Laboratory investigation in vaccinated patients with varicella

Siedler A.1, Polte C. 2, Tolksdorf K. 1, Ehlers B 3

1 Immunization Unit, Robert Koch Institute, Berlin
2 Technische Universität Dresden, Dresden
3 Department for Infectious Diseases, Robert Koch Institute, Berlin

Background
- Accompanying varicella vaccination in children in Germany recommended with one (2004) and two (2009) doses, sentinel surveillance of varicella with a sample (n=1000) of private physicians was established in 2005.
- Sentinel physicians sent swaps of skin lesions of vaccinated patients to laboratory investigation in order to confirm diagnosis and identify varicella-zoster virus (VZV).
- We analyzed the association of varicella vaccine doses with laboratory results.

Methods
- Skin lesion samples were obtained with a cotton tip and sent together with a case-based questionnaire (containing patient’s age and gender, dates of vaccination and disease onset and classification of number of lesions) to the reference laboratory.
- VZV wild-type and vaccine-type DNA was identified by polymerase chain-reaction (PCR) and pyrosequencing methods.
- Case-based data and laboratory results were descriptively analyzed by chi-squared test.

Results
From April 2005 to December 2012, monthly reports in the sentinel-system included a total of 4126 vaccinated varicella cases with one (n=3571) or two (n=551) vaccine doses, four had no sufficient data on vaccination recorded. Of all reported vaccinated varicella cases 21% (n=877) had samples sent to the laboratory.

<table>
<thead>
<tr>
<th>Vaccine Dose</th>
<th>PCR Positive</th>
<th>PCR Negative</th>
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<tbody>
<tr>
<td>1 dose</td>
<td>1016.4 (963.8-1069.0)</td>
<td>871.6 (755.5-987.6)</td>
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<tr>
<td>2 doses</td>
<td>929.3 (766.0-1092.7)</td>
<td>652.9 (572.8-733.1)</td>
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Severity of disease was classified by number of lesions (n=50>50). Most vaccinated patients with confirmed as well as with suspected varicella had less than 50 lesions. Severity did not differ between individuals vaccinated once or twice, but in 1-dose recipients information on severity was missing more often (figure 3).

No significant association was found between PCR result and age at vaccination or age at disease onset or gender, respectively.

Conclusion:
- In vaccinated patients with clinical varicella symptoms PCR might fail due to low virus load in lesions, but clinical misdiagnosis seem to be another reason for PCR negative results, particularly in patients vaccinated twice.
- The shorter time interval between vaccination and disease onset in 2-dose recipients reflects the later availability and recommendation of the 2-dose schedule.
- Severity of varicella after vaccination does not differ with regard to number of vaccine doses.
- More detailed clinical data are necessary and serological investigations should be added to complement sentinel surveillance and to better understand associations between number of vaccine doses and laboratory results.