



# Adjusting your medications in preparation for surgery



Dr Keith Holt

*This pamphlet is designed to give some basic advice in regard to drugs and medications that you should or should not take prior to surgery. It is a guide and is not meant to be all inclusive. Nevertheless, it sets out standard practice for the drugs listed. If there are concerns after reading this, or if medications that you are worried about are not mentioned, then please contact Dr Holt's office prior to your surgery.*

## **Drugs that can be taken prior to surgery**

Most regular drugs can be taken on the day of, and prior to, surgery. Blood pressure tablets, antacid tablets such as Nexium or Pariet, antidepressant tablets and pain modifiers such as Lyrica, are usually best taken rather than missed out. All of these medications can be taken with a small amount of water but, do not take these with food or milk if you are in a fasting period. Similarly, when taking this medication, try and take it at least 2 - 3 hours before surgery, earlier being better.

## **Drugs that must be taken prior to surgery**

Anti-epileptic drugs, whether being used for epilepsy, migraine or neuralgic pain (pain of nerve origin), should never be missed out. A drop in blood level of these drugs can cause a flare up or recurrence of the problem for which they are being taken.

## **Drugs that should not be taken, or which need to undergo dosage modification, prior to surgery**

This group includes fish and krill oils and all of the anticoagulants (blood thinners), the most common examples of which are: aspirin, dipyridamole (persantine and asasantin), clopidogrel (plavix, iscover, coplavix etc.), warfarin, rivaroxaban (xaralto), apixaban (elequis), dabigatran (pradaxa), etc. It also includes diabetic medications such as insulin and the oral hypoglycemics (glypizide, metformin, diaformin, diabex etc.), and drugs that interfere with healing (such as some of those that are used to treat rheumatoid arthritis and other inflammatory joint problems). Such drugs include immuran and all the TNF blockers (humera, remicade, cimzia, simponi etc.).

**Fish and krill oils** If taken regularly can cause significant bleeding, equivalent to taking warfarin.

They should be stopped at least a week prior to surgery.

**Aspirin** is a drug that inhibits platelet aggregation (a clumping together of platelets that blocks leaks in blood vessels). Platelets are essential to the clotting mechanism and, any interference to their function, can lead to excessive bleeding, both during, and after surgery. In some people this can be quite significant so, unless the aspirin is essential, it should be stopped a week before surgery. This amount of time is required, in order to let the platelet numbers recover sufficiently to bring clotting parameters back to normal. The aspirin permanently damages the platelets, and hence, the body has to generate new ones to restore full function, they do not recover.

For those who take aspirin purely as a prophylactic agent to reduce the risk of stroke, and to hopefully thereby, prolong life, the aspirin can be safely stopped.

For those who have had a stroke or a transient ischemic attack (TIA - transient stroke), and for those who have a stent in their heart or other vessel, particularly a drug eluting stent, aspirin is mandatory. It should not be stopped: and for all surgery, we accept the fact that the bleeding and bruising will be a little bit more than normal. Against this however, is that the risk of a TIA or stroke, or a clotting up of a stent, is significantly reduced.

**Anti-inflammatory agents** are represented by 2 separate groups of drugs: **NSAID's** (non-steroidal anti-inflammatory agents such as naproxen, voltaren, ibuprofen etc.) **and COX2 inhibitors** (celebrex, mobic etc.) all slow down or prevent bone healing. Therefore, these should not be used after any procedure that requires bony healing (osteotomy, tibial tubercle transfer etc.); at least not until such time as the bone

has been shown to have healed.

The NSAID's in particular, also interfere with platelet aggregation but, unlike aspirin, their effect is temporary, so they can be taken up to 24 hours prior to surgery.

**Clopidogrel** (plavix, iscover, coplavix etc.) is a very powerful drug which has an irreversible effect on platelets. It can cause significantly more bleeding than aspirin, its effect cannot be altered by any means, and surgery is contra-indicated whilst this is being taken.

There are some conditions that do require long term anti-platelet therapy and, in those conditions, the general plan is to come off clopidogrel and just take low dose aspirin instead (100mg per day). If necessary, another anti-coagulant can be added (such as low dose clexane), and this would be the case where maximum safe DVT prophylaxis is required (e.g. knee replacement in someone with cardiac stents).

Where aspirin and clopidogrel have been prescribed together for a cardiac stent, it is generally thought that the clopidogrel is only essential for the first year and that, even with drug eluting stents, it can be stopped thereafter. Certainly, the European groups believe that low dose aspirin alone is sufficient prophylaxis after the first year. Thus, in most cases, providing that aspirin is used, the clopidogrel can be safely stopped for 5 days prior to surgery, and then restarted sometime thereafter.

The importance of stopping clopidogrel prior to surgery cannot be over estimated, particularly for large surgery, where it may make it almost impossible to stop the bleeding. Not only does this cause risk to the area being operated on, but it also causes significant risk to life.

Where there is concern over stopping clopidogrel, advice will be sought from a haematologist, cardiologist or other treating specialist.

**Dipyridamole** (persantine) and dipyridamole / aspirin combinations (asasantin) are anti-platelet therapies. They are more powerful than aspirin alone, hence, like clopidogrel, they are best ceased, changing to low dose aspirin alone for surgery.

**Warfarin** is an oral anticoagulant which has been the mainstay of long term anticoagulation for most of the last century. It is a vitamin K inhibitor which, in turn, means that it inhibits the formation of some of the factors needed in clotting. It is broken down in the liver to various fragments, some of which are active and some of which are not: and different people form different percentages of each of those breakdown products. Hence, there is a wide range in the dose required to achieve adequate anti-coagulation and, in some people, that dose can be hard to stabilise.

It is used both in people at significant risk of getting thromboses (DVT's etc.) and pulmonary emboli (PE), and in those with cardiac arrhythmias [such as atrial fibrillation (AF), where a dysfunctional heart chamber causes blood stasis which can lead to clot formation]. It is also used to stop artificial heart valves and other cardiac devices developing clots on their surface which can lead to mechanical failure or, as in AF, cause clots to be propelled into the systemic circulation (blocking off end arteries thus causing strokes or other problems).

In the case of AF (atrial fibrillation), the usual plan is to stop the warfarin 5 days before surgery, use low dose aspirin in the perioperative period, and to use an injectable anticoagulant (such as clexane), either at the time of surgery or, if necessary, beginning the day the warfarin is stopped. This will then be gradually replaced with warfarin following surgery, usually re-commencing the warfarin the evening after surgery.

Often, after major surgery, the warfarin dosage has to be reduced for some weeks, due to a change in sensitivity to this drug. The reasons for this are unknown, but it does require frequent monitoring early on.

In the case of artificial heart valves, where a moderately high level of continuous anticoagulation is required, reduction of anti-coagulation to a level that is safe for surgery, but also safe for the heart valve, is something that needs careful planning. The usual method is to replace the warfarin with clexane (or similar), and to use this in the peri-operative period: beginning when warfarin is ceased and stopping when the INR is back to the required level. Clexane is an injectable anti-coagulant, and the level of anti-coagulation is much easier to control. The dosage is fixed per Kg of body weight, hence, it does not require monitoring and its effect is entirely predictable.

In order to keep risks low, a plan will need to be made, in conjunction with the patient's treating cardiologist, to work out what the lowest safe level of anti-coagulation might be. Usually, warfarin is ceased, 5-7 days prior to surgery, being replaced by clexane, 1mg / kg, injected twice a day. This is full anti-coagulation, similar to being on warfarin. On the day of surgery, the dose is then reduced to a lower level, usually 20 - 40 mg, and this is given on the morning of surgery. The dose is then gradually increased, back to near full anti-coagulation, over the next 24 hours or so. Warfarin is also re-introduced, usually beginning on the evening after surgery. When the INR is high enough (usually 2.0), the clexane is ceased. The warfarin level is then adjusted, such that the INR comes up to previous levels.

Other than for complicated changes in anticoagulation, such as for artificial heart valves, the management is

relatively straightforward and, generally, this will be done for you by Dr Holt. If there are concerns however, he will get a haematologist or cardiologist involved.

**Oral anti-coagulants** [rivaroxaban (xaralto), apixaban (elequis), dabigatran (pradaxa), etc.] are becoming increasingly popular, and indeed, are expected to fully replace warfarin as the mainstay of long term anti-coagulation soon. We already use these routinely after hip and knee replacement for prophylaxis and, more recently, we have been using them as the sole treatment for DVT and PE. In general, these cause a little more bleeding than low dose clexane, and hence, in joint replacement, they seem to be best started after about 5 days, using clexane (or a similar injectable agent) in that initial period after surgery.

At present, there are very few guidelines for modifying these agents for surgery but, dose reduction, or conversion to clexane for a few days, should be safe. As most of these agents wear off over 12 - 24 hours, they are much more easily managed than clopidogrel or warfarin. Hence, we think that, with time, these will become the standard of treatment for a number of the conditions now managed with warfarin.

### **Modifying agents used for rheumatoid disease and other inflammatory disorders**

**Immuran and similar agents** can decrease the healing response of the body to surgery. For this reason, they are often best stopped for a period of time, both before and after surgery. Fortunately, most people who have been on these for a long period of time, do not have a flare up or relapse when these are withdrawn for a while. If that is possible however, then alternative anti-inflammatory drugs which don't affect healing so much (such as cortisone), can be used in the interim.

**TNF (tumour necrosis factor) blockers** (humera, remicade, cimzia, simponi etc.) are the new wonder drugs for the inflammatory disorders (rheumatoid arthritis, ankylosing spondylitis, psoriasis etc.). Mostly, they decrease the bodies immune response as part of their mode of action. This means that there is an increased susceptibility to infections, some decreased healing, and so on. For this reason, major procedures, especially those involving the implantation of prosthetic devices (e.g. joint replacement), should not be done whilst these are most active.

The majority of these agents are given on a once a month basis. When planning surgery therefore, the best option is to organise for the surgery to be at the time when the next injection would normally be given, so that the previous dose will have largely worn off. The missed dose is then re-scheduled for 1 - 2 weeks post surgery when things have stabilised, the wound has started to heal, and the likelihood of infection is

small. This is usually organised with the help of the rheumatologist involved.

### **Modifying drugs for diabetes**

**Oral hypoglycaemic agents** are used for Type 2 diabetes. These agents (glypizide, metformin, diaformin, diabex etc.) are mostly taken in the morning. If the surgery is in the morning, then all that is usually required, is to miss out the morning dose. The rise in blood glucose level, if fasting, is not significant: and therefore a drug to lower that level, is not needed. For afternoon surgery, where breakfast is eaten, the tablet can usually still be missed out but, if deemed really necessary, a smaller dose can be taken.

Following surgery, once regular eating has commenced, oral hypoglycaemic agents can be used again.

**Insulin** is the definitive treatment for type 1 diabetes and for those type 2 diabetics who are not fully controlled by an oral hypoglycaemic agent. The standard management plan for someone on insulin therapy, is to: just take half the normal morning dose on the day of surgery, take no food (fasting for at least 6 hours), and then to have the operation done within the first couple of hours, preferably on a morning list. Needless to say, timing of surgery for first thing in the morning is not always practicable, and some diabetics will, by necessity, end up on an afternoon list. This is not too critical however, provided that the diabetes is under control and the anaesthetist is happy with the timing of the procedure.

With the above in mind, Dr Holt will almost always recommend that insulin dependent diabetics ring the anaesthetist ahead of time, so that a management plan can be made with their help. When surgery is in the afternoon, the anaesthetist will then advise on breakfast and morning insulin requirements.

**Insulin Pumps** require special management and this will always need to be discussed with the anaesthetist. Frequently, the diabetic physician who manages them, will also be asked to advise.

### **Questions and concerns**

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**Further information** can also be obtained on this and other related topics at:

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