III-1. Effectiveness of pertussis vaccination during pregnancy

Effectiveness of pertussis vaccination during pregnancy

The USA was the first country to recommend pertussis vaccination to pregnant women in certain situations starting in 2008 and now this vaccination is widely recommended. In EU countries this vaccination is recommended by ECDC.

In England, a retrospective cohort studies to assess vaccine effectiveness one year and three years after the start of national maternal pertussis immunisation programme has been conducted (here and here).

The overall vaccine effectiveness was about 90% for infants too young to be vaccinated according to national immunisation schedule.

Based on the unmatched case-control study which was conducted in England and Wales the vaccine effectiveness was 93% (95%CI 91-97%) in infants less than 8 weeks of age. In a retrospective cohort study of infants born in North California the effectiveness of vaccination during pregnancy to prevent infant pertussis was 91% (95%CI 20-99%) during the first 2 months of life.

Infants born from mothers immunised with pertussis vaccine during pregnancy and infectid with Bordetella pertussis have usually less classic pertussis symptoms than infants born from maternally unimmunised mothers. The risk of paroxysmal cough (RR, 0.41; 95% CI: 0.25–0.68), apnea (0.66; 95%: 0.47–0.91), cyanosis (0.53; 95%CI: 0.39–0.73), or whoop (0.78; 95%CI: 0.62–0.99) were significantly lower among infants born from mothers immunised with pertussis vaccine during pregnancy compared with unimmunised ones. In addition, infants whose mothers received prenatal acellular pertussis vaccine had significantly lower risk of being hospitalised (RR, 0.5; 95% CI: 0.4–0.6) or admited to ICU (0.8; 95%CI: 0.7–0.9). Even if infants, whose mothers were vaccinated during pregnancy with pertussis vaccine were hospitalised because of pertussis the duration of hospitalisation was significantly shorter compared with infants born form unimmunised mothers (median 3 vs 6 days; P = 0.02). No infants born from prenatally immunised mothers had seizures, were intubated or died because of pertussis.

The maternal pertussis vaccine effectiveness depends on the timing. In a study conducted in England the effectiveness was 91% for infants born from mothers who received vaccine at least four weeks before the delivery (95%CI 88-94%) and 1-3 weeks before the delivery (95%CI 80-96%).
Based on the data from USA if the acellular pertussis vaccine was administrated to mother at 27-36 gestational weeks, then the effectiveness compared with postpartum vaccination was 85% (95%CI: 33-98%) and 72% (95%CI: 30–89%) for infants <8 and ≤12 weeks of age, respectively. The vaccine effectiveness at any point during the pregnancy compared with postpartum immunisation of mothers was 64% (95% CI: 11–85%) in infants less than 8 weeks of age and 53% (95%CI: 8–76%) in infants ≤12 weeks of age.

For conclusion, maternal pertussis immunisation is highly effective to prevent pertussis in infants too young to be vaccinated according to national immunisation programme. The highest effectiveness is achieved if the vaccine is administrated at least four weeks before the delivery. Even if infants whose mothers were immunised during pregnancy get pertussis, the course of the disease is mostly mild.

**Topic conclusions**

Pertussis immunisation in pregnancy is shown to be safe, effective and is recommended in different countries in the world.