ABSTRACT

New approaches for the control of influenza: the intradermal vaccination

L. STICCHI, F. ANSALDI, P. DURANDO, G. ICARDI
Department of Health Sciences, University of Genoa and Hygiene Unit, San Martino University Hospital of Genoa, Italy

The need of innovative influenza formulations to improve immunogenicity and effectiveness of conventional trivalent vaccines, subunit or split non-adjuvanted types, in groups of patients at risk of developing severe complications has facilitated the development of interesting lines of research in recent years.
Moreover, the interest in the dose-sparing potential and the recent availability of innovative injection systems has led to a renewed attention in the intradermal (ID) administration of influenza vaccines. This new microinjection system (Soluvia®, Beckton Dickinson, USA), currently the only intradermal device licensed for influenza vaccines, is a prefilled syringe with a single 30-gauge needle, 1.5 mm in length, that has a system specifically designed to limit the depth of penetration, reducing blood vessel and nerve injuries in patients. The sensation of injection is claimed to be almost imperceptible to the patient. The device is designed to protect the needle after injection, reducing risk of injury for health care workers.
In recent years, numerous studies have been conducted with the aim of assessing the immunogenicity of ID vaccines, containing a dose of antigen equal to or lower than that contained in the non-adjuvanted intramuscular (IM) vaccine (15 μg/Hemagglutinin (HA) strain). The results of these studies demonstrate the ability of ID vaccines to elicit a good response even at lower doses of antigen, and to determine, at the same dose, a response even greater than that of the IM vaccines. This aspect is of crucial importance, especially in low-responders after IM. In this regard, a recent study of 3,707 subjects aged > 60 years, randomized to receive either a preparation ID or IM containing 15 μg of antigen demonstrated that ID vaccine is more immunogenic of the conventional IM vaccine, maintaining a safety profile comparable to the vaccine IM [1].
The immunogenicity of an intradermal seasonal influenza vaccine was compared with that of an adjuvanted vaccine in the elderly: 795 subjects were randomized to receive an ID vaccine or an MF59 adjuvanted IM vaccine, both containing 15 μg of HA. The immunogenicity and safety of the ID vaccine in the elderly was comparable with that of the adjuvanted vaccine [2].
Recently, a new ID, trivalent, inactivated, seasonal influenza vaccine (Intanza®, Sanofi Pasteur, France) has been available in Europe: two formulations are currently available on the market, one for adults aged 18-59 years (9 μg/HA strain) and the other for the elderly ≥ 60 years (15 μg/HA strain). We carried out an "on field" randomised study in elderly to evaluate the acceptability of Intanza® and to compare it to that of a trivalent subunit virosomal formulation (Inflexal V®, Berna, Switzerland) delivered by IM route.The study showed a good acceptability of both the vaccines. As expected, since the ID injection is close to the skin surface, an higher bother due to redness, itching and induration was observed in the ID-group, but it was in a few proportion of subjects and its clinical relevance was not meaningful.
In general, the good profile of immunogenicity, safety and tolerability suggests the ID immunization suitable for the subjects low-responders to conventional vaccines.

References

[1] Arnou R, Icardi G, De Decker M, et al. *Intradermal influenza vaccine for older adults: a randomized controlled multicenter phase III study.* Vaccine 2009;27:7304-12.

[2] Van Damme P, Arnou R, Kafeja F, et al. *Evaluation of non-inferiority of intradermal versus adjuvanted seasonal influenza vaccine using two serological techniques: a randomised comparative study.* BMC Infect Dis. 2010;10:134.