pregnancy itself can worsen symptoms or trigger a flare of SLE, therefore, all pregnant women with SLE must be closely monitored by an obstetrician who is familiar with high risk pregnancy and who works closely with the rheumatologist.
The safest forms of contraception in SLE patients are barrier methods (condoms or diaphragms) and spermicidal agents. Birth control pills containing estrogen may increase the risk of flares in women with SLE.

APPENDIX 1.

Antiphospholipid antibodies

Antiphospholipid antibodies are autoantibodies made against body's own phospholipids (part of a cell's membrane) or proteins that bind to phospholipids. The two most known antiphospholipid antibodies are anticardiolipin antibodies and lupus anticoagulant. Antiphospholipid antibodies can be found in 50% of children with SLE, but they are also seen in some other autoimmune diseases, various infections, as well as in a small percentage of children without any known illness.

These antibodies increase clotting tendency in blood vessels and has been associated with a number of illnesses including thrombosis of arteries and/or veins, abnormally low blood platelet counts (thrombocytopenia), migraine headaches, epilepsy and purplish mottling discoloration of the skin (livedo reticularis). A common site of clotting is the brain, which can lead to a stroke. Other common sites of clots include the leg veins and kidneys. Antiphospholipid syndrome is the name given to a disease when thrombosis has occurred along with a positive antiphospholipid antibody test.

Antiphospholipid antibodies are especially important in pregnant women, because they interfere with the function of the placenta. Blood clots that develop in the placental vessels can cause premature miscarriage (spontaneous abortion), poor fetal growth, preeclampsia (high blood pressure during pregnancy), and stillbirth. Some women with antiphospholipid antibodies may also have trouble getting pregnant.

Most children with positive antiphospholipid antibody tests have never had a thrombosis. Research into the best preventive treatment for such children is currently being carried out. At present, children with positive antiphospholipid antibodies and underlying autoimmune disease are often given low dose aspirin. Aspirin acts on platelets to reduce their stickiness, and hence reduces the ability of the blood to clot. The optimal management of adolescents with antiphospholipid antibodies also include the avoidance of risk factors such as smoking and oral contraception.

When the diagnosis of antiphospholipid syndrome is established (in children after thrombosis) the main treatment is to thin the blood. This is usually achieved with a tablet called warfarin, which is an anticoagulant. This is taken daily, and regular blood tests are required to ensure that the warfarin is thinning the blood to the required degree. The length of anticoagulation therapy is highly dependent on the severity of the disorder and the type of blood clotting.

Women with antiphospholipid antibodies who have recurrent miscarriages can also be treated, but not with warfarin as it has the potential to cause fetal abnormality if given during pregnancy. Treatment for pregnant women with antiphospholipid antibodies is aspirin and heparin. Heparin needs to be given daily during pregnancy by injection under the skin. With the use of such medications and careful supervision by obstetricians, about 80% of the women will have successful pregnancies.

APPENDIX 2.

Neonatal lupus

Neonatal lupus is a rare disease of the fetus and neonate acquired from the transplacental passage of specific maternal autoantibodies. The specific autoantibodies associated with neonatal lupus are known as the anti-Ro and anti-La antibodies. These antibodies are present in about one third of patients with SLE, but many mothers with these antibodies do not deliver children with neonatal lupus. On the other hand, neonatal lupus could be seen in the offspring of mothers who do not have SLE.

Neonatal lupus is different from SLE. In most cases, the symptoms of neonatal lupus disappear spontaneously by 3 to 6 months of age, leaving no after-effects. The most common symptom is rash, which shows up a few days or weeks after birth, particularly after sun exposure. The rash of neonatal lupus is transient and usually resolves without scarring. The second most common symptom is an abnormal blood count, which is seldom serious and tends to resolve over several weeks with no treatment.

Very rarely a special type of heart beat abnormality known as congenital heart block occurs. In congenital heart block, the baby has an abnormally slow pulse. This abnormality is permanent and can often be diagnosed between the 15^{th} and 25^{th} week of pregnancy by fetal cardiac ultrasound. In some cases, it is possible to treat the disease in the unborn baby. After birth, many children with congenital heart block require pacemaker insertion. If a mother has already had one child with congenital heart block, there is approximately 10 to 15% risk of having another child with the same problem.

Children with neonatal lupus grow and develop normally. They have only a small chance for developing SLE later in life.