

Plain Language Summary

Genetic testing to guide clopidogrel use after an ischaemic stroke or transient ischaemic attack (TIA) | October 2024

Key messages

- Clopidogrel is a medication given to people who have had a stroke or TIA to reduce the risk of them having another. Some people are clopidogrel resistant.
- People who have clopidogrel resistance are more likely to have another stroke if they are treated with clopidogrel compared to people who are not resistant.
- Genetic testing can tell doctors whether a person has clopidogrel resistance. People who are clopidogrel resistant should be given a different medication.
- Testing for clopidogrel resistance would save the NHS £17.9 million over a 5-year period by reducing the number of people who have another stroke and need additional healthcare.

What are ischaemic stroke and TIA?

An ischaemic stroke is a potentially life-threatening event where a blood clot blocks the flow of blood to parts of the brain. A stroke can cause lasting brain damage, disability or death.

A TIA is a milder, related condition where the brain's blood supply is briefly interrupted.

People who have an ischaemic stroke or TIA are then at increased risk of having another stroke. They are often prescribed antiplatelet medications to reduce this risk. Antiplatelet medications reduce the risk of stroke by preventing blood clots from forming. The most commonly prescribed antiplatelet medication is called clopidogrel.

What is clopidogrel resistance?

Clopidogrel needs to be processed within the body before it can be effective. Clopidogrel resistance occurs when a person is unable to process this medication properly. Mutations in a gene called CYP2C19 can result in clopidogrel resistance.

What is CYP2C19 genetic testing?

Genetic testing can determine if a person has clopidogrel resistant. The genetic test for CYP2C19 mutations can be done in a laboratory or on a hospital ward. For the laboratory test, a blood sample is taken. A cheek swab is used for the ward test.

Why is this important?

In 2023, there were 9,373 people in Scotland who had an ischaemic stroke. In the same year, an estimated 3,763 people had a TIA. People who have a stroke or TIA are often given clopidogrel to reduce their risk of having another stroke.

In the UK, an estimated 28.7% of people who are prescribed clopidogrel are resistant. Identifying people who have clopidogrel resistance lets doctors prescribe them a different medication.

What we did

We looked at whether genetic testing for clopidogrel resistance in people who have an ischaemic stroke or TIA is effective and safe. We calculated the effects of introducing genetic testing on the NHS budget.

What we found

We asked which approach is better – A or B?

- A) give everyone clopidogrel after they have a stroke
- B) do a genetic test to decide the best medication for each person

We found four studies in China that addressed this question. The studies reported that genetic testing might reduce the risk of another stroke by giving each person the best medication for them.

English guidance recommends using genetic testing to decide on the best antiplatelet medication for individual patients. This guidance found that genetic testing for stroke patients was good value for money.

Our assessment of the value for money of genetic testing for clopidogrel resistance found that:

- genetic testing in laboratories saved the NHS £17.9 million over 5 years, starting in the year it was introduced
- genetic testing on hospital wards cost the NHS money in the year it was introduced

- after the first year, hospital ward-based testing saved the NHS £17.6 to £18 million over 5 years.

Genetic testing for clopidogrel resistance saves money because fewer people have another stroke. As a result, fewer people need hospital treatment and rehabilitation support.

Are other antiplatelet medications as effective and safe as clopidogrel?

If a person has clopidogrel resistance they should be given a different antiplatelet medication.

Two trials found that the antiplatelet ticagrelor is more effective than clopidogrel at reducing the risk of having another stroke in people with clopidogrel resistance. The benefits of ticagrelor were still present 1 year after starting the medication. People who take ticagrelor have a higher risk of internal bleeding compared with people taking clopidogrel.

What happens if you give clopidogrel to people with clopidogrel resistance?

In three analyses, people given clopidogrel when they are resistant had an increased risk of having another stroke.

How accurate is the genetic test for clopidogrel resistance (CYP2C19 gene mutations)?

The genetic tests are reported to be 100% accurate. They correctly diagnose people as having or not having the gene mutation every time.

Sometimes the test does not work. This failure rate is low, generally less than 1% of tests.

What do people think about genetic testing for clopidogrel resistance?

We did not find any evidence from people who had a stroke or TIA. People who have a heart condition can also be prescribed clopidogrel.

Three studies reported what people with heart conditions thought about genetic testing for clopidogrel resistance. People felt that genetic testing was important because it guided their care. People who were confident they understood genetic information were more likely to value genetic testing.

What is our conclusion?

People who have clopidogrel resistance are at increased risk of having another stroke when treated with clopidogrel. Genetic testing to determine if a person has clopidogrel resistance could reduce this risk.

People with clopidogrel resistance should be given a different antiplatelet medication. Ticagrelor appears to be more effective than clopidogrel in reducing the risk of another stroke in these people. People taking ticagrelor also have a higher risk of internal bleeding. No evidence was found for other antiplatelet medications.

Genetic testing for clopidogrel resistance provides good value for money and saved the NHS around £17.8 million over 5 years.

What next?

Genetic testing for clopidogrel resistance in people who have an ischaemic stroke or TIA will be considered for national rollout in Scotland.

This plain language summary has been produced based on an SHTG Assessment