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What is Warfarin?

Warfarin belongs to a group of drugs called *anticoagulants*. Warfarin stops unwanted blood clots from forming and can stop any blood clots that have already developed from growing bigger. Warfarin does NOT break down blood clots that have already formed. Warfarin changes how our blood clots by affecting just one part of our body's clotting system. Warfarin stops something called *Vitamin K* from joining together with clotting proteins (made in the liver), which makes those proteins weaker. By doing this, warfarin slows down the time it takes for our body to make new blood clots.

Who needs warfarin?

People are given warfarin for only two reasons.

1. They have had a blood clot and are taking warfarin to make sure the blood clot doesn't grow or break off and travel to another part of the body (e.g. the lungs).
2. They haven't had a blood clot yet, but for some reason their doctor thinks they have a bigger risk than other people for getting a blood clot.

How do I give warfarin?

In Australia, warfarin comes in two brands. Whatever brand of warfarin your doctor tells you to start, you should keep taking that brand and not change to the other one. Both brands are safe to use in children. Both brands of warfarin have colour-coded their tablets. You should make sure you know which brand of warfarin you are to take, what dose you should be taking and what colour tablets you have. This will help you avoid making any mistakes taking your warfarin.

	1mg	**2mg**	**3mg**	**5mg**
Coumadin	Light tan	Lavender	n/a	Green
Marevan	Brown	n/a	Blue	Pink

Cutting warfarin tablets into halves or quarters are not good ways of giving warfarin as we can't be sure how much we are giving. It is safer to use whole tablets only, which means that the dose of warfarin given each night may change (e.g. for children sensitive to warfarin, we might tell them to take 1mg one night and no warfarin the next – this *alternate night* warfarin dosing can keep children's warfarin therapy more stable).

There is no liquid form of Warfarin. For smaller children the tablets can be crushed and/or dissolved. To crush the tablets you can use a mortar and pestle if you have one, or you can crush the tablets between two teaspoons. Put the tablet powder into a medicine cup and add water or milk (NOT infant formula). Once mixed up, warfarin can be given from the cup, a syringe or on a spoon.

Monitoring warfarin therapy

All patients taking warfarin must have regular blood tests to make sure we are slowing down their blood clotting system enough. If we don't give enough warfarin, the risk of making unhealthy blood clots is too high; if we give too much warfarin, the risk of having bleeding problems becomes too high. We measure how much clotting ability the blood has by a test called the *international normalised ratio.* Usually this test is just called an INR. When the INR is sitting right where we want it to be (not too high, not too low) we say this it is in the *target therapeutic range.* In someone not taking warfarin, the INR would be around 0.9-1.1. When warfarin slows down the time it takes for blood clots to form, it makes the INR get bigger. Most people taking warfarin have a *target therapeutic range* of 2.0-3.0. Sometimes we need to make patients have an INR result that is bigger or smaller than this, but we will make sure you know what INR range is best for you and why that is. It is important to remember that as the INR number gets bigger, the time it takes for blood to clot increases, making the risk of bleeding problems bigger.

When patients start warfarin is can take a number of days before the INR test starts to change. This is normal. It can take more than a week for the INR to be where we want it in children taking warfarin. During the early days of starting warfarin, we will often measure the INR every one to two days. Once the INR is in the target range, we will start to spread out the days between INR tests. In most children we ask for INR tests to be done every 2-4 weeks. Because children are always growing and can often get minor illnesses, we believe it is safest to do INR tests at least once a month.

Keeping the INR in the right range

Unfortunately, lots of different things can make warfarin therapy unstable, that is, make the INR go up or down even though the dose of warfarin doesn't change. Whenever changes happen that might affect your warfarin, it will often take 2-4 days before we see whether the INR has gone up or down. The list below mentions the five things that most often make the INR test go up or down:

1. ***Medication Changes.***

It is safest to think that any change in the medicines you take will affect how you respond to your warfarin therapy. Whenever any doctor changes the medicines you take, make sure the Haematology team knows about these changes. It may be necessary to do an INR test to check the affect of starting, stopping or changing the dose of another medicine. Some medicines you can buy without a prescription can still affect warfarin. Unless told by a doctor, do not give Aspirin, anti-inflammatory medicines (eg Nurofen) or herbal remedies to children taking warfarin.

2. ***Changes in Diet***

Warfarin acts like a road-block, stopping Vitamin K from working with clotting proteins made in the liver. Vitamin K is most often found in the foods we eat and liquids we drink. Some foods have a lot of Vitamin K (eg. Spinach, Lettuce, Chick Peas) other have very little. You do not have to avoid foods that have lots of Vitamin K in them. The most important thing is that you eat them consistently (eg once a week, every day, three

times a week, never). A good, healthy diet is the best thing for children. Occasional treats like take-away food and snacks are perfectly OK for children taking warfarin.

Special Information About Warfarin and Babies: Warfarin works very differently in babies who are fed breast milk compared to babies who are formula fed. Breast milk has no Vitamin K in it, so babies who are breast fed are very sensitive to warfarin. Infant formulas all have lots of Vitamin K added to them, so babies fed formula are quite warfarin resistant. If your baby needs warfarin, the Haematology team will need to make a special plan for keeping the INR test stable.

Special Information about Children Having Supplementary Milk Formulas: Just like infant formulas, supplementary milk formulas (eg Ensure, Sustagen) have extra Vitamin K added to them. When the amount of extra feeding children need changes, response to warfarin will also change. Make sure you tell the Haematology team whenever supplementary feeding patterns change.

3. Health Status

If you get sick, your body changes the way it uses warfarin. This might not change much if you just have a minor cold lasting a few days, but if you become so unwell that you go off food and/or have vomiting and diarrhoea, this change can be very big. Call the Haematology team if your illness last more than a couple of days. Diarrhoea can cause the INR to up more quickly than other illnesses. In some children, the INR can get high very quickly when they have diarrhoea, Please contact the Haematology department if you develop diarrhoea and it lasts more than 24 hours.

4. Alcohol

The RCH Haematology team does not encourage under-age drinking, but if teenagers are going to drink alcohol, we need to know about it. Alcohol can make the INR go up very quickly, making the risk of bleeding problems bigger. The occasional glass of alcohol is OK, but binge drinking is very bad. Let us know if you are going to start drinking so we can make a plan together about how to make this as safe as possible.

5. Following the Plan

If warfarin is not taken regularly it is difficult to manage. Patients must take the right dose, at the right time and have their INRs checked when asked. Keeping your "Blue Book" up to date can help you follow your warfarin plan properly.

Warfarin-related side effects

Bleeding is the most common side effect of warfarin therapy. It is very uncommon to have bleeding problems when your INR is within or under your target range. You can make your risk of bleeding much smaller by taking the correct dose of warfarin, having your INR tests when instructed and telling the Haematology team whenever any of the changes listed above occurs. Contact the Haematology team about any of the following:

- Any head injury caused by a fall or knock, even if there was no unconsciousness or headache.
- Bruises or tender swollen areas without clear cause.
- Blood in the urine, poo, vomit or coughed up from the lungs.
- Severe headache or back pain

- Prolonged bleeding:
    - from minor cuts.
    - from the gums after brushing of teeth.
    - from the nose.
    - during periods.

Warfarin may be associated with children having "thinner" bones (osteoporosis). To help avoid this problem, we recommend eating the recommended intake of dairy products (cheese, milk, yoghurt) and exercise as tolerated. If you need warfarin for more than 12 months, we will perform a special X-ray called a *bone mineral density* scan to see how strong your bones are.

Warfarin can cause birth defects if it is taken by women who are in the first 3-months of pregnancy. Sexually active women should use reliable contraception to avoid pregnancy. If you become pregnancy (or are planning to), contact the Haematology team as early as possible so appropriate plans can be made. Other warfarin complications are extremely rare. If you would like to discuss these, please ask the Anticoagulation Service

Sport and Activity

Warfarin makes your risk of bleeding bigger, so contact sports should be avoided (e.g. football, rugby, martial arts). When riding a bicycle, rollerblading or participating in any activity where falling is possible, a helmet should be worn. You should discuss your physical activities with the Anticoagulation Service, and notify them of any changes. Children taking warfarin are encouraged to participate in weight-bearing exercises as this will help strengthen their growing bones.

Seeing Other Doctors/ Dentists/ Health Specialists

Tell any other doctors or health professionals (e.g. physiotherapists, chiropractors, dentists etc) that you are taking warfarin. They may need to think about how warfarin affects what they do to you.

If you wish to contact the Haematology Team, contact options are listed below:

Non-Urgent Contact	Haematology Team Answering Machine Telephone 9345 5827 *(Messages are checked daily Monday to Friday – for urgent concerns see below)*
Urgent Contact	**Monday to Friday 9am to 5pm** Haematology Registrar Telephone 9345 5522 Ask for pager # 5914. **After-hours Weekdays and Weekends** Telephone 9345 5522 Ask for the "On-call Haematologist"