COVID-19 Vaccination
Summary Study

Introduction

On January 26, 2021, Caterina Staltari, BSc(N), MSc, APPR (MUHC) and member of the local deconfinement committee of Sainte-Angèle parish, presented a document entitled A New Day: Vaccination against Covid-19 to the members of the local deconfinement committees of our diocese. The summary below outlines the highlights, including the nature and function of the vaccines and the objectives of the vaccination campaign. This presentation was part of the response to a request submitted to religious leaders on January 20, 2021 by the Government of Canada (Dr. Tam). These data are based on the results of clinical observations (McGill University Health Centre), scientific research and recommendations from the Institut national de santé publique du Québec (INSPQ), the Ministère de la Santé et des Services sociaux (MSSS) and Health Canada.

Background information

History tells us that the creation of a new vaccine can usually take years. However, in today's context, the development of vaccines against COVID-19 has progressed rapidly for numerous reasons, including :

- International collaboration among scientists, health professionals, researchers, industry, philanthropists and governments;

- The urgency of the health situation at the global level;

- The rapid adaptation of existing research programmes, such as those focusing on RNA and viral vector technology;

- The increase in dedicated funding since the beginning of the pandemic;

- Rapid recruitment of clinical trial participants

- Adaptation of the vaccine approval process to review the data provided by the manufacturer as they become available.

Health Canada approves a vaccine only if it is supported by very strong scientific data and evidence that the benefits of the vaccine clearly outweigh any risks it might cause. In addition, Health Canada continues to work closely with its international and provincial counterparts in monitoring and ensuring the safety and efficacy of COVID-19 vaccines. Finally, Quebec also has a very comprehensive system for monitoring the safety of vaccines after they have been put on the market. This surveillance makes it possible to detect, document and monitor adverse reactions and to act accordingly.

The objectives of the vaccination campaign

Basically, the COVID-19 vaccination campaign has three main objectives:

- Prevent serious illness and death;

- Reduce the incidence of disease and the spread of the virus in the population to levels which would allow them to return to healthy and productive lives in a sustainable manner;

- Maintain the accessibility and proper functioning of the health care system, (by avoiding overwhelming emergency rooms, preventing hospitalizations, and relieving routine outpatient care and services).

Types of vaccines against COVID-19

There are three main types of COVID-19 vaccines: messenger RNA vaccines, protein subunit vaccines and viral vector-based vaccines. All three allow the body to recognize and protect itself against the SARS-CoV-2 virus and all target the spicule protein (S protein) on the surface of the virus. None of them can cause an infection of COVID-19.

Messenger RNA (ribonucleic acid) COVID-19 vaccines

Although the messenger RNA COVID-19 vaccines are the first widely manufactured vaccines of this type to be approved by Health Canada, researchers have been studying and working with messenger RNA vaccines for decades. These vaccines are not new, as they have already been studied, for instance in relation to influenza, Zika, rabies and cytomegalovirus (CMV), as well as for cancer immunotherapy.

How messenger RNA vaccines work

Messenger RNA vaccines do not contain the virus, so they cannot cause COVID-19 infection. Moreover, these vaccines do not affect, interact with, or alter our DNA (deoxyribonucleic acid) in any way, because messenger RNA does not enter into the nucleus of our cells. Rather, they use the body's natural defence response by providing harmless genetic instructions transmitted by the messenger RNA.

Messenger RNA vaccines contain a portion of the virus's RNA (ribonucleic acid), a molecule in the instructions for synthesizing proteins. The messenger RNA is surrounded by lipids which prevent it from breaking down too quickly, thus allowing it to enter into the cells.

Once it has entered the cells, the messenger RNA finds in the cytoplasm the ribosomes that synthesize all the proteins in the body. The ribosomes decode the instructions provided by the messenger RNA and make a spicule protein (S protein) identical to the one found on the surface of SARS-CoV-2. The S protein is a good antigen and its presence will stimulate the immune system to defend itself. The messenger RNA from the vaccine breaks down in the days following vaccination.

Alerted by the presence of the antigens (S protein), the immune system is activated and produces antibodies and lymphocytes that will defend the body if the real SARS-CoV-2 virus si encountered.

Messenger RNA vaccines are very pure. They contain no antibiotics, preservatives or latex. The body itself creates the antigens first and then antibodies. The RNA fragment degrades quickly after the vaccine is injected. There is no risk that the vaccine will change our genetic code.

Indications for COVID-19 messenger RNA vaccines

- The COVID-19 vaccine is safe, highly recommended (though not mandatory) and is free for all Quebec residents.

- The Pfizer-BioNTech vaccine can be given to children as young as 16. The Moderna vaccine can be given to persons from the age of 18 onwards.

- Vaccines are administered under conditions that comply with the norms in terms of storage, preparation and administration of a vaccine by healthcare professionals in a safe clinical setting. However, these vaccines are contraindicated for people who have already had an anaphylactic reaction following the administration of a previous dose of the same vaccine or another product with an identical component.

To date, there is little or no data on the safety and efficacy of these vaccines for pregnant or breastfeeding women, immunosuppressed individuals or those with autoimmune or demyelinating diseases.

Clinical events following administration of messenger RNA vaccines

Most people experience pain at the injection site after vaccination. Systemic reactions such as fatigue, headache, fever and chills are common, especially after the second dose. These reactions are usually mild to moderate and last 24 to 48 hours.

Reactions that prevent the continuation of daily activities for 1 or 2 days may occur in a small minority of vaccinees, including fatigue, headache and muscle or joint pain. These reactions are less common in the elderly. They occur somewhat more with the second dose.

Effectiveness of messenger RNA vaccines

In studies conducted on nearly 40,000 people aged 16 years and older, followingr the second dose, the Pfizer/BioNTech vaccine was 95% effective in preventing COVID-19. Efficacy was similar in people aged 65 years and older.

In studies conducted on more than 30,000 people aged 18 years and older, after the second dose, Moderna's vaccine was 94.1% effective in preventing COVID-19 and 100% effective in preventing severe disease. In people aged 65 years and older, the vaccine was 86.4% effective in preventing COVID-19.

Both vaccines were 92% effective 14 days after the first dose and before the second dose. Given the efficacy obtained after the first dose, the Comité sur l'immunisation du Québec (CIQ) recommends postponing the second dose in the instance of a vaccine shortage and the very high spread of COVID-19 in Québec, in order to vaccinate as quickly as possible those in priority groups: the elderly and the vulnerable, health professionals working in COVID areas and thereafter by age group.

Availability of COVID-19 vaccines

The first messenger RNA vaccines to be authorized by Health Canada were those of Pfizer-BioNTech and Moderna. They must be stored at very low temperatures.

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The Pfizer-BioNTech vaccine (available since mid-December 2020) and the Moderna vaccine (available since early January 2021) are administered to a limited number of people due to the limited number of doses. The number of people vaccinated will increase as the number of doses available permits.

Vaccine distribution is centrally coordinated by the Ministère de la Santé et des Services sociaux. Vaccinations began in December 2020 with the Pfizer-BioNTech vaccine being delivered directly by the manufacturer to just over 20 pre-determined vaccination sites. Distribution will be carried out following government guidelines, starting with the most vulnerable segments of the population.

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In conclusion, it is important to stress that the preventive health regulations and distancing instructions now in effect must be followed, since the virus is still in circulation and the entire population cannot be vaccinated at once.

Appendix: Is colchicine a new remedy for covid 19?

Colchicine, derived from the autumn crocus flower, is a medication with anti-inflammatory properties. It is mainly used to treat attacks of gout (a very painful joint disease), inflammatory pericarditis and Behçet's disease. Known for decades, the drug acts on white blood cells, which are the cause of inflammation in gout. It is important to note, however, that undesirable side effects should be monitored, especially as colchicine is a substance with a narrow therapeutic index, meaning that the difference between the recommended dose and a potentially dangerous one is slight. Moreover, there is no antidote to colchicine and evacuation through dialysis is not possible.

The 'hype' around colchicine can largely be traced to an announcement in the Montreal Heart Institute's press release of January 22. In March 2020, the Institute had launched a study (Colcorona clinical trial) into the value of colchicine in fighting the severe lung inflammation observed in severe COVID-19 cases. The main outcome of the study seems to demonstrate a 21% reduction in the risk of death or hospitalization for patients. This observation makes colchicine the first oral drug that could be used to treat patients in the pre-hospitalization phase. However, a systematic review by a committee of scientific experts is currently under way to review the methodology, findings and recommendations of the clinical trial.

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