A clinical nutritionist from your child’s primary clinic will follow her nutrition needs closely. Based on what your child eats and drinks each day, this staff member will total her daily calories (units of energy the body gets from food). The number of calories will help the nutritionist know if your child is getting enough nutrients (the parts of foods that are good for the body) or if she needs more. For this reason, it is very important to fill out your child’s “24-Hour Intake and Output” record correctly.

If your child is unable to eat or digest enough food to nourish her body and give her energy, the doctor might decide that she needs Total Parenteral Nutrition (TPN). TPN is a liquid given by IV (by vein). It gives most or all of the nutrients your child’s body needs through a central venous line (an IV line that is placed in a central place on the body, usually the chest). Your child may have TPN until she is able to eat normally.

Metabolic Infusion Support Service (MISS) team

If your child is not able to eat or digest enough food, the Metabolic and Infusion Support Service (MISS) may be called in to help care for her. The MISS team includes doctors, nurses, social workers, nutritionists, and pharmacists. Metabolic describes the process the body uses to break down nutrients and use them for energy. The MISS team oversees the daily care of all patients that need metabolic or nutrition support, including those on TPN.

The MISS team meets weekly to talk about the metabolic and nutrition needs of these patients. The members will work closely with your family to prepare you for home TPN if needed.

What is TPN?

TPN bypasses the normal way the body digests food in the stomach. It supplies the fuels the body needs directly into the bloodstream through a central IV line. The body needs 3 kinds of fuel — carbohydrates, protein, and fat.

- **Carbohydrates** provide calories to the body. They supply most of the energy or fuel the body needs to run. The main energy source in TPN is dextrose (sugar).
- **Protein** is made up of amino acids, which are the “building blocks” of life. The body uses protein to build muscle, repair tissue, fight infections, and carry nutrients through the body.
- **Fat or Lipids** are another source of calories and energy. Fat also helps carry vitamins in the blood stream. Fat supports and protects some of your organs and insulates your body against heat loss. Fat is white in color.

TPN also contains other nutrients, such as vitamins and minerals, electrolytes, and water.
TPN (Total Parenteral Nutrition)

- **Vitamins** added to the TPN provide the needed daily amounts of vitamins A, B, C, D, E, and K. It is the vitamins that are added to the TPN mixture that turns it yellow. The body also needs **minerals**. These minerals are zinc, copper, chromium, manganese, and selenium. The vitamins and minerals in the TPN are needed for the body’s growth and good health.

- **Electrolytes** are important for bone, nerve, organ, and muscle function. Electrolytes, such as calcium, potassium, phosphorus, magnesium, sodium, chloride, and acetate, are also added to the TPN mixture.

- **Water** is a vital part of TPN. It prevents patients from becoming dehydrated (too little fluid). The amount of water in the TPN is based on your child’s height and weight.

Staff members will use blood tests to check the balance of all the TPN parts. The most critical of these tests is the chemistry test that your child will have during each clinic visit. The TPN mixture may be changed based on your child’s needs and the blood test results.

**Possible TPN–related problems**

Some problems might occur when your child is on TPN. Sometimes the problem can be fixed by changing the levels of protein, carbohydrates, or electrolytes in the TPN mixture. The clinical pharmacist and the nutritionist will review all of your child’s blood tests daily and will correct any imbalances. Hyperglycemia, or too much blood sugar, is one of the problems that can occur while your child is receiving TPN. This imbalance does not happen often, but you should be aware of it.

**Hyperglycemia (High blood sugar)**

Hyperglycemia is a higher than normal level of sugar in the blood.

- It can happen when TPN is given too fast or if the body cannot accept the sugar. Sometimes having an infection or taking a medicine such as a steroid will make the body unable to use large amounts of sugar.

- Your child may have a headache or feel thirsty, weak, or sick to her stomach.

- The pharmacist and nutritionist will follow your child’s daily blood tests very closely. One of those tests checks the sugar level in the blood.

**Beginning inpatient TPN**

If the doctor decides that your child needs TPN, it will start in the hospital. TPN is started as a nonstop infusion over a 24-hour period. A pharmacist and nutritionist along with your child’s doctor will decide the total number of calories and other nutrients your child needs each day. The staff wants to avoid causing high blood sugar (hyperglycemia) when starting TPN. To do this the sugar (dextrose) in the TPN is slowly increased each day over several days until your child’s total calorie need is met.

During your child’s hospital stay, please write down everything your child eats or drinks for each 24-hour period on the Intake and Output record. The nutritionist uses this information to calculate how many calories your child is taking in by mouth. This will help the clinical team know how many calories need to go into the TPN mixture.
TPN (Total Parenteral Nutrition)

Your child must be weighed every morning at about the same time. This daily weight tells the clinical team if your child is getting enough fluid or too much fluid in her TPN.

If your child is an inpatient on TPN, the staff will draw blood early each morning for tests. It is important to let the nurse draw your child’s blood at this time so the test results will be ready for morning rounds by the clinical team. The blood test results will help the doctor and the pharmacist know how your child’s body is doing on the TPN.

Starting the discharge process

Preparing to go home as an outpatient with TPN

If your child is on TPN in the hospital and she cannot eat or drink without vomiting, she may continue TPN at home. Your child’s doctor and clinical team will look at several factors before discharging your child on home TPN:

- Can the child take food or liquids by mouth without vomiting?
- Does the child have a parent or main caregiver who is able and willing to give home TPN?
- Do the caregivers want to learn the process of home TPN?
- Will the child be able to get medical care in her local area if there are problems with the TPN?

At times the doctor and the MISS team will decide that a child must come into the Medicine Room to be connected to and disconnected from TPN. One of the MISS team members will discuss this with you.

The parent and other caregivers must learn how to give outpatient TPN correctly and safely. Before you and your child are discharged, you will learn the following:

- The best way to clean your hands
- How to run the ambulatory infusion pump (the machine used for giving TPN)
- How to connect and disconnect your child from the TPN
- Possible problems and how to correct them
- Who to call if you have TPN problems or concerns

IV infusion company

The staff will make plans with an IV infusion company to help your child receive quality care while she is an outpatient. Which IV infusion company the staff members choose is based on your insurance company’s IV infusion preferred provider. The staff members will also choose a company that they feel will help deliver the best care for your child. If you have a provider that you want to use and they are covered under your insurance, please tell the clinical nurse specialist (CNS). Your CNS will help to get your home TPN arranged.

The IV infusion company will deliver everything you need to give home TPN including the pump, IV pole, backpack and supplies. They will be delivered to the place where you are staying in Memphs or at your home. A company staff member will also give you a telephone number that you can call 24 hours a day if you have problems with the pump or have questions or concerns.
The supplies that the infusion company gives you for home TPN cannot be returned even when they are unused. The following are some of the supplies that the IV infusion company will provide:

- TPN mixture
- Multivitamins
- Alcohol pads
- Urine dipstix for glucose (sugar) tests
- IV medicines (if ordered by the doctor)
- Heparin and normal saline
- Tubing
- Batteries
- Blue claves

Two types of TPN plans – continuous and cycled

While your child is in the hospital, the TPN runs continuously (all the time). When your child is about to be discharged as an outpatient, the TPN can run over shorter time periods, such as 12, 14, 16, or 20 hours. Each time period is called a “cycle.” Usually, the cycle is started in the evening so that the TPN can be given while the child is sleeping. By doing this, your child’s cycle will end sometime during the day. This will allow your child to be flushed and clamped part of the day while she is still awake. Each patient has a cycle goal that is set by a St. Jude pharmacist. The length of the cycle is based on your child’s size and needs.

When your child is on continuous TPN, the pharmacist will slowly reduce the number of hours that the TPN runs each night until the best “cycle” time for your child is reached.

Sometimes your child’s TPN still must run continuously over 24 hours. Your child’s doctor, pharmacist, and nutritionist will decide if this is needed.

The clinical nurse specialist and the infusion company nurse will teach you how to give your child’s type of TPN, whether it is “continuous” or “cycled”.

Questions?

If you have more questions about TPN, please talk to your child’s doctor, clinical nurse specialist, pharmacist, nurse, or nutritionist.