

MEDICINES

What to Know About Medicines Before and After Kidney Transplant

To help prevent problems and keep your child's kidney healthy, you need to know your child's current medicines. The transplant team (including the doctors and nurses) will work with you to improve your understanding of your child's medicines and the importance of giving them as directed. The team will also help you to decide on the best times to give your child his/her medicines. To ensure that the medicines are given correctly, we need your help in supervising administration of **all** medicines. Many pre-teen and adolescents will say that they are taking their medicines when they are not. We will work with you and your child beginning at age 10 to develop strategies to help him/her develop independence, but until you and the team agree together that your child is able to take medicines without supervision, we ask for your help in making sure all doses of medicines are taken. Even though your child may feel that he/she is at an age to understand the importance of the medicines and are responsible, it is critical to your child's health and wellbeing that you, as a parent, still supervise.

You are encouraged to keep a list with you of all current medicines that your child is taking (this can be either a hand-written list or a printed list, such as the one we hand out in clinic). This list should also include any over-the-counter, herbal medicines or supplements. Since medicines are frequently adjusted or changed to meet the medical changes of your child, it is important that you update your list of medicines after each change (especially when these are done between clinic visits). Changes will be necessary before you finish all the medicines in a bottle. There will be times that the medicine instructions you have been given over the phone or in clinic are not the same as what is written on the prescription bottle. Your medicine list should include the following:

- Name of the medicine
- Concentration of the medicine if it is a liquid or compounded medicine. Examples: 1 mg/ml; 15 mg/5 ml
- Dose of the medicine. Example: give 10 mg. Don't just list 1 ml. Many of the compounded medicines are compounded differently by pharmacies. It is important to note that they may mix (compound) it differently than what we have requested. If you get a new prescription, please let us know the concentration on the bottle. As an example, we may request a concentration of 60 mg/ml but the pharmacy may make it up as 50 mg/ml.
- How often the medicine should be taken. Example: 10 mg daily (or 1 time per day) or 10 mg twice a day or every 12 hours.

Important Information to Know About the Medicines:

- The brand name and generic name of the medicine
- When to give each medicine
- How to give them
- Reason for giving that medicine to your child
- Major side effects from the medicine
- What food or other medicines should be avoided when giving the medicine
- What to do if your child misses a dose
- When and how to order refills
- What the medicine looks like

You Should Know the Following About Storing Medicines:

- Store in the original containers.
- Keep the medicines tightly capped.
- Store them in a cool, dry place away from direct sunlight.
- Do not store in an area that has too much moisture such as the bathroom. Moisture can make them lose their strength.
- Keep all medicines out of the reach of children.
- Do not let the liquid medicines freeze if they require refrigeration.
- Do not store the medicine in the refrigerator unless instructed by the pharmacist.
- Give the medicine as directed each day at the same time.
- Do not crush or cut the tablets, capsules or caplets unless instructed to do so.

You Should Call the Transplant Team About the Medicines if:

- Your child cannot take his/her medicines for any reason.
- Your child develops a rash, fever, nausea, vomiting, diarrhea or any unusual symptoms.
- You are not sure what dose to give your child.
- You believe your child needs an over-the-counter medicine such as pain relievers, cold medicines, etc.
- Another doctor prescribes or changes any of your child's medicines.
- You have any doubts or questions about your child's medicines.
- You need a refill of any of your child's medicines.

You Should Be Aware of the Following Related to Refills of Your Child's Medicines:

- Refills should be obtained at your child's clinic visit. Ask the transplant team for any prescriptions which will run out before the next clinic visit.
- Plan ahead by always checking prescription bottles for the number of remaining refills. Prescriptions can be written for a one-month or three-month supply. The choice is determined by your insurance coverage. If in doubt, ask the pharmacist.
- Use of mail order pharmacies may be required by your insurance.
- Call the pharmacy to request refills at least one week before the medicines are gone. Most mail order pharmacies require at least 10 days to process your child's medicine refill.
- When you start a new medicine, fill it at a local pharmacy for the first time. This will allow the mail order pharmacy enough time to send your next refill before you run out of medication.
- Most non-liquid medicines are good for one year. Many **liquids** are only good for one to four weeks after compounding. The pharmacist will inform you how long a liquid medicine is effective. **All medicines should be taken as directed by the transplant team.**
- If your child is planning to be away from home during medicine time, the caregiver should bring his/ her dose(s) of medicine. This is to ensure your child stays on time with his/her medicine.
- You should always bring your child's medicines with you when traveling, whether it is a short or a long trip. When traveling by plane, **always** carry the medicines in your carry-on bag instead of packing them in your checked bag. For liquid medicines, put all original bottles in a zip-lock bag for inspection.

You Should Know

Do not run out of medicines!

- If you need a refill of medicine before your child's next clinic visit, you should call the Pediatric Kidney Transplant office at **(734) 615-2040**. You will need to leave the following information with the clerical staff or on the answering machine:
 - Your name and your child's name
 - Your child's date of birth
 - The name and dosage of the medicine that is needed for refill
 - How much of the medicine you have left
 - The pharmacy's name and phone number so we can call in the prescription for you.
 - A telephone number where you can be reached between 8:00 a.m. and 4:30 p.m.
- Please allow a minimum of three days for refill requests to be processed. While a sincere effort will be made to process requests in less than three days, it cannot be guaranteed. If your child's medicines are a compounded liquid, your pharmacy will need **at least a two day notice and often more**. Compounding medicines takes several hours to process.
- The Pediatric Kidney Transplant office can only refill those medicines that have been prescribed by our office. For all other medicine refills, you will need to contact the doctor's office that ordered the medicine for your child. This is to ensure that the medicines and their potential side effects are being monitored appropriately. Also, if your child is not responding to the medicine, they may need adjustments that we can't do in the transplant clinic. An example would be medicines for asthma.



What You and Your Child Need to Know about the Medicines

The success of a transplant depends on the proper use of anti-rejection medicines. For this reason, your child cannot be discharged from the hospital until you, as family members, can demonstrate a basic understanding about all the medicines. It is important to give all of your child's medicines exactly as they are prescribed and on time in order to protect the new kidney from rejection. Sometimes you will be away from home when it is time to give your child the anti-rejection medicines. Therefore, you will need to get into the habit of carrying the medicines with you so that your child's medicine schedule will not be interrupted. Some of the medicines require refrigeration, so a cooler with ice may be necessary for transportation.

As your child grows and becomes older, he/she will be taught this same information in order to care for themselves as adults. Teen/adolescent recipients will be taught how to set up their medicine planner with the discharge medicines before leaving the hospital for home.

The transplant office should verify that it is safe to take **any** medicine other than the ones prescribed to your child by his/her transplant doctor before giving them. Many of the anti-rejection medicines have interactions with other medicines. We give you a list of some of these interactions in clinic. These interactions can cause the anti-rejection medicines to be either too strong or too weak and can lead to a rejection episode. The **only** thing that can be given without prior approval from the nurse coordinator is Tylenol. This includes any form of herbal supplements, weight loss and over-the-counter medicines.

Never stop giving medicine, skip doses or decrease the dosage of the prescribed medicines on your own. Doing so can risk your child's health. If your child has missed any of the doses of his/her medicines, contact your nurse coordinator immediately for instructions. Do not try to catch up by taking two doses of the medicine. When in doubt as to what to do, give the transplant office a call.

You Should Know

Never stop giving medicine, skip doses, or decrease the dosage of the prescribed medicines on your own.

The reality is that children may vomit after taking their medicines. Here are guidelines to follow if this should occur:

- If your child vomits within 30 minutes after the dose, the entire dose must be given again.
- If your child vomits within 30 minutes to one hour after the dose, half of the dose must be given again.
- If your child vomits more than one hour after the dose, there is no need to give the dosage again.
- If your child **cannot** keep any medicines, food or fluids down, you **must** contact the transplant office immediately.

Prescription coverage: Sustained and consistent use of the anti-rejection medicines is essential to maintaining a healthy kidney and is very expensive without the help of insurance coverage. Therefore, you must maintain coverage for these medicines at all times. If you have questions about your insurance coverage, please contact either the transplant social worker or financial coordinator.

Anticipated Cost of Medicines – Per Month

Proper use of prescribed medicines is one of the most important ways for a patient to maintain a healthy kidney. Unfortunately, these medicines are very expensive – but necessary. It is very important to maintain your insurance coverage for your child's medicines. **Lapse in coverage can be extremely costly to you.** If you have concerns about your insurance coverage for your child's prescriptions, you are asked to contact the transplant social worker and financial coordinator who will assist you in developing a plan.

Anti-Rejection Medicines

Your child will take at least some combination of anti-rejection medicines for the rest of his/her life. Anti-rejection medicines are also called immunosuppressive drugs. These drugs decrease the body's ability to fight off what it sees as foreign. The medical team attempts to minimize the amount of immunosuppression while preventing rejection. This allows an appropriate balance for the body to fight infection without rejecting the transplanted organ.

Since the chance of rejection is highest immediately following the transplant surgery, patients receive the greatest number of drugs and in higher dosages shortly after surgery. As the time after surgery increases, it is likely a patient will take fewer drugs and in smaller doses. The types and amounts of anti-rejection medicine may change over time, but your child will need an ongoing medicine schedule.

There are four types of anti-rejection medicines that are commonly used. Each type works differently in the body to prevent rejection but all affect T-cell (lymphocytes) function. Patients often take a combination of the following:

- Tacrolimus (Prograf®) or Cyclosporine (Neoral®, Gengraf®)
- Mycophenolate Mofetil (CellCept®) or Mycophenolate Sodium (Myfortic®)
- Prednisone
- Sirolimus (Rapamune®) or Everolimus (Zortress®)



Tacrolimus (Prograf® or Generics) or Modified Cyclosporine (Neoral®, Gengraf® or Other Generics)

Tacrolimus and cyclosporine are similar in their effects on white blood cell function; they are called calcineurin inhibitors. Your child will take either tacrolimus or cyclosporine but will never take both at the same time. Each drug is taken twice a day, 12 hours apart. Infants and small children may require three doses per day of the medicine because of their higher rate of metabolism. As the time from transplant increases, they can eventually move to twice a day dosing.

It is important to maintain therapeutic blood levels as this is the only way to tell if your child is on enough medicine. Blood concentrations are measured at their lowest level which is referred to as a “trough level.” For example, if the tacrolimus is taken at 8:00 p.m. on Monday night, you need to have your child in the lab on Tuesday at 8:00 a.m. to have the blood drawn. Once the blood has been drawn, you should give your child his/her morning dose of tacrolimus. Measuring trough levels reflects whether adequate blood levels are being maintained. Based on this trough level, the transplant team will adjust the medicine.

When taking tacrolimus or cyclosporine your child should not eat or drink grapefruit (juice), or Seville orange juice (used to make orange marmalade), since it increases the amount of the medicine absorbed into the blood stream. There are several tropical fruits that should not be consumed including papaya, star fruit, pomegranate and pomelo. Juices and fruits that are OK to use include grape, orange, apple, cranberry, tangerine and pineapple.

■ Tacrolimus (Prograf®) and Generic Formulations

Prograf is an immediate-release formulation of tacrolimus. Envarsus XR and Astagraf XL are extended-release once-daily formulations of tacrolimus. These are not interchangeable. Conversion between these formulations should be done by the transplant doctor with close monitoring of tacrolimus blood levels.

Dose Strengths:

- Liquid 0.5 mg/ml
- 0.5 mg capsules
- 1 mg capsules
- 5 mg capsules
- If your child takes the capsules, he/she must take them whole. **Do not cut, crush or chew them.**

Frequency:

- Most common is twice a day, 12 hours apart.
- Infants and small children may require three times a day, eight hours apart.
- **The medicine must be given on time.**

Possible Side Effects:

- Kidney toxicity
- High blood pressure
- High blood sugar/diabetes
- Headache, tingling and/or shaking hands
- Nausea, vomiting, diarrhea
- High potassium levels

- Low magnesium levels
- Hair loss
- Increase chance for infections
- Post-transplant lymphoproliferative disorders

The side effects of Prograf® are usually dose-related. They generally get better or disappear as the dose is lowered over time. When your child comes to the clinic or has local lab studies drawn, we will continue to monitor the level of Prograf® in the blood and make adjustments in the dosage based on these levels.

Individual Dosing:

- Dose varies based on drug levels
- Higher doses are usually required shortly after transplant or after an episode of rejection

■ Modified Cyclosporine (Neoral®, Gengraf® or Generics)

Neoral® and Gengraf® are two brands of modified cyclosporine that are frequently used. There are several generic products that are available by manufacturers such as Sandoz and IVAX.

If cost is an issue and you or your insurance state that your child must change to a generic product, the following actions need to be taken:

- Notify the Transplant Office before the change.
- Obtain drug levels within two weeks of beginning the new drug.
- Do not interchange different brands.

Dose Strengths:

- Liquid 100 mg/ml
- 25 mg capsules
- 100 mg capsules
- If your child takes the capsules, they must take them whole.
- **Do not cut, crush or chew them.**

Frequency:

- Taken twice a day, 12 hours apart
- **The medicine must be given on time.**

Possible Side Effects:

- Kidney toxicity
- High blood pressure
- Headache, tingling and/or shaking hands
- Nausea, vomiting, diarrhea
- High potassium levels
- Low magnesium levels
- High cholesterol
- Increased hair growth
- Overgrowth of gums
- Gout
- Increase chance for infections
- Post-transplant lymphoproliferative disorders

Individual Dosing:

- Dose varies based on drug levels
- Higher doses are usually required shortly after transplant

■ Mycophenolate Mofetil (CellCept®) or Mycophenolate (Myfortic®)

These drugs work by inhibiting production of white blood cells (WBC). Myfortic® is not usually a first line drug but may be used if the patient is unable to tolerate CellCept®.

■ Mycophenolate Mofetil (CellCept® or Generics)

Dose Strengths:

- Liquid 200 mg/ml
- 250 mg capsules
- 500 mg tablets
- If your child takes the capsules or tablets, they must take them whole.
- **Do not cut, crush or chew them.**

Frequency:

- Taken twice a day, 12 hours apart
- **The medicine must be given on time.**

Possible Side Effects:

- Diarrhea
- Nausea
- Abdominal cramping, bloating
- Low white blood cell and platelet counts
- Increase chance for infections
- Post-transplant lymphoproliferative disorders

Individual Dosing:

- Dosing is according to weight and WBC/platelet counts.
- Dose may be adjusted for infections or low WBC/platelet counts
- Usually given with either tacrolimus or modified cyclosporine



■ Mycophenolate Sodium (Myfortic® or Generics)

Dose Strengths:

- 180 mg tablets
- 360 mg tablets
- If your child takes the tablets, they must take them whole.
- Do not cut, crush or chew them.

Frequency:

- Taken twice a day, 12 hours apart
- The medicine must be given on time.

Possible Side Effects:

- Diarrhea
- Nausea
- Abdominal cramping, bloating
- Low white blood cell and platelet counts
- Increase chance for infections
- Post-transplant lymphoproliferative disorders

Individual Dosing:

- Dosing is according to weight and white blood cell/platelet counts
- Dose may be adjusted for infections or low white blood cell/platelet counts
- Usually given with either tacrolimus or modified cyclosporine

Pregnancy After Transplant and Mycophenolate REMs

Most transplant patients will be on mycophenolate mofetil or mycophenolate sodium to prevent rejection. Females taking mycophenolate while they are pregnant have a higher risk of miscarriage in the first three months. There is also a higher risk that the baby will have birth defects. Because of this, a separate education module has been designed regarding these risks and contraception. Long term it is possible to switch to other immunosuppressants with less risk during pregnancy and this should be discussed with your child's kidney doctor **before** conception. See page 23 for more information.

■ Prednisone

Prednisone is a generic name for a corticosteroid used as anti-inflammatory drugs. We use this medicine to help prevent rejection from occurring and treat episodes of rejection.

Dose Strengths:

- Liquid: 5 mg/5 ml or 5 mg/ml
- 1 mg tablets
- 2.5 mg tablets
- 5 mg tablets
- 10 mg tablets
- 20 mg tablets
- 50 mg tablets

This medicine can be crushed and mixed with liquid or food. It **must** be taken with food to prevent stomach upset or ulceration.

Frequency:

- Usually only once a day in the outpatient setting; sometimes every other day

Possible Side Effects:

- Diabetes, increased blood sugar
- High blood pressure
- Mood swings
- Trouble sleeping
- Swelling of face (moon shape), hands and feet
- Sodium and water retention
- Increased cholesterol
- Increased appetite and weight gain
- Bone loss, brittle bones
- Thin arms and legs
- Muscle weakness
- Sweating

- Vision changes, cataracts
- Poor wound healing
- Increased susceptibility to infections

The side effects may be more noticeable during the tapering process.

Individual Dosing:

- Steroid is administered as IV methylprednisolone immediately following the transplant instead of oral prednisone. At first, it is given every six hours. Before discharge, dosing will convert from IV to oral tablets.

To Taper Prednisone:

- Decreasing the dose should only be done under the care of the transplant team.

■ Sirolimus (Rapamune® or Generics)

Sirolimus is usually given by itself, but may be given in association with tacrolimus.

Dose Strength:

- Liquid 1 mg/ml solution
- 0.5 mg tablets
- 1 mg tablets
- 2 mg tablets

Frequency:

- Taken once a day

Possible Side Effects:

- Low red blood cell count
- Low platelet count
- Low white blood cell count
- High cholesterol and triglyceride

Individual Dosing:

- Dose adjustment is made based on drug levels.

■ Everolimus (Zortress®)

Dose Strength:

- 0.25 mg tablets
- 0.5 mg tablets
- 0.75 mg tablets

Frequency:

- Taken twice a day, 12 hours apart
- The medicine must be given on time.

Possible Side Effects:

- Low red blood cell count
- Low platelet count
- Low white blood cell count
- High cholesterol and triglyceride

Individual Dosing:

- Dose adjustment is made based on drug levels.

Medicines to Prevent or Treat Infections

After transplant, patients are at greater risk of infection. These infections can come from bacteria, fungi or viruses that are normally found in the environment. Since transplant patients take anti-rejection medicines that lower their resistance to infection, they also are given several medicines to help prevent infections.

Anti-Bacterial

■ Sulfamethoxazole/Trimethoprim (brand names: Bactrim, Septra, Cortimoxazole)

Dose Strength:

- Suspension
- Single-strength tablet

Frequency:

- Taken once a day

Individual Dosing:

- Is given for a total of 90 days after transplant

Side Effects:

- Nausea, vomiting
- Skin rash
- Low white blood cell count

**Precautions:**

- If your child is allergic to sulfa, a different medicine called pentamidine inhalation will be given as prevention.
- This medicine can cause an increased sensitivity to sun. Sunscreen should be used.

*Anti-Fungal***■ Mycostatin/Nystatin****Dose Strength:**

- Swish and Swallow (S/S) 400,000 units (4 mls)

Frequency:

- Use four times daily

Individual Dosing:

- Is given for a total of 30 days after transplant, but may be given longer if your child is experiencing symptoms of “thrush” in the mouth.
- Swab the mouth with the liquid or swish and swallow.
- Do not allow your child to eat or drink for at least 15 minutes after the dose.

Side Effects:

- Nausea
- Diarrhea

Anti-Viral

CMV (cytomegalovirus) is a common herpes virus most people have had as a child. The usual symptoms of CMV infection are “flu like symptoms.” Many younger children have not been exposed to CMV and are at great risk of developing the infection after a transplant. Before transplant, patients have a blood test to identify the presence of an antibody to CMV which indicates that they have previously had the infection. The results of this test (and a similar test given to the organ donor) determine which anti-viral medicines are prescribed to prevent CMV or other herpes infections. The most commonly used is Valganciclovir (Valcyte®).

■ Valganciclovir (Valcyte®)

Dose Strength:

- Liquid 50 mg/ml solution
- 450 mg tablets

Frequency:

- Used once per day

Individual Dosing:

- Is given for a total of 90 days after transplant

Side Effects:

- Nausea, vomiting
- Decreased white blood cell counts

■ Acyclovir (Zovirax®)

This medicine is given after transplant to prevent and treat viral infections. A common reason for giving this drug after transplant is to treat the virus that causes chickenpox.

Dose Strength:

- Compounded liquid 200 mg/5 ml suspension
- 200 mg capsules
- 400 mg tablets

Frequency:

- Used once per day and up to five times per day as treatment

Individual Dosing:

- Is given depending on need of this medicine

Side Effects:

- Nausea, vomiting
- Decreased white blood cell count

Other Medicines

Frequently, it may be necessary for children to take medicines that are new to them. Anti-rejection medicines and surgery can cause a patient to have high blood pressure, high blood sugars, stomach problems and electrolyte imbalances. These conditions can be temporary or permanent. The following are examples of medicines that may become necessary.

Medicines for Electrolyte Imbalances

Sometimes medicines can cause imbalances in the body's electrolytes, the substances needed by your body to maintain fluid balances and many other functions. Sodium, potassium, chloride, magnesium, calcium and phosphorus are some of the electrolytes found in your body. When electrolytes are higher or lower than normal range, medicines can be used to correct the imbalance.

■ Magnesium Oxide or Magnesium Gluconate (Magonate®)

Magnesium oxide or magnesium gluconate is used to treat a low magnesium level.

Dose Strength:

- Magonate® (1 gm/5 ml solution)
- Tablets in various strengths

Frequency:

- Used once to twice daily

Individual Dosing:

- Is given depending on need for this medicine

Side Effects:

- Diarrhea, abdominal cramping
- Muscle weakness
- High magnesium levels
- Low blood pressure

■ Sodium Bicarbonate or Sodium Citrate/Citric Acid (Bicitra®)**Dose Strength:**

- Bicitra (1 mEq/ml bicarbonate)
- Sodium bicarbonate 325 mg and 650 mg tablets

Frequency:

- Used once per day and up to five times per day as treatment

Individual Dosing:

- Is given depending on need for this medicine

Side Effects:

- Abdominal distention, gas
- Swelling of the hands and feet
- Low levels of sodium, potassium and/or calcium

Anti-Hypertensive Medicines (Blood Pressure)

High blood pressure may be a result of the surgery and the anti-rejection medicines. The high blood pressure may be a short-term or a long-term problem. Not controlling the high blood pressure can lead to long-term effects on the kidneys and other organs. The Pediatric Kidney Transplant team will help manage the anti-hypertensive medicines. Before discharge from the hospital, you will be taught how to take your child's blood pressure. Most patients are sent home with a blood pressure machine. It is important to record the blood pressure readings and contact the transplant team with blood pressures that are out of the ideal range. If the blood pressure remains elevated even with the current medicine, adjustments may be necessary. The blood pressure record should be reviewed at each clinic visit by the transplant team.

There are different potential anti-hypertensive medicines that could be used to control the high blood pressure. More than one of these medicines may be needed to control blood pressure.

■ **Isradipine (DynaCirc®)**

Dose Strength:

- Compounded liquid – 1 mg/ml
- 2.5 mg tablets
- 5 mg tablets

Frequency:

- Used once per day and up to four times per day

Individual Dosing:

- Is given depending on the blood pressure readings

Side Effects:

- Headaches, dizziness
- Swelling in the hands and/or feet
- Palpitations
- Flushing
- Low blood pressure
- Nausea

■ **Amlodipine (Norvasc®)**

Dose Strength:

- Compounded liquid – 1 mg/ml
- 2.5 mg tablets
- 5 mg tablets
- 10 mg tablets

Frequency:

Used one to two times per day

Individual Dosing:

- Is given depending on the blood pressure readings

Side Effects:

- Headaches, dizziness
- Irregular heartbeat
- Fatigue
- Nausea
- Low blood pressure

■ Lisinopril**Dose Strength:**

- Compounded liquid – 1 mg/ml
- 2.5 mg tablets
- 5 mg tablets
- 10 mg tablets
- 20 mg tablets

Frequency:

- Used one to two times per day

Individual Dosing:

- Is given depending on the blood pressure

Side Effects:

- Rash
- Nausea, vomiting
- Dizziness, headaches
- Cough
- High potassium levels
- Low blood pressure

Diuretics

Some patients after having a kidney transplant will still need to use a water pill (diuretic) such as furosemide (Lasix). The drug will be decreased and stopped as swelling decreases. It can take several weeks to months for the swelling to go away.

Acid-Reducing Medicines

These medicines protect the digestive system and will be prescribed as long as your child needs them. Once some of the medicines (prednisone or mycophenolate) are tapered (decreased), patients often don't need anti-ulcer medicines and will be asked to stop using them. Examples of these medicines include Zantac®, Prevacid®, Pepcid®, Protonix® and Nexium®. These medicines come in liquid or tablet/capsule form.

Medicines to Prevent Clotting

Blood thinners such as a baby aspirin will be given to your child to prevent the blood vessels to the kidney from clotting after transplant. A baby aspirin is usually taken 30 days for those less than 40 kilograms or 88 pounds after transplant. Baby aspirin must be given with food or after meals to help prevent stomach upset.

Medicines to Treat High Blood Sugar/Diabetes

Tacrolimus and prednisone can cause blood sugar to increase. Elevated blood sugars can sometimes be managed using an oral medicine such as glipizide, glyburide or several others. If oral medicines do not manage the elevated blood sugar, insulin may be necessary. Elevated blood sugar may be a short-term or a long-term problem. Long-term management of diabetes is managed through the patient's local doctor or by a diabetic team.

As prednisone and tacrolimus are decreased, blood sugars may come down. Therefore, it is important for you to closely monitor your child's blood glucose levels. Monitoring blood sugar levels at home requires a machine (glucometer) which is prescribed at the time of discharge. You will be instructed on the proper use of the glucometer and how to record and treat your child's blood sugar levels. It is important to bring the blood sugar record to all clinic visits to be reviewed by the transplant team.

Over-The-Counter (OTC) Medicines

There are many medicines that do not require a prescription and can be purchased over the counter. These drugs are used to treat minor ailments and are generally safe to use. However, there are some OTC medicines that may cause problems in a post-transplant patient.

You Should Know

Do not take anything that contains ibuprofen or naproxen including Advil, Motrin, Naprosyn and Aleve.

In selecting OTC medicines for these minor conditions, it is important to avoid any medicine that contains ibuprofen or naproxen because they can interact with anti-rejection medicines and cause kidney failure. Examples that contain ibuprofen or naproxen and should be avoided include Advil®, Motrin®, Naprosyn®, or Aleve®. The only medicine that can be used for fever or discomfort is Tylenol. It is important to read the labels on the medicines to know the content and dosage before giving these medicines to your child.

Nutritional Supplements

It is generally recommended that your child receive a multivitamin supplement after transplant. This is particularly important if your child's nutritional status was poor before transplant, had a difficult recovery with complications following surgery or if he/she has poor eating habits. If your child requires something more than a multivitamin, the dietitian will recommend this to you. In Michigan, it is also common to require a vitamin D supplement because of our long winter.

Diet Pills and Herbal Products

It is strongly recommended that transplant patients avoid taking any type of diet pill or herbal products, remedies or teas. Prior to giving your child any of these products, it should be approved by the transplant team. Many of these products interfere with the transplant medicine and could lead to problems with the kidney.

All transplant patients should avoid St. John's Wort because of its serious health risk.

Pregnancy After Transplant

Pregnancy after transplant is considered high risk.

- Pregnancy may increase the risk of rejection to your transplanted organ.
- There are higher rates of fetal complication such as premature delivery and low birth weight in transplant patients.
- There are increased risks for maternal complications, including preeclampsia (a medical condition that may occur during pregnancy characterized by high blood pressure and significant amounts of protein in the urine) in transplant patients.

Although successful pregnancies have occurred after transplantation, **it is important that pregnancies in transplant patients be planned and managed preferably by both a transplant doctor and high-risk obstetrician.** Please discuss your plans of becoming pregnant with your transplant doctor. If you are pregnant, you should let your transplant doctor and obstetrician know as soon as possible.

Some anti-rejection medications may cause fetal harm.

- The use of mycophenolate (CellCept® or Myfortic®) during pregnancy has been associated with a higher risk of miscarriage in the first three months, as well as birth defects. Therefore, the FDA has developed a program to educate patients of possible risks while taking a medication that contains mycophenolate:
 - Mycophenolate mofetil
 - Mycophenolate sodium
 - CellCept®
 - Myfortic®
- Certain blood pressure lowering medicines (ACE inhibitors and angiotensin receptor blockers) are known to cause fetal harm and must be discontinued.
- Commonly used birth control methods may be less effective in combinations with anti-rejection medications. **Female transplant recipients MUST use the recommended effective contraception (see table) during the entire treatment with mycophenolate and for six weeks after stopping mycophenolate** unless abstinence is the chosen method.
- A member of the transplant team will discuss the potential risks with you and acceptable birth control options while you are taking mycophenolate.
- If you discover that you are pregnant, **do NOT discontinue any anti-rejection medications without talking to your transplant doctor.** Discontinuing anti-rejection medications can result in rejection or loss of the transplanted organ.

ACCEPTABLE CONTRACEPTION METHODS — Choose One Option

Option 1

Methods to Use Alone

- Intrauterine devices (IUDs)
- Tubular sterilization
- Patient's partner had a vasectomy

Option 2

Choose One Hormone Method **AND** One Barrier Method

Hormone Methods (choose 1)

Estrogen and Progesterone

- Oral contraceptive pills
- Transdermal patch
- Vaginal ring

Progesterone only

- Injection
- Implant

AND

Barrier Methods (choose 1)

- Diaphragm with spermicide
- Cervical cap with spermicide
- Contraceptive sponge
- Male condom
- Female condom

Option 3

Choose One Barrier Method from EACH column (must chose **TWO** methods)

Barrier Methods (choose 1)

- Diaphragm with spermicide
- Cervical cap with spermicide
- Contraceptive sponge

AND

Barrier Methods (choose 1)

- Male condom
- Female condom

Medicines to Avoid

There are many drugs that can interact with anti-rejection medicines. If you are taking cyclosporine, tacrolimus, sirolimus or everolimus you should check with the transplant team before taking any new prescription or over-the-counter medications. The following are some examples of medicines with significant interaction potential, however, this list does not include all of them.

CLASS	MEDICINE	COMMON TRADENAME
Anti-infective medicines	Clarithromycin	Biaxin®
	Erythromycin	EES, Ery-Tab, E-mycin, ERYC
	Telithromycin	Ketek™
	Amikacin	—
	Gentamicin	—
	Tobramycin	—
	Nafcillin	—
	Rifabutin	—
	Rifampin	—
	Amphotericin B	—
	Fluconazole	Diflucan®
	Itraconazole	Sporanox®
	Ketoconazole	Nizoral®
	Voriconazole	VFEND®
Anti-seizure medicines	Carbamazepine	Tegretol®
	Phenobarbital	Luminal®
	Phenytoin	Dilantin®
Blood pressure lowering medicines	Diltiazem	Cardizem®, Cardizem CD®, Cartia XT®, Dilacor XR®, Dilt-CD®, Dilt-XR®, Diltia XT®, Taztia XT®, Tiazac®
	Verapamil	Calan®, Calan SR®, Covera-HS®, Isoptin®, Isoptin SR®, Verelan®, Verelan PM®
Pain killers	Non-steroidal anti-inflammatory medicines	Advil®, Motrin®, Naproxen®, Aleve®
	Celecoxib	Celebrex®

