EDITORIAL

Managing blood clotting with viral vector vaccine

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Vaccines are important tools for controlling the COVID-19 pandemic caused by SARS-CoV-2. Vaccination can cause occasional side effects, which are normal signs of building protection. These can influence the daily activities, but are temporary, lasting for a few days only. Usually no side effects are encountered. If the symptoms persist, affecting the daily routine, the vaccine providers should be informed for recommendations regarding further management.

The recombinant adenovirus vector vaccine encoding the spike protein antigen of SARS-CoV-2 (AZD1222, AstraZeneca and Johnson and Johnson) are being presently used. Occasional cases of thrombotic events and thrombocytopenia have emerged after mass vaccination for COVID-19.

What could the connection be between blood clots and vaccines causing the unwanted immune response against platelet factor 4.?

The clots that have been associated with COVID Vaccine, AstraZeneca and Johnson & Johnson occur in unusual parts of the body, such as the brain or abdomen, and are coupled with low levels of platelets that aid blood coagulation. During the vaccination, after 5-10 days, drive of about 6.8 million doses of J&J vaccine, six cases of cerebral venous sinus thrombosis (CVST) were encountered in combination with thrombocytopenia.[1] All six cases occurred among women between the ages of 18 and 48 years, and symptoms developed 6 to 13 days after vaccination. The 5/million cases of the blood clots have also been reported of AstraZeneca vaccination. This vaccine is not recommended in women under 40 years of age. The treatment of this specific type of blood clot differs from the usual recommended therapy of anticoagulant drug as heparin. In this situation heparin can prove to be dangerous, and alternative treatment need to be given.[1-4]

The Viral vector or recombinant vaccines may have some adverse effects but serious ones are very rare. For example, blood clotting is reported in one in a million vaccinated people. Therefore, fear of the rare side effects should not set back the use of vaccines. Awareness should be present of the possible reactions and the time period when they could be encountered along with the susceptible population referring to the age group, gender and existing co-morbidities. Careful monitoring of the signs and symptoms of clotting or any other pathology with early intervention is the key to avoid any subsequent complications.

Timeline and compounding factors:

The blood clot does not appear immediately after inoculation. It takes about 2-3 weeks to develop with a higher frequency in females of reproductive age (18-48 years). It is mostly seen in females of younger age or those who have other risk factors for clotting such as patients on hormonal therapy.

Most probable mechanism is vaccine induced thrombotic thrombocytopenia. It is named as "Vaccine Induced Prothrombotic Immune Thrombocytopenia" or VIPTIT. There is a risk of bleeding, damage to vital organs as the heart, brain, lungs or other tissues or even death can occur. Such a patient must be hospitalised and managed in the Intensive Care Unit (ICU).

These complications of Blood clots, thrombosis, Deep Venous Thrombosis (DVT) and Pulmonary Embolism (PE) were rarely encountered after inoculation with vaccines from Johnson and Johnson and Astra Zeneca. The data shows that 6 people developed blood clots after administration of these vaccines in over 6.1 million population. Probability of serious complications and death following severe COVID-19 infection is far greater than the possibility of developing rare side effects after vaccination. Thus the protection offered by COVID-19 vaccine exceeds the risks of its use. The Centre for Disease control (CDC) has presently advised to pause the use of J&J vaccine.[5]

Sign and symptoms of blood clots after vaccination

Develop within 3 weeks (after 5-16 days) and include

- Persistent severe headache
- Nose bleeding
- Bleeding gums

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- Shortness of breath
- Abdominal pain
- Leg pain
- Petechia
- Bruises

Physical Findings

Petechial haemorrhage, gums haemorrhage, shortness of breath, stiff calf muscles.

Early Diagnosis

It is similar to heparin induced thrombocytopenia (HIT) and include the following:

1. CBC and platelets count thrombocytopenia (when <50% count)

2. ELISA for PF4 antibodies (STRONG level)

3. If bleeding starts, immediate treatment should be implemented

4. Platelets activation/aggregation Assay

5. Doppler for screening the legs

6. PT/APTT for calibration of the treatment

Management of blood clots after COVID Vaccination

Treatment is also similar to heparin induced thrombocytopenia (HIT). Some prophylactic measures should be adopted for subjects going in for vaccination and are on hormone therapies or have any risk of acquiring thrombosis.

A. Prophylaxis: Prophylaxis should not be given without supervision of the doctor as bleeding is possible and can be lethal. Patient should be managed in hospital.

1. Aspirin

2. Rivaroxaban

3. Apixaban

Note: heparin is contraindicated because it has the same symptoms (HIT).

B. Treatment as outpatient but under supervision of Haematologist and physicians and includes:

1. Rivaroxaban

2. Apixaban (inhibits Factor Xa)

3. Argatroban IV (these drugs are metabolised in liver)

4. Transition to warfarin

5. Intravenous IgG

6. Steroids can be given

Note: keep the patient in ICU and monitor the patient carefully because mismanagement may lead to death. Treatment can be monitored with BT, PT/APTT.

Currently, these adverse events appear to be extremely rare. COVID-19 vaccine safety is a top priority for the federal government, and all reports of health problems following COVID-19 vaccination are taken very seriously. People who have received the J&J vaccine or any vaccine and develop severe headache, abdominal pain, leg pain, or shortness of breath within three weeks after vaccination should contact their health care provider.

References

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