New study updates evidence on rare blood-clotting condition after COVID-19 vaccination

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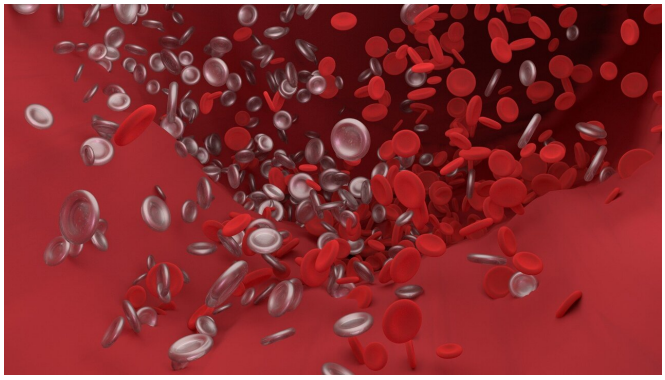

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A study published by *The BMJ* today sheds further light on the risk of developing a very rare blood-clotting condition known as thrombosis with thrombocytopenia syndrome (TTS) after vaccination against the COVID-19 virus.

Based on health data from five European countries and the US, it shows a small increased risk of TTS after a first dose of the Oxford-AstraZeneca vaccine, and a trend towards an increased risk after the Janssen/Johnson & Johnson vaccine, compared with the Pfizer-BioNTech vaccine.

The researchers stress that this syndrome is very rare, but say these observed risks "should be considered when planning further immunization campaigns and future vaccine development."

TTS occurs when a person has blood clots (thrombosis) as well as low blood platelet counts (thrombocytopenia). It's very rare and different from general clotting conditions like deep vein thrombosis (DVT) or lung clots (pulmonary embolism).

TTS is currently being investigated as a rare side effect of adenovirus based COVID-19 vaccines, which use a weakened virus to trigger an immune response against coronavirus, but no clear evidence exists on the comparative safety of different types of vaccines.

To address this knowledge gap, an international team of researchers set out to compare the risk of TTS or thromboembolic events associated with use of adenovirus based COVID-19 vaccines with mRNA based COVID-19 vaccines.

Their findings are based on routinely collected health data for over 10 million adults in France, Germany, the Netherlands, Spain, the UK, and the US who received at least one dose of a COVID-19 vaccine (Oxford-AstraZeneca, Pfizer-BioNTech, Moderna or Janssen/Johnson & Johnson) from December 2020 to mid-2021.

To minimize possible error, participants were matched by age and sex and a range of other potentially influential factors such as pre-existing conditions and medication use were taken into account. The researchers then compared rates of thrombosis and of thrombosis with thrombocytopenia between the adenovirus vaccines (Oxford-AstraZeneca or Janssen/Johnson & Johnson) and the mRNA vaccines (Pfizer-BioNTech or Moderna) within 28 days after vaccination.

Overall, 1.3 million first dose Oxford-AstraZeneca recipients were matched to 2.1 million Pfizer-BioNTech recipients from Germany and the UK. An additional 762,517 people receiving Janssen/Johnson & Johnson were matched to 2.8 million receiving Pfizer-BioNTech in Germany, Spain, and the U.S., and all 628,164 Janssen/Johnson & Johnson recipients from the

US were matched to 2.2 million Moderna recipients.

A total of 862 thrombocytopenia events were found in the matched first dose Oxford-AstraZeneca recipients from Germany and the UK, and 520 events after a first dose of Pfizer-BioNTech.

When the data were pooled together, analysis showed a 30% increased risk of thrombocytopenia after a first dose of Oxford-AstraZeneca compared with Pfizer-BioNTech—an absolute risk difference of 8.21 per 100,000 recipients.

An increase in risk—albeit not statistically significant—of venous thrombosis with thrombocytopenia was observed after a first vaccine dose of Janssen/Johnson & Johnson compared with Pfizer-BioNTech. But the researchers say this finding needs to be replicated in other studies before any firm conclusions can be drawn.

No differential risk of thrombocytopenia was seen after a second dose of Oxford-AstraZeneca compared with a second dose of Pfizer-BioNTech. Similarly, no increased risk of thrombocytopenia was noted after Janssen/Johnson & Johnson compared with a first dose of Pfizer-BioNTech.

This is an observational study, and the researchers acknowledge that the rarity of the condition and incomplete vaccine records may have affected the results. What's more, they can't rule out the possibility that some of the observed risk may have been due to other unmeasured (confounding) factors.

However, this was a well-designed study that allowed comparison of available vaccines with each other, rather than with no vaccination, and the results were consistent after additional analyses, suggesting that they withstand scrutiny.

"To our knowledge, this is the first multinational analysis of the comparative safety of adenovirus based compared with mRNA based COVID-19 vaccines," say the authors.

"Although these events are very rare, absolute numbers of affected patients could become substantial, owing to the large numbers of vaccine doses administered worldwide," they warn.

As such, they suggest that the observed risks after adenovirus based vaccines "should be considered when planning further immunization campaigns and future vaccine development."

More information: Comparative risk of thrombosis with thrombocytopenia syndrome or thromboembolic events associated with different covid-19 vaccines: international network cohort study from five European countries and the US, *The BMJ* (2022). DOI: 10.1136/bmj-2022-071594

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