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Editorial

BCG Vaccination - Still a Concern

Persio Roxo-Junior[1]*

[1]*Department of Pediatrics, Ribeirão Preto Medical School, University of São Paulo, Brazil*

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***Corresponding author**

Persio Roxo-Junior, Department of Pediatrics, Ribeirão Preto Medical School, University of São Paulo, Brazil, Email: persiorj@fmrp.usp.br

Editorial

Tuberculosis is a major world public health problem. In 2011, approximately 30% of the world's population was thought to be infected with *Mycobacterium tuberculosis*, with more than 1 million deaths attributed to this organism.

BCG vaccine, which contains a live attenuated Mycobacterium bovis strain, is part of the vaccination schedule of several countries worldwide since 1960. Because BCG vaccine has been considered as part of efforts to control *tuberculosis,* billion doses were applied and it remains one of the most widely used of all current vaccines worldwide. So, million newborns are vaccinated every year through national childhood immunization programs, because in several countries around the world it is administered to all children during the neonatal period.

It should be remembered that the effect of BCG vaccination on transmission of *Mycobacterium tuberculosis* is limited. There is evidence that it does not prevent primary infection and, more importantly, does not prevent reactivation of latent pulmonary infection, the main source of bacillary spread in the community. On the other hand, the BCG vaccine has a well documented protective effect against meningitis and disseminated tuberculosis in children.

Severe Combined Immunodeficiency (SCID) represents a group of genetic heterogeneous diseases that predominantly impair the development of T cells (in some types also compromises B and/or natural killer cells), both numbers and function. This primary immunodeficiency is not a frequent disease. In Europe and North America, the incidence of SCID is estimated to be at least 1 case per 100,000 per year.

The main manifestations are retarded growth and severe recurrent infections starting in the first year of life, caused by intra- and extracellular microorganisms. Unfortunately, most children are diagnosed only after the occurrence of severe infections and their complications, with a considerably worse prognosis. Severe pulmonary and hepatic infections are closely related to high morbidity and mortality. If untreated, infants with typical SCID succumb early in life from severe and recurrent infections. Thus, SCID is considered to be a pediatric emergency. Early diagnosis can be achieved by quantifying the number of T Cell Receptor Excision Circles (TRECs) in neonatal screening, which is not available in most countries in the world. The prognosis and survival of patients with SCID are directly related to the age at transplant. When the transplant is performed during the first three months of life and before the onset of infections, the survival is approximately 91%.

Complications of the vaccine, especially disseminated infection, are known to occur in immunodeficient patients, particularly those with SCID who are asymptomatic when they receive the vaccine. Some data showed that dissemination of *Mycobacterium bovis* after BCG vaccination, with a fatal outcome, may occur in up to 30% of SCID patients.

A recent multicentre study described the complications and risks in 349 BCG-vaccinated patients with SCID from 28 centers in 17 countries, through an extensive standardized questionnaire evaluating complications, therapeutics, and outcomes regarding BCG vaccination in patients given a diagnosis of SCID. Fifty-one percent of the patients had BCG-associated complications, 34% disseminated and 17% localized. Patients that received vaccination less 1 month of age presented an increased prevalence of complications and death caused by BCG-associated complications. The study also showed that the number of T lymphocytes at diagnosis was important. Patients with T-cell numbers of 250/mL or less at diagnosis had 2.1 times more complications than those with T-cell numbers of greater than 250/mL Patients with SCID who received antimycobacterial therapy while asymptomatic presented very low incidence of BCG-associated complications, and no deaths caused by BCG-associated complications. On the other hand, in the group of patients treated with antimycobacterial therapy for a symptomatic BCG infection, 46 BCG-associated deaths were reported. The authors concluded that BCG vaccine has a very high rate of complications in patients with SCID, and they proposed that delay in BCG vaccination should be considered to protect highly vulnerable populations from preventable complications, until safer and more efficient antituberculosis vaccines become available [1].

Recently a group of Brazilian researchers contacted 23 centers and 70 SCID patients from 65 families. Eighty-five percent of patients were vaccinated with BCG before the diagnosis, 65% of these had complications related to BCG vaccine, and the complication was disseminated in 74.3%. Half of the patients died, and disseminated BCG was the cause of death, either alone or in association with other causes. The authors concluded that in Brazil, mortality of SCID caused by BCG-associated complications is higher than in developed countries. Complications of BCG vaccine are an important warning sign for the presence of SCID and account for significant morbidity during disease progression [2].

Following this issue, another group of Brazilian researchers reported a patient with a very early diagnosis of SCID, which was suspected on the basis of the previous death of two siblings younger than one year caused by severe BCG-associated complications. These authors suggested that in countries where BCG vaccine is routinely used, pediatricians must be alert of occurrence of severe or fatal complications in other family members and this situation should be included as a warning sign for the early diagnosis of SCID [3].

Considering all aspects above, it is of paramount importance that pediatricians and physicians have knowledge of the risks of BCG vaccination for patients with SCID. Until safer vaccines or screening for SCID by quantifying TRECs are available to the population, pediatricians should be aware and consider delaying vaccination for suspected cases until the diagnosis is completely elucidated.

References

1. Marciano Be, Huang CY, Joshi G, Rezaei N, Carvalho Bc, Allwood Z, et al. BCG Vaccination in Patients with Severe Combined Immunodeficiency: Complications, Risks, and Vaccination Policies. J Allergy Clin Immunol. 2014; 133: 1134-1141.

2. Mazzucchelli Jt, Bonfim C, Castro G, Condino-Neto A, Costa Nmx, Cunha L, et al. Severe Combined Immunodeficiency in Brazil: Management, Prognosis and BCG-Associated Complications. J Investig Allergol Clin Immunol. 2014; 24: 184-191.

3. Roxo-Junior P, Silva J, Andrea M, Oliveira L, Ramalho F, Bezerra T, et al. A family history of serious complications due to BCG vaccination is a tool for the early diagnosis of severe combined immunodeficiency. Italian J Pediatr. 2013; 39: 54-58.