Seroreactivity Against SARS-CoV-2 & Influenza a Hemagglutinin Among Immuneresponding and None-Immunresponsive Adults and Older Adults

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Abstract:

Background: During the respiratory tract infection season 2019/2023, an influenza vaccine study with TIV (VaxiGrip) was conducted on fifty elderly individuals >75 years (75-87 years) and a control group 4-fold increased virus-neutralizing serum activity, HI). Among the non-responding individuals, six individuals with non-significant humoral seroreactivity were selected from each age group. A thorough serological influenza HA-binding assay was performed regarding serum IgG reactivity to the hemagglutinin (HA) antigen in the vaccine at 1 month and 6 months after vaccination.

Methods: Serological analys method was performed by ELISA. In brief, Nunc-microplates were coated with 0,25 ug/ml HA1 subtype antigens (A/H1N1/California.p(dm09 eller A/H1N1Michigan. 2015-California-like09.pdm) 0,25 ug/ml (SinoBiologicals, Erlangen, Germany). Total serum and nasal IgA med HRP-rabbit anti-human IgA (Fischer Scientifics H). Subklass IgG1, IgG2, IgG3 och IgG4 analyses with monoklonala antibodies (BAM) specific for humana IgG-subklasses. Detektion with HRP-anti IgG-subklass (BioRad). Inkubations 90 min (vid +37oC, 5% CO2) 0.0003% H2O2/o-phanylene diamine-substrate (2mg/mL) i Citratbubert pH5,5. Reaktionsabsorbance 490 nm. Virus-neutralization assays and ADCC against Influenza A and SARS CoV-2 viruses performed.

Results: In the majority of the studied serum samples the IgG1 subclass was dominant both before and after vaccination. ELISA IgG1 titer increases was only seen after vaccination among individuals responding with a significant HI-serum titer rise.

Discussion: In this limited serum sample study material collected from adults (75 yrs) a correlation on HI-titers was seen with the serum IgG ELISA reactivity towards the HA-antigens in the vaccine. Individuals with a >4-fold HI-titer increase, also showed a >4-fold ELISA IgG titer increase. The duration of influenza virus serum neutralizing activity was significantly more shortlived than the anti-SARS-CoV-2 neutralizing activity. The diberences in neutralizing capacity in serum and in local mucosal tissues will be discussed.

Table 1: Duration of neutralizing and NK active serum antibodies after influenza A and SARS-CoV-2 vaccination in two age groups

Influenza	1M	3M	6M	ADCC	SARS	1M	3M	6M
>75 (76-85)	92%	33%	11%	69%		19,7%	10%	9,5%
30-66 yrs	100%	100%	82%	75%		99,7%	100%	95%
Nasal								
>75 (76-82)	82%	91%	88,5%	85%		66%	78%	79%
28-63 yrs	96%	100%	99%	100%		84,5%	89%	81%

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