ACOG Committee Opinion

Committee on Obstetric Practice

Number 282, January 2003

Immunization During Pregnancy

ABSTRACT: Preconceptional immunization of pregnant women to prevent disease in the offspring, when practical, is preferred to vaccination of pregnant women. The benefits of immunization to the pregnant woman and her neonate usually outweigh the theoretic risks of adverse effects. Current information on the safety of vaccines given during pregnancy is subject to change and can be verified from the Centers for Disease Control and Prevention web site at www.cdc.gov/nip.

The benefits of immunization to the pregnant woman and her neonate usually outweigh the theoretic risks of adverse effects. The theoretic risks of the vaccination of pregnant women with killed virus vaccines have not been identified.

Current recommendations for immunization of pregnant women are presented in Table 1. Although new information continues to confirm the safety of vaccines intentionally or inadvertently given during pregnancy, current information is subject to change because the effects of many diseases and vaccines on the pregnant woman or the fetus may be rare and infrequently reported. (For further information and updates refer to www.cdc.gov/nip.)

In the decision of whether to immunize a pregnant woman with other vaccines not listed in Table 1, the risk for exposure to disease and its deleterious effects on the pregnant woman and the fetus must be balanced against the efficacy of the vaccine and any beneficial effects resulting from it. Preconceptional immunization of women to prevent disease in the offspring, when practical, is preferred to vaccination of pregnant women with certain vaccines. Vaccination of women during the postpartum period, especially for rubella and varicella, should be encouraged. Women susceptible to rubella should be vaccinated with measles–mumps–rubella on postpartum discharge from the hospital.

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Table 1. Immunization During Pregnancy

Immunobiologic Agent	Risk from Disease to Pregnant Woman	Risk from Disease to Fetus or Neonate	Type of Immunizing Agent	Risk from Immunizing Agent to Fetus	Indications for Immunization During Pregnancy	Dose Schedule*	Comments
			LIVE VIRUS VACCINES				
Measles	Significant morbidity, low mortality; not altered by pregnancy	Significant increase in abortion rate; may cause malformations	Live attenuated virus vaccine	None confirmed	Contraindicated (see immune globulins)	Single dose SC, preferably as measles–mumps–rubella†	Vaccination of susceptible women should be part of postpartum care. Breastfeeding is not a contraindication.
Mumps	Low morbidity and mortality; not altered by pregnancy	Possible increased rate of abortion in first trimester	Live attenuated virus vaccine	None confirmed	Contraindicated	Single dose SC, preferably as measles–mumps–rubella	Vaccination of susceptible women should be part of postpartum care
Poliomyelitis	No increased incidence in pregnancy, but may be more severe if it does occur	Anoxic fetal damage reported; 50% mortality in neonatal disease	Live attenuated virus (oral polio vaccine) and enhanced-potency inactivated virus vaccine‡	None confirmed	Not routinely recommended for women in the United States, except women at increased risk of exposure	*Primary:* Two doses of enhanced-potency inactivated virus SC at 4–8 week intervals and a third dose 6–12 months after the second dose *Immediate protection:* One dose oral polio vaccine (in outbreak setting)	Vaccine indicated for susceptible pregnant women traveling in endemic areas or in other high-risk situations
Rubella	Low morbidity and mortality; not altered by pregnancy	High rate of abortion and congenital rubella syndrome	Live attenuated virus vaccine	None confirmed	Contraindicated, but congenital rubella syndrome has never been described after vaccine	Single dose SC, preferably as measles–mumps–rubella	Teratogenicity of vaccine is theoretic, not confirmed to date; vaccination of susceptible women should be part of postpartum care
Yellow fever	Significant morbidity and mortality; not altered by pregnancy	Unknown	Live attenuated virus vaccine	Unknown	Contraindicated except if exposure is unavoidable	Single dose SC	Postponement of travel preferable to vaccination, if possible

Varicella	Possible increase in severe pneumonia	Can cause congenital varicella in 2% of fetuses infected during the second trimester	Live attenuated virus vaccine	None confirmed	Contraindicated, but no adverse outcomes reported if given in pregnancy	Two doses needed with second dose given 4–8 weeks after first dose. Should be strongly encouraged	Teratogenicity of vaccine is theoretic, outcomes reported weeks 4–8 not confirmed to date. Vaccination of susceptible women should be considered postpartum
				OTHER			
Influenza	Increase in morbidity and mortality during epidemic of new antigenic strain	Possible increased abortion rate; no malformations confirmed	Inactivated virus vaccine	None confirmed	All women who are pregnant in the second and third trimester during the flu season (October–March); women at high risk for pulmonary complications regardless of trimester	One dose IM every year	—
Rabies	Near 100% fatality; not altered by pregnancy	Determined by maternal disease	Killed virus vaccine	Unknown	Indications for prophylaxis not altered by pregnancy; each case considered individually	Public health authorities to be consulted for indications, dosage, and route of administration	—
Hepatitis B	Possible increased severity during third trimester	Possible increase in abortion rate and preterm birth; neonatal hepatitis can occur; high risk of newborn carrier state	Purified surface antigen produced by recombinant technology	None reported	Pre-exposure and postexposure for women at risk of infection	Three-dose series IM at 0, 1, and 6 months	Used with hepatitis B immune globulin for some exposures; exposed newborn needs birth dose vaccination and immune globulin as soon as possible. All infants should receive birth dose of vaccine.
Hepatitis A	No increased risk during pregnancy	—	Inactivated virus	None reported	Pre-exposure and postexposure for women at risk of infection; international travelers	Two-dose schedule 6 months apart	—

			INACTIVATED BACTERIAL VACCINES				
Pneumococcus	No increased risk during pregnancy; no increase in severity of disease	Unknown, but depends on maternal illness	Polyvalent polysaccharide vaccine	None reported	Recommended for women with asplenia; metabolic, renal, cardiac, pulmonary diseases; smokers; immunosuppressed. Indications not altered by pregnancy.	In adults, one SC or IM dose only; consider repeat dose in 6 years for high-risk women	—
Meningococcus	Significant morbidity and mortality; not altered by pregnancy	Unknown, but depends on maternal illness	Quadrivalent polysaccharide vaccine	None reported	Indications not altered by pregnancy; vaccination recommended in unusual outbreak situations	One SC dose; public health authorities consulted	—
Typhoid	Significant morbidity and mortality; not altered by pregnancy	Unknown	Killed or live attenuated oral bacterial vaccine	None confirmed	Not recommended routinely except for close, continued exposure or travel to endemic areas	Killed *Primary:* Two injections SC at least 4 weeks apart. *Booster:* Single dose SC or ID (depending on type of product) *Booster:* Schedule not yet determined	Oral vaccine preferred
Anthrax	Significant morbidity and mortality; not altered by pregnancy	Unknown, but depends on maternal illness	Preparation from cell-free filtrate of *B anthracis*; no dead or live bacteria	None confirmed	Not routinely recommended unless pregnant women work directly with *B anthracis*, imported animal hides, potentially infected animals in high incidence areas (not United States) or military personnel deployed to high-risk exposure areas	Six-dose primary vaccination SC, then annual booster vaccination	Teratogenicity of vaccine theoretical

(continued)

Table 1. Immunization During Pregnancy *(continued)*

Immunobiologic Agent	Risk from Disease to Pregnant Woman	Risk from Disease to Fetus or Neonate	Type of Immunizing Agent	Risk from Immunizing Agent to Fetus	Indications for Immunization During Pregnancy	Dose Schedule*	Comments
			TOXOIDS				
Tetanus–diphtheria	Severe morbidity; tetanus mortality 30%; diphtheria mortality 10%; unaltered by pregnancy	Neonatal tetanus mortality 60%	Combined tetanus–diphtheria toxoids preferred: adult tetanus–diphtheria formulation	None confirmed	Lack of primary series, or no booster within past 10 years	*Primary:* Two doses IM at 1–2-month interval with a third dose 6–12 months after the second. *Booster:* Single dose IM every 10 years after completion of primary series	Updating of immune status should be part of antepartum care
			SPECIFIC IMMUNE GLOBULINS				
Hepatitis B	Possible increased severity during third trimester	Possible increase in abortion rate and preterm birth; neonatal hepatitis can occur; high risk of carriage in newborn	Hepatitis B immune globulin	None reported	Postexposure prophylaxis	Depends on exposure; consult Immunization Practices Advisory committee recommendations (IM)	Usually given with hepatitis B virus vaccine; exposed newborn needs immediate postexposure prophylaxis
Rabies	Near 100% fatality; not altered by pregnancy	Determined by maternal disease	Rabies immune globulin	None reported	Postexposure prophylaxis	Half dose at injury site, half dose in deltoid	Used in conjunction with rabies killed virus vaccine
Tetanus	Severe morbidity; mortality 60%	Neonatal tetanus mortality 60%	Tetanus immune globulin	None reported	Postexposure prophylaxis	One dose IM	Used in conjunction with tetanus toxoid

Varicella	Possible increase in severe varicella pneumonia	Can cause congenital varicella with increased mortality in neonatal period; very rarely causes congenital defects	Varicella–zoster immune globulin (obtained from the American Red Cross)	None reported	Should be considered for healthy pregnant women exposed to varicella to protect against maternal, not congenital, infection	One dose IM within 96 hours of exposure	Indicated also for newborns of women who developed varicella within 4 days before delivery or 2 days following delivery; approximately 90–95% of adults are immune to varicella; not indicated for prevention of congenital varicella
			STANDARD IMMUNE GLOBULINS				
Hepatitis A	Possible increased severity during third trimester	Probable increase in abortion rate and preterm birth; possible transmission to neonate at delivery if woman is incubating the virus or is acutely ill at that time	Standard immune globulin	None reported	Postexposure prophylaxis, but hepatitis A virus vaccine should be used with hepatitis A immune globulin	0.02 mL/kg IM in one dose of immune globulin	Immune globulin should be given as soon as possible and within 2 weeks of exposure; infants born to women who are incubating the virus or are acutely ill at delivery should receive one dose of 0.5 mL as soon as possible after birth

*Abbreviations: ID, intradermally; IM, intramuscularly; PO, orally; and SC, subcutaneously.

†Two doses necessary for adequate vaccination of students entering institutions of higher education, newly hired medical personnel, and international travelers.

‡Inactivated polio vaccine recommended for nonimmunized adults at increased risk.

Data from General recommendations on immunization. Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Family Physicians (AAFP). Centers for Disease Control. MMWR Recomm Rep;51(RR-2):1–35. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5102a1.htm. Retrieved October 11, 2002.