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COMMENTARY

Exegesis of Sabin poliovaccine in terms of medical science

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1 Short Story of the Battle Against Poliomyelitis

There are three types of poliovirus. The type 2 Lansing and type 3 Leon have been virtually eradicated everywhere thanks to vaccines developed by Salk first in 1955 and then by Sabin in 1961. The use of the Sabin vaccine has prevailed for the new idea to use an attenuated virus and the convenience of administration (oral and not intramuscular) and because it is cheaper. Two billions and a half am01ong children and adults were vaccined in 200 countries, freeing up 80% of the world of this scourge and bringing down the figure of 35,000 children suffering from polio in 1988 to 279 in 2014, of which 236 cases appeared in Pakistan. The poliovirus type 1 Brunhilde, however, has not been eradicated completely and appeared recently in Pakistan, Somalia, Ethiopia, Guinea, Kenya and Afghanistan. Each recurrence may be the beginning of new infections, so the war can never be said to be completely won.

Meanwhile, for the period 2013−2018, the World Health Organization and the Rotary Foundation allocated US$1 million each a year, for a total of US$5 billion, to the Global Polio Eradication Initiative.

2 Poliomyelitis (Polio)

Polio is a very serious disease caused by a virus of the Picornaviridae family, genus Enterovirus. Many children and adults who developed severe forms of polio were paralyzed, that is, losing the use of their legs or arms; some, unfortunately, even have died as a result of the disease.

The poliovirus infects the body through the digestive tract (mouth, throat, intestines); from here it can reach the nervous system and cause serious forms of the disease. The most severe cases of polio first cause strong muscle pain and subsequent paralysis, sometimes the immobility of one or both legs, or one or both arms, or worse, of the rib cage with the consequent impossibility to breathe without the help of a machine.

There are no medications, or other treatments that can cure people affected by polio. There is no specific antiviral drug.

Each patient has a different possibility: some will heal, others will carry some disability to an arm or leg for the rest of their lives, others will remain with severe disabilities, others are likely to die.

In the early 1960s polio was still a widespread disease in Italy and it was rightly feared; just in 1961, the beginning of mass vaccination campaigns about 3,500 cases of paralytic polio were reported. Thanks to vaccination, made compulsory in 1967, polio suffered a sharp decline, and in 1968 only 90 cases were reported throughout Italy.

Over the past 15 years it has been reported only one case, coming, however, from abroad. Polio, in fact, it is still present in some areas of the world, creating a potential risk for travellers who are not vaccinated, as well as the Italian population as a result of the importation of cases affected by poliovirus.

Precisely to prevent an imported case that might cause the onset of an epidemic, it is appropriate to maintain the highest possible number of individuals vaccinated, making the circulation of the virus dificult and thus protecting the few individuals who could not have been vaccinated.

3 Risks of Polio Vaccines

There are two types of polio vaccine. The oral vaccine called Sabin (OPV) consists of live attenuated virus; this

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means that the virus used for the vaccine, although still alive, is not able to cause disease. The administration of this preparation is carried out thr-ought the mouth in drops. The other type of vaccine uses killed poliovirus (vaccine with phormaline tre01ated virus); It is called Salk (IPV) and is administered by intramuscular injection. At least 90% of those vaccinated with three or more doses of both vaccines are protected against polio.

4 Sabin Vaccine

In rare cases the vaccine was causing paralysis in people who got it. The overall risk is approximately 1 case of paralytic disease for 2.4 million doses administered. The risk resulting from the first dose, compared to the next one is 1 in 760,000 doses, including vaccines and contacts. In vaccinated people, the risk is about 1 in 1.5 million for the subsequent doses; for contacts exposed to a person who has received the first dose of vaccine the risk is 1 to 2.2 million doses. For subsequent doses, the risk is substantially lower for those vaccinated and their contacts.

In Italy, since 1990, 10 cases of paralytic disease associated with the vaccine have been reported to the Ministry of Health for a rate of one in every 550,000 newborns and for 2,200,000 doses administered.

For people with immuodeficiency the risk is 3200C 6800 times higher than that for people who are immunologically normal vaccinated. For this reason to vaccinate a child or adult living with an immunocompromised patient, the Salk vaccine must be used.

5 Parenteral Vaccine (Salk)

The vaccination administered intramuscularly can cause slight pain and redness at the injection site. The Salk vaccine should not be administered to people who have severe allergy to antibiotics such as streptomycin, neomycin and polymyxin B; they must get in touch with the doctor before vaccination.

No serious event was associated with the use of the Salk vaccine.

6 Vaccine Currently Used

The Italian Decree of April 7, 1999 stated that for the first two doses of vaccine against polio, the Salk type should be used, while for subsequent doses (third and fourth), if there were no specific contraindications, one should continue using the Sabin vaccine.

The Decree of the Ministry of Health of June 18, 2002 abolished altogether antipoliomyelitic vaccination with Sabin vaccine and on August 12, 2002 it stated to use only the Salk vaccine for all doses. The transition from the Salk to Sabin vaccine was made possible by the new epidemiological situation of the poliomyelitis disease that, thanks to vaccination performed in the past with the Sabin vaccine, has led to the disappearance of polio in Europe. Therefore the use of only the Salk vaccine aims to eliminate even those rare cases of post-vaccination paralysis that may occur, under the above conditions, with the Sabin vaccine, making this vaccination even safer.

7 Vaccine Rating

The social importance of vaccination has justified imposing mandatory extent in many legislations, in view that the non-acceptance of the vaccination offer may endanger the health of the community. In fact, for people to be vaccinated in most cases means not merely to protect themselves, but also constitute a barrier to the spread of pathogens to other individuals of the population. For these same reasons, the legislature included those subjected to compulsory vaccination, that have suffered damage due to the practice of immunization, among those who are entitled to compensation under specific law. The evaluation of these preliminary elements, specific of vaccination and different from therapeutic treatments, is not a simple introductory premise, but also assumes importance as part of understanding the behavior of the public health authorities regarding the management of adverse events by vaccination. In fact, by having preventive and not therapeutic purposes, due to the fact that the vaccinations are targeted to very wide bands of the healthy population (mostly children), special attention was always paid to monitoring the risk/benefit of the vaccine, in order to highlight, in a timely manner, the existence of potential safety problems of the vaccine preparation before its use.