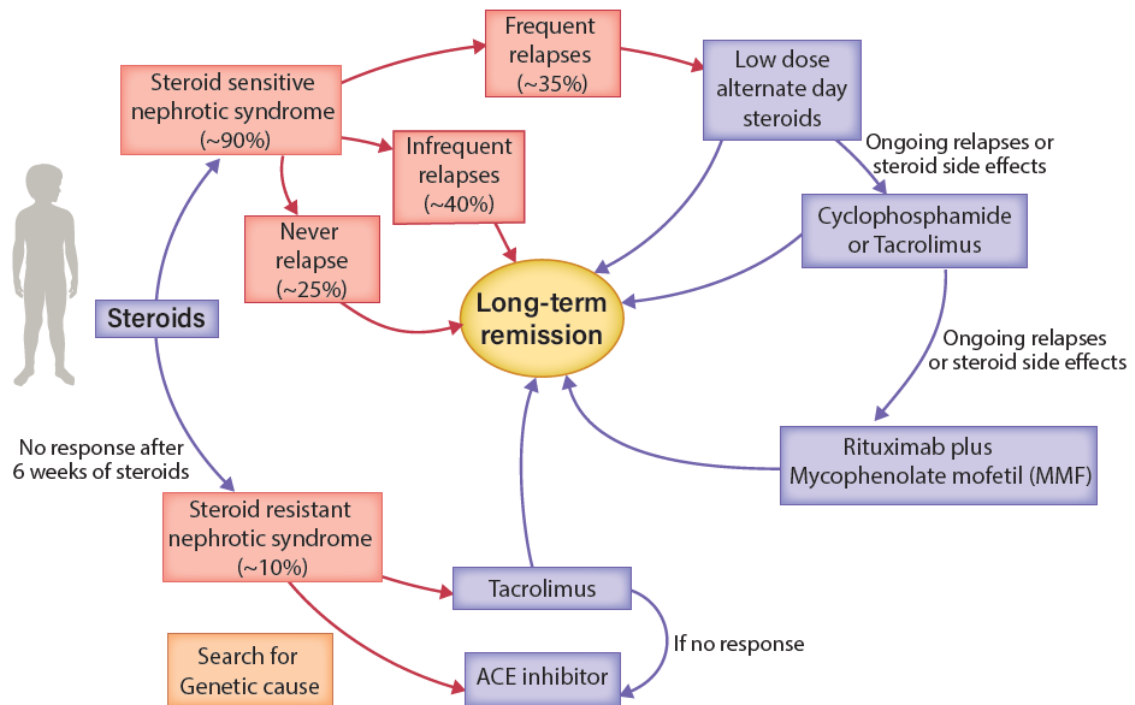


Medications in Nephrotic Syndrome: A Comparison



Which medications are used?

- Steroids are used to treat the initial episode and relapses of nephrotic syndrome
- Non-steroid immune suppressing medications (cyclophosphamide, tacrolimus, mycophenolate mofetil (MMF), and rituximab) are also sometimes needed
- These medications also suppress the immune system to prevent nephrotic syndrome relapses and prolong disease remission

When do we use non-steroid immune suppressing medications?

- In children who do not get better with steroids, have repeated relapses, or have side effects from steroids
- These medications are often used in combination with steroids or other immune suppressing medications

How do we choose between these medications?

- We carefully consider many factors in deciding which medication is right for each child. These medications are all effective for treating nephrotic syndrome but have potential side effects
- Some important considerations include the child's age, disease characteristics, previous treatment, medication side effects, prescription coverage, and if the child can tolerate regular blood tests
- The typical order of these medications is: 1) cyclophosphamide, 2) tacrolimus, then 3) rituximab and MMF

Medication Comparison and Additional Resources

	Cyclophosphamide	Tacrolimus	Rituximab	Mycophenolate mofetil
Effectiveness	One-third of children will have no further relapses after cyclophosphamide	Half of children will not relapse while taking tacrolimus; one-quarter have no further relapses	Relapses are uncommon in the first 6mo after rituximab, but most children eventually relapse (usually by 12-18mo)	Typically used to prevent relapses after rituximab or if a child is unable to take other medications
Route	Oral (tablets)	Oral (capsules or liquid)	Intravenous	Oral (capsules, tablets, or liquid)
Dosing frequency	Once daily	Twice daily	<i>Initial dose:</i> two infusions in hospital two weeks apart (6hr each). <i>Subsequent doses:</i> one infusion	Twice daily
Treatment duration	2-3 months	Usually 2+ years	Repeat dosing based on the child's condition, response	Usually 2+ years
Monitoring	Weekly bloodwork for 2-3 months	Monthly bloodwork with drug level monitoring	Monthly bloodwork with blood cell count monitoring	Monthly bloodwork with drug level monitoring
Is a kidney biopsy needed?	Not usually – depends on the child's condition	Not usually – may be done if tacrolimus is still required after 2+ years	Not usually – depends on the child's condition	Not usually – depends on the child's condition
Potential side effects*	Nausea, low blood cell counts, hair loss, bladder irritation, possible reduced fertility**	High blood pressure, laboratory abnormalities, diabetes (rare), kidney damage (rare with short-term use)	Allergic reactions, low blood cell counts, infections (such as hepatitis – vaccines should be up to date), uncertain long-term safety	Abdominal pain, nausea, diarrhea, low blood cell counts
Prescription coverage	Covered by OHIP+	Covered by drug insurance or through compassionate review	Not covered by OHIP+ Possible funding via EAP or SickKids	Covered by OHIP+

* There is a theoretical increased risk of cancer after any immune suppressing medication, although this risk is very low

** There is a theoretical risk of reduced fertility after cyclophosphamide, although this risk is very low at the dose used for nephrotic syndrome

Information on nephrotic syndrome treatment

AboutKidsHealth (SickKids): Nephrotic syndrome

<https://www.aboutkidshealth.ca/article?contentid=3846&language=english>

National Institute of Diabetes & Digestive & Kidney Diseases (NIDDK): Nephrotic syndrome in children

<https://www.niddk.nih.gov/health-information/kidney-disease/children/childhood-nephrotic-syndrome>

National Health Service (United Kingdom): Nephrotic syndrome in children

<https://www.nhs.uk/conditions/nephrotic-syndrome/>

How to give each medication

AboutKidsHealth (SickKids): How should you give your child these medications?

[https://www.aboutkidshealth.ca/drugaz?startswith="*](https://www.aboutkidshealth.ca/drugaz?startswith=)

NephCure Kidney International: How should you give your child these medications?

<https://nephcure.org/livingwithkidneydisease/treatment-options/>