RESEARCH LETTER

Transplacental Antibody Transfer Following Maternal Immunization With a Pandemic 2009 Influenza A(H1N1) MF59-Adjuvanted Vaccine

To the Editor: Pregnant women and their offspring are at increased risk for influenza-related complications.1 During the 2009 influenza A(H1N1) pandemic, the estimated rate of admission for complications in pregnant women was 4 times higher than in the general population, accounting for 9% of admission for complications in pregnant women.5,6


The ethical committee of Luigi Sacco Hospital, Milan, approved the study, and participants provided written informed consent.

Results. Six women were lost to follow-up, and 69 maternal-infant pairs completed the study. Thirty-eight male and 31 female infants born from November 2009 to January 2010 were enrolled. Mean (SD) gestational age at delivery was 39 (1) weeks, and mean (SD) birth weight was 3267 (414) g.

All mothers had HI-antibody titer to A/California/07/2009(H1N1) at or above 1:40 at the time of delivery and during the follow-up (Table). The proportion of infants with HI-antibody titer at or above 1:40 was 95.6% (n=66) at birth and at 2 months and then declined to 81.2% (n=56) at 5 months. Among mothers, GMTs were similar at delivery and 2 months and decreased 5 months later. In infants, GMTs were most frequent in infants younger than 6 months.3 Influenza vaccination appears to be both safe and effective in pregnant women and elicits an antibody response comparable with age-matched, nonpregnant control participants,4 which could result in the passive transfer of sufficient antibody to protect their infants for the duration of the influenza season.5,6

The aim of this study was to evaluate the antibody presence in women immunized with a pandemic influenza A(H1N1) MF59-adjuvanted vaccine during pregnancy and to assess the duration of passively acquired maternal antibodies in their infants.

Methods. In October and November 2009, 75 consecutive women in Milan in their third trimester of pregnancy were injected intramuscularly with a single dose (0.5 mL) of MF59-adjuvanted influenza A(H1N1) vaccine (Focetria, Novartis, Italy), containing 7.5 µg of A/California/07/2009(H1N1)-hemagglutinin antigen. Exclusion criteria were a history of systemic disease; previous influenza vaccination; and at or above 1:40 at the time of delivery and during the follow-up (Table). The proportion of infants with HI-antibody titer at or above 1:40 was 95.6% (n=66) at birth and at 2 months and then declined to 81.2% (n=56) at 5 months. Among mothers, GMTs were similar at delivery and 2 months and decreased 5 months later. In infants, GMTs at birth progressively decreased during the 5-month follow-up (Table). The transplacental transfer of antibody, defined as GMT ratio of the HI-antibody titers in infants and mothers at time of delivery, was 0.55 (95% CI, 0.49-0.61). The estimated half-life of passively acquired maternal antibody against A/California/07/2009(H1N1) was 83.4 days.

Table. Antibody Titer Response in 69 Mothers Immunized With a Pandemic 2009 Influenza A(H1N1) MF59-Adjuvanted Vaccine and Their Infants

<table>
<thead>
<tr>
<th>HI-Antibody Titer ≥1:40, No. (%) [95% CI]</th>
<th>Delivery/Birth</th>
<th>2 mo</th>
<th>5 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers</td>
<td>69 (100.0)</td>
<td>69 (100.0)</td>
<td>69 (100.0)</td>
</tr>
<tr>
<td></td>
<td>[95.7-100.0]</td>
<td>[95.7-100.0]a</td>
<td>[95.7-100.0]a</td>
</tr>
<tr>
<td></td>
<td>257.9 (200.8-331.1)b</td>
<td>232.2 (177.4-306.6)b,c</td>
<td>167.6 (115.9-242.3)c</td>
</tr>
<tr>
<td>Infants</td>
<td>66 (95.6)</td>
<td>56 (81.2)</td>
<td>56 (81.2)</td>
</tr>
<tr>
<td></td>
<td>[88.6-95.0]d</td>
<td>[56.9-95.0]d</td>
<td>[56.9-95.0]d</td>
</tr>
<tr>
<td></td>
<td>141.8 (108.3-185.7)e</td>
<td>106.5 (81.9-138.9)e,f</td>
<td>38.3 (22.5-65.1)f</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; GMTs, geometric mean titers; HI, hemagglutination inhibition.

aComparison of 2 mo vs delivery, P=.50 for both.
bComparison of 2 mo vs 5 mo, P=.20.
cComparison of 5 mo vs delivery, P=.001; 5 mo vs 2 mo, P=.01.
dComparison of 5 mo vs delivery, P=.008 for both.
eComparison of 2 mo vs delivery, P=.01.
fComparison of 2 mo vs 5 mo, P=.01.
(95% CI, 63.8-107.9 days). No serious adverse events were reported in mothers and infants. Three women reported self-limited injection site reactions. None developed influenza-like illness during the 5-month follow-up.

Comment. These data indicate that HI antibody against A/California/07/2009(H1N1) is present in serum samples from both mothers and their newborns after maternal pandemic influenza vaccination. One study limitation is that the time period of the investigation partially overlapped with pandemic A(H1N1) virus circulation in Milan, and in the absence of a control group, it is possible that natural exposure to the virus could have affected antibody concentrations in a subset of participants. However, the exclusion criteria and absence of apparent influenza illness during follow-up make this less likely.

These findings suggest that passively acquired serum antibody levels that are thought to be associated with protection can persist in most infants for at least 5 months.

GianVincenzo Zuccotti, MD
gianvincenzo.zuccotti@unimi.it
Laura Pogliani, MD
Department of Pediatrics
Elena Pariani, PhD
Antonella Amendola, PhD
Alessandro Zanetti, PhD
Department of Public Health, Microbiology and Virology
Università degli Studi di Milano
Milan, Italy

Author Contributions: Dr Zuccotti had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Zuccotti, Zanetti.

Acquisition of data: Pogliani, Amendola.

Analysis and interpretation of data: Pariani, Zanetti.

Drafting of the manuscript: Zuccotti, Pogliani, Pariani, Zanetti.

Critical revision of the manuscript for important intellectual content: Zuccotti, Amendola, Zanetti.

Statistical analysis: Pariani.

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