



## **Editorial**

**World PI Week (WPIW) April 22-29, 2015**

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### **The importance of vaccination and immunoglobulin treatment for patients with primary immunodeficiency diseases (PID).**

Primary immunodeficiency diseases (PIDs) are a heterogeneous group of rare genetic disorders that affect the development and/or function of innate and/or adaptive immunity. Most patients have increased susceptibility to both common and unusual infections with sometimes a fatal outcome. Therefore, it is essential to give prompt and effective treatment to prevent infection by providing proper vaccination schedules, regular administration of immunoglobulin (Ig) replacement therapy in disorders with antibody deficiency. In some conditions, antibiotic and antifungal chemoprophylaxis may also be indicated.

Vaccines are one of the greatest success stories in public health. This worldwide routine use has eradicated small pox, nearly ended poliomyelitis, and reduced outbreaks of measles, pertussis and other illnesses to an all-time low. In addition, vaccines are our best defense against infectious diseases especially in endemic regions of the world.

In patients with PIDs, vaccines could play an important role in preventing infections with vaccine-preventable diseases. However, the decision to immunize such patients or not depends on the type and severity of PID as well as the type of vaccine to be administered (Live or killed). In some PIDs, the vaccine can induce adequate protection as in healthy individuals while in others the immune response may be impaired and the efficacy of vaccinations therefore reduced. However, the potential for some response, either through T cells or antibody production, means that vaccination should be considered a beneficial tool in protecting patients with PIDs from serious infectious diseases.

Inactivated (killed) vaccines, such as Diphtheria, Tetanus, Pertussis (DTP), conjugated Haemophilus influenza type b (Hib), hepatitis A and B, Meningococcal, and conjugate pneumococcal, can be given in PIDs. Live (attenuated) vaccines including oral Polio vaccine (OPV), rotavirus vaccine, some types of influenza vaccine, and yellow fever are contraindicated in severe antibody deficiencies (eg, X-linked agammaglobulinemia and common variable immunodeficiency) and in severe T cell and severe combined Immunodeficiencies.



Other live viral vaccines such as measles, mumps, rubella (MMR) and varicella vaccine appear to be safe in antibody deficiencies but are contraindicated in severe T cell and severe combined immunodeficiencies. Also, Bacillus Calmette-Guerin (BCG) is contraindicated in PIDs with impaired cell mediated immunity, chronic granulomatous disease and IFN- $\gamma$ -IL-12 pathway defects because of the risk of disease from vaccine strains.

To be on the safe side it is recommended to postpone administering live vaccines – especially BCG, OPV and rotavirus vaccine - to infants suspected to have PIDs and those with a family history of PID or previous sibling death of infection until the immune status is properly evaluated. In patients receiving regular immunoglobulin replacement treatment, that is planned to stop vaccine administration whether live or killed should be withheld until at least 3 months after cessation of such treatment; in patients on long term immunoglobulin replacement, vaccines can be given whilst on treatment.

In addition, all PID patients should not receive live oral polio (OPV) because of reported prolonged excretion of the virus for months and even years. These patients should receive inactivated polio vaccine (IPV) instead of OPV.

Moreover, siblings and household contacts of patients with suspected or diagnosed PIDs should receive all of the national immunization scheduled vaccines, particularly IPV, MMR, varicella and influenza. Yearly influenza vaccination of family members is recommended in order to reduce the risk of household-social transmission.

Immunoglobulin (Ig) replacement therapy provides passive protection against infections using antibodies present in the pool of healthy donors. The demonstrated success of Ig prophylaxis in antibody deficiencies either by intravenous or subcutaneous route relies mainly on maintaining an adequate protection against infections. According to international guidelines the Ig monthly dose of 300–600 mg/kg body weight should be administered intravenously every 3 or 4 weeks or an equivalent dose subcutaneously once/twice a week. Without doubt, the regular administration of Ig replacement therapy has provided better quality of life, decreased the frequency of infections and improved the prognosis of patients with antibody deficiencies.

Unfortunately, not all patients with antibody deficiencies are privileged to have regular Ig therapy due to the high cost of Ig products. In this regard and as immunoglobulins are listed by the WHO as essential medicines for both adult and pediatric patients with a PID, we urge health authorities and governmental stakeholders to support Ig treatment in PIDs and to consider such treatment a priority in maintaining optimal health service to those patients.

## References

1. Medical Advisory Committee of the Immune Deficiency Foundation, Shearer WT, Fleisher TA, Buckley RH, Ballas Z, Ballow M, Blaese RM, Bonilla FA, Conley ME, Cunningham-Rundles C, Filipovich AH, Fuleihan R, Gelfand EW, Hernandez-Trujillo V, Holland SM, Hong R,



- Lederman HM, Malech HL, Miles S, Notarangelo LD, Ochs HD, Orange JS, Puck JM, Routes JM, Stiehm ER, Sullivan K, Torgerson T, Winkelstein J. Recommendations for live viral and bacterial vaccines in immunodeficient patients and their close contacts. *J Allergy Clin Immunol.* 2014;133(4):961-6.
2. Papadopoulou-Alataki E, Hassan A, Davies EG. Prevention of infection in children and adolescents with primary immunodeficiency disorders. *Asian Pac J Allergy Immunol.* 2012; 30(4):249-58.
  3. Principi N, Esposito S. Vaccine use in primary immunodeficiency disorders. *Vaccine.* 2014; 32(30):3725-31.
  4. Martin J. Vaccine-derived poliovirus from long term excretor and the end game of polio eradication. *Biologicals.* 2006;34: 117-22.
  5. Chapel H, Cunningham-Rundles C. Update in understanding common variable immunodeficiency disorders (CVIDs) and the management of patients with these conditions. *Br J Haematol.* 2009;145:709–27
  6. Kerr J, Quinti I, Eibl M, Chapel H, Späth PJ, Sewell WA, Salama A, van Schaik IN, Kuijpers TW, Peter HH. Is dosing of therapeutic immunoglobulins optimal? A review of a three-decade long debate in europe. *Front Immunol.* 2014;5:629.
  7. World Health Organization (WHO) [Lists](#) (Adult and Pediatric) of Essential medicines