UniversityHealth Care Center
A PRACTICE SITE OF UNIVERSITY HOSPITAL
90 Presidential Plaza • Syracuse, NY 13202
www.universityhospital.org

SUNY Upstate Medical University
UniversityHospital
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Information for You from Your Health Care Team

All about TTP
Thrombotic Thrombocytopenic Purpura

What is TTP?

TTP is Thrombotic Thrombocytopenic Purpura. The name itself is difficult to say, let alone understand, but we hope to help you understand your diagnosis better by providing you with this information. Thrombotic means forming clots, Thrombocytopenic means low platelet count, and Purpura is a condition causing skin blotching. TTP is a complex disease where there is rapid breakdown of a patient's red blood cells. The occurrence of TTP has been estimated at 3.7 annually per million persons. The symptoms one has with this disease are directly related to what is going on inside the body on a cellular level. Let's take a closer look.

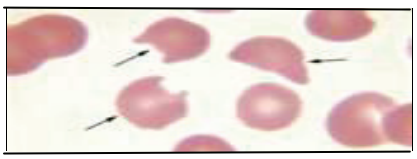
What happens inside your body?

To start with, vonWillebrand factor (vWF) is a large protein that is normally present in the blood stream to help repair leaks in the blood vessels and prevent bleeding. It does this by causing platelets to stick together reducing the platelet count and forming clots (vFW acts like glue). This vWF protein when first produced is large, but is rapidly broken down to smaller less active forms by an enzyme known as zinc metalloprotease and is also called ADAMTS 13. If ADAMTS 13 is not present, the vWF proteins stay large and as a result, become hyperactive and cause excessive platelet clumping.

The clumped platelets then interfere with the smooth flow of the red blood cells and cause the cells to break into pieces as they pass through the small blood vessels. These broken pieces of red blood cells, called schistocytes, are floating around in the bloodstream and can be seen under a microscope in the lab. Having ADAMTS 13 enzyme activity is very important.

A significant outcome of the platelet clumping is blockage of the small blood vessels in different body organs causing tissue damage. Physical symptoms vary depending on which organs are involved.

Schistocytes under a microscope



No one really knows what causes TTP at this time.

What causes TTP?

Researchers are not certain of the cause of TTP, but have been evaluating many theories. TTP can occur in pregnancy, or when you have an autoimmune disease, with infection, in bone marrow transplant, or when you take certain medicines. For many patients with TTP, the underlying problem is low ADAMTS 13 enzyme levels. There are several reasons why this enzyme may be low or absent. One reason is due to the presence of an antibody that is produced by a person's immune system. This antibody binds to the enzyme causing it to be destroyed. Remember that antibodies are produced by the immune system to keep the body protected from foreign substances. This is how immunizations work. Therefore, in these cases, TTP is thought to be an autoimmune disease, because the body is identifying something of its own and destroying it like it is foreign.

There are other reasons why the ADAMTS 13 enzyme may be decreased or absent; for example: genetic, idiopathic (unknown), or following certain medications (perhaps herbal medicines).

To complicate things more, some patients have TTP and plenty of ADAMTS 13 enzyme floating around in their blood. We are unsure what causes this form of TTP. People can be tested to determine if they truly have TTP, how severe it is, or if they have something that just looks like TTP.

What are the symptoms of TTP?

The classic five indications that help diagnose TTP are:

- neurological changes such as confusion, stroke, headache
- low hemoglobin and hematocrit (blood counts) with schistocytes seen under a microscope
- low platelet count
- fever
- kidney failure

A person may have some or all of these symptoms and also other symptoms, depending on their disease progression and their own body's response to the disease.

The platelet count will be low because of the abnormal clotting of cells in the bloodstream and body organs causing tissue damage. Symptoms caused by tiny clots (micro-infarcts) can be headaches and/or strokes, the level of consciousness changes or mental "fog", swelling, blurred vision, kidney failure, skin bruising, or tiny red dots (petechiae) of the skin. The low hemoglobin and hematocrit blood counts are related to the red blood cells breaking apart in the blood stream.

Another laboratory value that is affected by the breaking of the red blood cells and tissue damage is LDH (lactate dehydrogenase). Because tissue damage occurs in TTP and many red blood cells break; the level of LDH rises significantly in the blood.

There may be a fever present due to the immune system response. This can cause flu-like symptoms, including joint pain or nausea.

Doctors will order blood work to be drawn to evaluate the blood levels. They will look at the blood under a microscope as soon as TTP is suspected. If schistocytes are seen, along with some of the symptoms and blood work findings as described above, they may determine the diagnosis of TTP.

How is TTP treated?

One of the most common treatments for TTP is therapeutic plasma exchange (TPEX), also known as plasmapheresis. TPEX is used to get rid of the autoantibody to the ADAMTS 13 enzyme and some of the schistocytes which are contained in the plasma. The patient's plasma is separated out and removed, and fresh frozen plasma from healthy donors is used as a replacement solution. By using healthy plasma as a replacement, some of the ADAMTS 13 enzyme is restored to the patient. Plasma exchange is very effective in TTP management.

What your treatment schedule may look like

Plasma exchange treatments are typically done daily until platelets and LDH have returned to normal and hematocrit has stabilized for a few days. Treatments may then be tapered (example: every other day) to see how the patient responds. Your lab work will be monitored closely. The Hematology/Oncology doctor and the Hemapheresis doctor talk and come up with the best plan for you, based on how you have responded to the treatments.

Other treatments that may be used

Other treatment options including steroids and/or Rituxan® may be considered along with TPEX, especially in people who respond poorly or their disease starts to come back. TPEX is not a cure; it just relieves the symptoms temporarily. If the body is still making antibodies to the ADAMTS 13 enzyme, keeping it from doing its job, TTP may come back.

Steroids may be used because they help prevent antibody production. This suppresses the immune system which helps the body rebuild its ADAMTS 13 enzyme.

Rituxan® is an IV medication that works by targeting the type of cells that produce the antibody and destroys them which also helps the body rebuild its ADAMTS 13 enzyme.

TTP is a very complicated disease, and there is not a singular treatment cure. Your doctor will determine the best plan for you, based on your physical response and blood work results. You and your family will decide with your doctor what medicines to add to your treatment (if any) and when the best time is to introduce these medicines.

Will I get better? (Prognosis)

Eighty percent of people respond well to Therapeutic Plasma Exchange treatment. One third to one half of people has a return of the disease, particularly those with severely low ADAMTS 13 enzyme levels. Generally the outlook is very good, and in time you may return to your previous activities after careful monitoring by your doctor.

What is the Hemapheresis Service goal?

TTP is a complicated disease which may require the services of several different specialties. These specialties each work together as a team to make you feel better. The hemapheresis team at University Hospital is dedicated to providing you with the best care available.

We know this is a complicated disease to understand, and your health care providers are giving you a lot of information to absorb. All of our nurses have additional education in hemapheresis.

Speak up if you have a question or concern. If you do not understand, ask again. We want you to feel informed and confident about the care you are receiving from us.

References

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Hemapheresis Service
Phone 315-464-9024
Fax 315-464-9021

Speak Up if You Have Questions or Concerns

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