TRANSIENT ERYTHROBLASTOPENIA OF CHILDHOOD:
A GUIDE FOR PARENTS & REFERRING PHYSICIANS

WHAT IS TRANSIENT ERYTHROBLASTOPENIA OF CHILDHOOD (TEC)?

TEC is a form of anemia that occasionally occurs in previously well and otherwise healthy children, usually between 6 months and 3 years of age. The anemia results from temporary absence of red blood cell production by the bone marrow. The anemia resolves without treatment (except for a blood transfusion in some cases). TEC is not a serious or life-long problem.

WHAT CAUSES TEC?

The cause of TEC is not known. Research has shown that children with TEC may have an antibody in their blood that reacts against their own baby red blood cells in the bone marrow. Therefore, TEC is a form of "allergy" against one's own red blood cell production. However, TEC is unrelated to other forms of allergies. Children with TEC often have had a virus infection of some sort several months earlier. It is unclear, however, whether this virus is important in triggering the blood problem.

WHAT ARE THE SIGNS & SYMPTOMS OF TEC?

Infants and children with TEC are usually quite healthy. Their anemia is often identified on a blood count performed for another purpose (for example, for a fever). Some children, however, are noted to be pale (a white, yellow, or light brown color to the skin and lips in contrast to the usual pinkness) for a variable period of time. Sometimes the paleness is noticed gradually over several months, whereas on other occasions it seems to be sudden. Many children with TEC have no symptoms at all – they feel fine. However, as a result of the anemia, some children with TEC are tired and fatigued; they often sleep more and exhibit less energy than usual. Children with TEC do not have persistent high fevers, jaundice (manifested by a yellow color to the whites of the eyes), dark colored urine, or other problems.

WHAT IS ANEMIA?

Anemia is reduction in the number of red blood cells in the body. The function of the red blood cells is to carry oxygen from the lungs to the tissues. Therefore, when anemia occurs the body's organs do not receive sufficient oxygen. This results in symptoms such as tiredness, excessive sleeping, irritability, decreased activity, and in severe cases fainting, breathing difficulties, and shock. Ultimately, anemia can be fatal.

Anemia is determined by measuring the concentration of hemoglobin (the substance in the red blood cells that carries oxygen) in the blood. The normal hemoglobin value during childhood is 11 to 13 gm/dl. Children with TEC usually have hemoglobin values between 4 and 8 gm/dl. When the hemoglobin is below 6 or 7 gm/dl, children are usually pale and exhibit some symptoms of anemia. When the hemoglobin is less than 4 to 5 gm/dl, severe symptoms may develop, and a blood transfusion is often necessary.

WHAT ARE THE VARIOUS CAUSES OF ANEMIA?

There are many different forms of anemia. Anemia may result from: (1) decreased production of red blood cells by the bone marrow (the spongy and fatty tissue inside the bones where all of the blood elements are made), (2) loss of blood from the body (for example, from the nose, intestines, or other sites), or (3) premature destruction of the red blood cells (called "hemolysis"). After blood cells are produced by the bone marrow, they normally live in the body for 120 days. If the red blood cells are destroyed prematurely and live, for example, for only 20 or 30 days, the bone marrow may not be able to "keep up" by producing enough red blood cells, and the child may become anemic (a so-called hemolytic anemia).

Children with TEC have anemia as result of decreased production of red blood cells by the bone marrow. The simplest test to determine how well the bone marrow is making red blood cells is the reticulocyte count (or retic count). Children with moderately severe anemia (as seen in TEC) should

have a retic count of 5 to 20% if their bone marrow were working properly. However, children with TEC usually have very low retic counts since their bone marrows are not making cells effectively. A separate brochure, available from us upon request, provides further information about anemia in general.

WHAT CLINICAL & LABORATORY ABNORMALITIES ARE IDENTIFIED IN TEC?

When the doctor does a physical examination on a child with TEC, he or she usually finds no abnormalities except for evidence of anemia. Specifically, there is no jaundice, enlargement of the lymph glands, enlargement of the liver or spleen, evidence of bleeding, or other signs suggesting that there is a serious disorder such as leukemia.

The blood count in children with TEC usually shows, as mentioned above, a moderately severe anemia (hemoglobin usually 4 to 8 gm/dl), and the reticulocyte count is very low (usually less than 1%). Very importantly, the remainder of the blood count is usually normal. This includes the platelets (the small sticky elements made by the bone marrow that help the blood to clot) and the white blood cells (blood elements that help fight infection). A slight reduction in the neutrophils (a form of white blood cell) is sometimes seen in TEC, but marked abnormalities of the WBC count do not usually occur.

WHAT OTHER CONDITIONS DOES THE DOCTOR THINK OF WHEN CONSIDERING THE POSSIBILITY OF TEC IN MY CHILD?

The diagnosis of TEC is usually straightforward. However, we are always concerned about the possibility of leukemia or another serious condition involving the bone marrow which suppresses red blood cell production. Children with leukemia, however, usually have abnormalities on the physical examination and in the white blood cell count and platelet count. If there is any doubt about the possibility of leukemia, your doctor will wish to perform a bone marrow examination on your child. This consists of removing several drops of liquid bone marrow from the back of the hip bone in order to examine the baby blood cells in the bone marrow. This is usually quite conclusive in excluding leukemia or similar disorders. Most children with "classic" TEC do not need a bone marrow examination.

There are several other conditions that cause markedly decreased red blood cell production but normal platelet and white blood cells. One of these is Diamond Blackfan anemia, a rare congenital (present from birth) form of anemia that is sometimes associated with congenital anomalies (birth defects). Children with Diamond Blackfan anemia, however, are usually anemic before 6 months of age.

Another condition that can sometimes resemble TEC is a congenital or acquired hemolytic anemia complicated by what is called an aplastic crisis – a temporary cessation of red blood cell production as a result of a specific virus. These children, however, usually have other relatives with hemolytic anemia, a history of jaundice, an enlarged spleen, or other problems.

HOW WILL MY CHILD WITH TEC BE TREATED?

There is no specific treatment for TEC. Vitamins, hormones, and special diets are of no value. Fortunately, TEC gets better by itself! Within a few weeks, the suppression of red blood cell production in the bone marrow ceases, the retic count rises, and the hemoglobin increases steadily to normal (11 to 13 gm/dl), along with return of the child's pink color and resolution of the symptoms of anemia. Some children with TEC, whose hemoglobin values drop below 4 or 5 gm/dl, require a single transfusion of red blood cells to give them a "boost" until they resume red blood cell production on their own. This is not a big problem, since with the careful screening of blood donors that has become standard, the risk of complications from transfusions is negligible. We will discuss this further with you if your child needs a transfusion.

After TEC is diagnosed in your child, he or she should have a blood count performed once or twice each week. As the child begins to recover, then blood counts can be performed less frequently until it is documented that they have returned to normal. Often the blood counts can be performed by your

pediatrician or family physician so that you do not have to return to the Center for Cancer and Blood Disorders each time. Children with TEC always make a full recovery within several months. There is no need for continued blood counts thereafter or for concerns that this condition will "turn into" some other blood disorder.

CONCLUSION

Many blood conditions are extremely serious. TEC is not. Therefore, if a child has to have a blood condition, TEC is the one to have! We hope that this brochure has been helpful to you. If you have any questions about TEC or any aspect of the hematology program at the Center for Cancer and Blood Disorders, please give us a call.

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