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| **Module** | Anticoagulation management: patient’s guide to self-monitoring |
| **Topic** | How other medicines, food and alcohol can affect the INR |
| **Audience** | Self-monitoring warfarin patient |
| **Type** | Content |
| **Version** | 5 |

**1. Introduction**

The aim of this topic is to give you an understanding of how medication, dietary changes, lifestyle and illness can affect action of oral anticoagulants (vitamin K antagonists). The vitamin K antagonist in common use in the UK is warfarin.

By the end of this topic you should be able to:

1. State the factors that may alter the action of warfarin
2. List some medicines that commonly interfere with warfarin
3. State how changes in diet may affect the action of warfarin
4. Describe how alcohol may affect anticoagulation

**2. Check your understanding**

Before you start reading this topic check how much you already know by taking a short quiz. You will have an opportunity to take the quiz again at the end of the module, where we will reveal the correct answers.

a) Which of the factors listed below are likely to alter the effect of warfarin? (please select any that apply)

1. **Aspirin**
2. **Alcohol**
3. Paracetamol
4. **Changes in diet**
5. **Getting a dose of ‘flu**

b) Please indicate which of the following medicines is likely to interact with warfarin. (you may select more than one option)

1. **Ibuprofen**
2. **Antibiotics**
3. Cough medicine
4. Vitamin C tablets

c) Which of the following products that you might buy at the chemist or supermarket is most likely to interact with warfarin?

1. Nicotine replacement therapies
2. **Herbal or dietary supplements**
3. Allergy medicines
4. Calcium supplements

d) Eating large amounts of food that containing vitamin K whilst taking warfarin can –

1. increase your risk of bleeding from warfarin
2. **reduce the effectiveness of warfarin**
3. cause stomach upset & vomiting
4. reduce your risk of having a blood clot

e) Whilst on warfarin you –

1. should not eat spinach
2. can eat spinach one time a month
3. can eat as much spinach as you like whenever you would like
4. **can eat spinach but should eat the same amount regularly each month**

f) While out to dinner with friends you have just finished your third large glass of wine. This amount of alcohol consumed in a single evening will –

1. cause a decrease in your INR
2. **cause an increase in your INR**
3. will not affect your INR
4. will give you side effects from your warfarin

**3. What happens when other medicines are taken with warfarin?**

When you take two or more medicines, the effects of one medicine may be altered by the other medicine. This is known as a **drug-drug interaction**.

Many medicines can interact with warfarin. The result of this interaction can be to enhance or reduce the effect of warfarin. This can lead to an increased risk of you bleeding or of your blood clotting.

**POINTS TO PONDER**

Can you remember an occasion when you took another medicine that interacted with your warfarin? What was the other medicine? How did it affect your INR?

**4. What should I do if I am taking a new medicine?**

It is important that you check that any new medicines are safe to take with warfarin. This applies to any new medicine prescribed by your doctor, but also to medicines that you buy from the chemist or at the supermarket, including natural or herbal remedies.

To check that your medicines are safe to take with warfarin, you can contact your anticoagulant clinic, ask your doctor or local pharmacist, or read the patient information leaflet that comes with your medicine.

However, even if you have checked with other sources of information, you should always let the anticoagulation clinic know about any new medicine when you next check your blood INR.

The advice they will give will depend on a few factors. These include the likelihood of the new medicine interacting with warfarin, how ‘strong’ this interaction is and how long you will be on the new medicine for.

Often, no change in the management of your warfarin will be needed. In other cases, the clinic may advise more frequent blood tests to safely assess the effect of the new medicine. Sometimes you may need to change your dose of warfarin to compensate for the action of the second medicine.

**5. How do other medicines alter the effect of warfarin?**

*(image - 118\_MP900398845.JPG (tabs and caps))*

Other medicines may alter the effect of warfarin in one of two main ways: by affecting its metabolism or by increasing the risk of bleeding

Enzymes in the liver break down warfarin, a process known as **metabolism**. Other medicines can interact with warfarin by increasing or decreasing its metabolism. This leads to reduced or increased levels of warfarin the blood.

Although not an exhaustive list, here are examples of medicines that commonly interact with warfarin:

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| Medicines that can increase levels of warfarin (increase INR) | AmiodaroneFluconazoleMetronidazoleAllopurinolCiprofloxacinRosuvastatinCiprofloxacin ClarithromycinOmeprazoleHigh dose corticosteroids (e.g. prednisolone) |
| Medicines that can decrease levels of warfarin (decrease INR) | CarbamazepinePhenytoinRifampicinPioglitazoneGriseofulvin |

**Medicines that can affect the metabolism of warfarin**

Medicines that can **increase your risk of bleeding** with warfarin include the following:

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| --- | --- |
| Aspirin | Pain-killing doses (300 – 600mg) of aspirin increase the risk of bleeding and can damage the stomach. This is not advised.If a pain-killer is needed, paracetamol is a safer option, but it is essential that you do not exceed the maximum dose of 4g in 24 hoursLow dose aspirin (75 – 150 mg) is safer, and in some circumstances is prescribed with warfarin. |
| Non-steroidal anti-inflammatory drugs (NSAIDs) | For example, ibuprofen (Nurofen (T)), diclofenac, naproxenAs aspirin. Should be avoided if possible.  |
| Some antidepressant drugs | For example; sertraline, fluoxetine, citalopram, paroxetine |

 **Medicines that increase the risk of bleeding with warfarin**

**6. How can medicines that treat infections affect my INR?**

Medicines that treat infections can interact with warfarin. These can be medicines to treat bacterial infections (**antibacterials**) or fungal infections (**antifungals**).

Any antibacterial has the potential to interact with warfarin. Examples of antibacterials in common use are **amoxicillin, co-amoxiclav (Augmentin (T))** and **cephalexin**. Their effect is difficult to predict, but usually antibacterials enhance the effect of warfarin. In some circumstances, your anticoagulation practitioner may advise you to reduce your dose of warfarin slightly (e.g. 0.5 mg) for the duration of the treatment course.

**7. Can natural remedies interact with warfarin?**

Natural and herbal remedies may interact with warfarin. Common examples are shown in below. Please note that this is not a complete list and all natural remedies should be treated with caution.

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| --- | --- |
| Chondroitin | Chondroitin also has anticoagulant activity and should be avoided |
| Cranberry juice | Likely to enhance the effect of warfarin. Avoid use. |
| Devil’s Claw | May enhance the effect of warfarin. |
| Fenugreek | May increase the risk of bleeding |
| Feverfew | May increase the risk of bleeding |
| Fish oils (e.g. cod liver oil) | May increase the risk of bleeding |
| Garlic | May increase the risk of bleeding. Do not take garlic supplements. However, regularly eating foods containing small amounts of garlic should not be a problem. |
| Ginger | Large amounts may increase the risk of bleeding  |
| Gingko Biloba | Increased risk of bleeding  |
| Ginseng | Increased risk of bleeding  |
| Glucosamine | Likely to enhance the effects of warfarin. Avoid use |
| Grapefruit juice | May enhance the effect of warfarin. Avoid or use cautiously. Note that the fruit itself (i.e. not the squeezed juice) is likely to be safe in small quantities. |
| Multivitamin supplements | Use cautiously. May contain ingredients that affect warfarin metabolism e.g. Ginseng |
| St John’s Wort | Reduces the effect of warfarin. Avoid use |

**Natural remedies that can interact with warfarin**

Vitamin K is the natural antidote for warfarin. This is explained further below. Therefore, you should avoid any natural remedies that contain vitamin K. If you cannot decide if a remedy contains vitamin K, please check with your pharmacist or with the anticoagulant clinic. Alfalfa contains large amounts of vitamin K and Co-Enzyme Q10 is very similar to vitamin K. Both remedies should be avoided.

**8. How do changes in my diet affect warfarin?**

*(image - 118\_MP900402672.JPG)*

We have seen that warfarin acts by preventing vitamin K from forming the clotting factors that are essential for coagulation. Vitamin K is not stored in the body but is supplied from your food. Therefore, if you increase the amount of vitamin K rich foods in your diet, you may significantly reduce the effect of warfarin (lowering the INR). You should also be cautious of natural remedies, including health foods and food supplements, which may contain vitamin K.

Examples of foods that contain significant quantities of vitamin K are listed below:

* **Turnip greens**
* **Beetroot**
* **Broccoli**
* **Cabbage**
* **Lettuce**
* **Spinach**
* **Avocado**
* **Green beans**
* **Liver**
* **Soya bean products**
* **Peas**

A common misconception is that if you are on warfarin you should avoid all food that contains vitamin K. This is not the case! However, you should keep the amount of vitamin K-containing foods in your diet consistent. For example, let us suppose that you have a diet that is very low in vitamin K and you decide to eat a spinach salad for lunch. As spinach is very high in vitamin K, this will be a large increase in the amount of vitamin K you usually eat. This may reduce the effect of your warfarin treatment.

However, you may have a diet that has a moderate intake of vitamin K. In this case, although you would have increased your vitamin K intake by eating the spinach salad, this increase is far less significant than in the first scenario.

A more exhaustive list of foodstuffs that contain vitamin K can be found here (<http://www.coumadin.com/html/diet.htm>*)* On this page you will also find a diary that may help you track your intake of vitamin K containing foods.

You should let your anticoagulant professional know if you have changed your diet since your last blood INR test.

**7. How does alcohol affect warfarin?**

*(image - 118\_MP900442439.JPG)*

Whilst alcohol can be a source of pleasure and enjoyment, drinking too much can cause problems when on warfarin. In excess, alcohol can greatly enhance the effect of warfarin, increasing your INR, and it can put you at risk of bleeding.

It is important to let your anticoagulant professional know if you have changed your alcohol intake since your last blood INR test.

It is important to know where the benefits end and the risks begin! It is recommended that you do not drink more than three units of alcohol a day if you are a man, or two units a day if you are a woman.

**One unit** is roughly equivalent to half a pint of beer or lager or a single measure (25ml) of a spirit such as vodka. A small glass (125ml) of wine is around 1.5 units (Figure A). We recommend that you should drink the same amount of alcohol each day, thus avoiding big variations in the amount you drink from day to day. It is not safe to save up units to have on one day (binge drinking).

*Image - UK standard drinks containing one unit of alcohol (need image)*

Please remember that some drinks are stronger than others. The strength of alcoholic drinks is shown on the labels. You can find out more by using an alcohol unit calculator *(Link to* [*https://www.drinkaware.co.uk/understand-your-drinking/unit-calculator*](https://www.drinkaware.co.uk/understand-your-drinking/unit-calculator) *or http://www.downyourdrink.org.uk )*

**8. How do changes in my health affect warfarin?**

*(image - 118\_MP900422201.JPG)*

Changes in your health can affect the way warfarin works.

Acute illness will change how your body responds to warfarin. If you are running a temperature and have an infection (for example, cold or ‘flu) the effect of warfarin may be enhanced. An episode of heart failure or liver disease will also enhance the effect of warfarin. Conversely, diarrhea and vomiting will reduce the effect of warfarin.

You should let your anticoagulant professional know if you have experienced any of the above since your last blood INR test.

As you get older, your body may not be as efficient at metabolising warfarin, and this will enhance the effects of warfarin. Therefore, if you are on long-term treatment you may find that over the years you may need a lower dose of warfarin to achieve the same affect.

**DEMONSTRATE YOUR UNDERSTANDING**

Now please try to answer the questions at the beginning of this topic again. Did you get a higher score?