Covid-19: Possible Lessons from the History of Variolation and Vaccination against Smallpox: A Brief Note.

Covid-19 and smallpox viruses have very different characteristics, but perhaps we have something to learn about immunity through the history of immunisation against smallpox.

Before the development of vaccination, there was a long history of another prophylactic measure against smallpox – variolation. It had been practised in China, Turkey and elsewhere for a number of decades, but was introduced into England as an officially recognised practice in the 1720s. It involved the taking of virus from a smallpox pustule from someone suffering from the disease and inoculating it into the arm of the patient. This invariably resulted in the eruption of a number of pustules in different parts of the body, and conferred a lifetime immunity against the disease, but in rare cases, there was the risk of a fatal outcome and the danger of spreading the disease through secondary infection.

The practitioners of variolation experimented with different methods of attenuating the severity of the operation, and eventually successfully created a mild form of inoculation resulting in a single eruption at the point of injection. Although safer than the traditional method of variolation, the practitioners carrying out these experiments rejected this radically attenuated form of the operation because they believed it would only confer a limited protection against future attacks of the disease.

Edward Jenner who had been a practitioner of variolation, developed vaccination at the end of the eighteenth century, believing it to be based on the inoculation of cowpox but this has been questioned by modern virological research. The origin of modern strains of vaccinia is unknown but Jenner's vaccination was successful in providing a safe prophylactic measure against the disease. Jenner originally believed that vaccination would provide a permanent protection against smallpox, but after a number of years some vaccinated patients were subsequently attacked by smallpox.

The contrast between the long-term consequences of variolation and vaccination were well-established, but given the limited immunity provided by vaccination, it became imperative that it be repeated in order to achieve long-term immunity.

It is likely that the difference in immunity between the two types of operation was a result of the severity of the resulting symptoms. Variolation appears to have stimulated a permanent boost to the immune systems, whereas vaccination only provided a temporary measure. It is possible that the same principle applies to any vaccination developed against Covid-19, and only a form of vaccination that can create a sufficiently robust response is likely to be successful. Likewise, a mild and asymptomatic form of the disease may only create limited immunity against further attacks of the virus.