

# Aspirin as an anticoagulant

## Aspirin – The wonder drug

Aspirin is the most widely used medicine in the world with over 100 billion tablets swallowed every year. It is also one of the earliest of the modern drugs to be developed. Aspirin in its current form was developed by Felix Hoffman on October 10<sup>th</sup>, 1897. However aspirin was in use as early as 400 BC in the form of the bark of the willow tree which contains a compound called Salicin from which aspirin can be extracted. The active ingredient in aspirin is acetylsalicylic acid.

Aspirin is effective in the treatment and prevention of a variety of medical conditions. It has 'analgesic', 'anti-pyretic' and anti-inflammatory properties and so can be used in adults to treat pain, fever and inflammation. Regular use of aspirin in adults may help prevent bowel cancer. Aspirin is now recommended for use in pregnancy after the first trimester to prevent pre-eclampsia; a condition associated with high blood pressure which may lead to premature birth, still-birth and babies being born smaller than average size.

One of the most important effects of aspirin is its anti-platelet effect. Aspirin in low doses (2-5 milligrams/kg) prevents the aggregation of platelets thereby preventing the formation of blood clots. It does this by inhibiting an enzyme called cyclo-oxygenase thereby preventing the formation of a substance called thromboxane which acts as a scaffolding for platelets to aggregate and form a blood clot (a 'thrombus').

The platelet inhibiting effect of aspirin makes it ideal for use in patients with congenital and acquired heart disease. It is used to prevent blood clots causing blockage in patients with systemic to pulmonary artery 'shunts' i.e. small artificial connections between the systemic (body) arteries and the pulmonary (lung) vessels. It is also to prevent blood clot formation in patients with sluggish blood flow. These include patients with a Hemi-Fontan connection (the superior vena cava connected to the lung arteries) and a Fontan circulation (both superior and inferior vena cavae connected to the lung arteries). Some cardiac centers prefer to use a drug called warfarin in patients with a Fontan circulation. This has a more powerful anti-clotting effect. There is however, no clear evidence to suggest that one of these options is better than the other.

Patients with sluggish blood flow within the heart due to poor cardiac function also benefit from using low dose aspirin to prevent clot formation within the heart. The regular use of aspirin in adults helps to prevent clot formation in the arteries of the heart and the brain thereby preventing heart attacks, strokes and dementia.

Whilst Aspirin is a very safe drug, especially when used in low doses; it does have a few adverse effects. It can cause erosion and bleeding from the lining of the stomach. It should not be taken on an empty stomach for this reason. Non steroidal anti-inflammatory drugs (NSAIDs) like brufen reduce the anti-platelet effect of aspirin and hence should not be used

concurrently on a regular basis. Aspirin should be stopped if a child develops chicken pox as the use of aspirin in patients with chicken pox has been found to be associated with a life-threatening condition called Reye's syndrome. Aspirin is usually stopped for 6 weeks and replaced by an alternative drug called Clopidogrel which is also very effective in preventing clot formation. Patients who receive the chicken pox vaccine should also have their aspirin replaced by Clopidogrel for 6 weeks. Aspirin can worsen asthma in a few patients and so may need to be avoided. Clopidogrel may be used in these patients.

Aspirin is truly a 'wonder-drug' and when used appropriately can both save and prolong lives of patients of all ages.

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