
Chapter 81: Asthma and Allergic Diseases during Pregnancy

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1. Which of the following drugs would be considered pregnancy category B by the FDA?
   A. Animal and human studies both show teratogenicity.
   B. Neither animal nor human studies have shown teratogenicity.
   C. Animal studies show teratogenicity, human studies do not.
   D. Animal studies show no teratogenicity, human studies do.
   E. Neither animal nor human studies of teratogenicity have been done.

2. Which of the following statements about antibody levels in pregnant women is correct?
   A. IgG levels decrease in proportion to the hemodilution of pregnancy.
   B. IgG2 levels decrease disproportionately as a result of active placental transport.
   C. IgM levels increase in the third trimester as a result of exposure to fetal antigens.
   D. IgE levels increase in proportion to the hemodilution of pregnancy.
   E. IgE levels decrease in proportion to the hemodilution of pregnancy.

3. The clinical course of which of the following infectious diseases is not altered by pregnancy?
   A. Influenza
   B. Measles
   C. Varicella pneumonia
   D. HIV
   E. Leprosy

4. Which of the following oral medications are considered to be pregnancy category A (adequate and well-controlled studies in pregnant women show no potential for causing congenital malformations) by the FDA?
   A. Chlorpheniramine
   B. Prednisone
   C. Loratadine
   D. None of the above.

5. Which of the following pruritic disorders of pregnancy is diagnosed by immunofluorescence staining for C3 on skin biopsy?
   A. Pruritic urticarial papules and plaques of pregnancy.
   B. Pemphigoid gestationis.
   C. Prurigo of pregnancy.
   D. Cholestasis of pregnancy.
6. The use of which allergy and asthma medication has been associated with an increased risk of oral clefts in infants of mothers on this particular medication?
   A. 1st generation antihistamines
   B. 2nd generation antihistamines
   C. Inhaled corticosteroids
   D. Oral corticosteroids

7. Asthma in the pregnant woman is associated with the following in the fetus
   A. Intrauterine growth failure
   B. Respiratory distress syndrome
   C. Chronic lung disease
   D. Necrotizing enterocolitis

8. The following is true in regards to vasomotor rhinitis in pregnancy
   A. It is most prominent in the first half of pregnancy
   B. It usually persists for months after the pregnancy
   C. There is decreased levels of serum placental growth hormone in patients with rhinitis compared to those without
   D. There is a higher nasal mucociliary transport speed

9. Which medication has the best safety profile and is thus considered to be the first choice medication for allergic rhinitis during pregnancy?
   A. Intranasal corticosteroids
   B. Intranasal antihistamine
   C. Intranasal mast cell stabilizer
   D. Oral antihistamine

10. In general, pregnant women with a good history of venom sensitivity should:
    A. Be instructed insect avoidance measures and receive an EpiPen prescription
    B. The above, and have skin prick testing done
    C. The above in “a” and “b” and start immunotherapy

Answers
1. C, page 1432, table 81.2
   Category B is used for both drugs for which animal studies are negative for teratogenicity in which human studies have not been done as well as studies in which animal studies show teratogenicity but human studies do not.

2. A, page 1424, section on Serum Immunoglobulin Levels.
   Numerous studies have found that a decrease in immunoglobulin G (IgG) levels is about proportionate to the hemodilution of pregnancy. All IgG subclasses are transported across the placenta, and although some preferential transport of IgG1 may occur, this does not lead to any change in subclass distribution in maternal blood. Levels of IgM, IgA, and IgE do not change significantly.
Influenza is the most common infection that seems to cause greater morbidity in pregnancy, but only particularly virulent strains have been associated with increased risk. Pregnant women are three times as likely to be diagnosed as having measles pneumonia and six times as likely to die from measles complications than age-comparable non-pregnant women. Even when treated with acyclovir, mortality from Varicella pneumonia in pregnancy is substantial. Worsening of leprosy status with increased concentrations of bacilli in cutaneous smears occurred in 35% of prospectively followed women during pregnancy, with the majority of these women worsening during the third trimester (as opposed to 2% worsening during an unspecified period before conception). Patients whose immune system is being undermined by human immunodeficiency virus (HIV) infection might be expected to be a sensitive indicator of a pregnancy effect on the immune system. However, Prins et al conclude that “the studies we reviewed failed to find any harmful effect of pregnancy on HIV disease progression.”

No asthma or allergy medication meets the requirements for pregnancy category A.

5. B, page 1442, section on Other Dermatoses of Pregnancy.
Pemphigoid gestationis (PG) is characterized by true bullae and is an autoimmune disorder. It can abruptly start in abdominal striae and mimic pruritic urticarial papules and plaques of pregnancy (PUPPP). It typically starts in the second or third trimester, but the clinical presentation and course can be extremely variable. PG is much rarer than PUPPP, occurring in only 1 in 50,000 pregnancies. A skin biopsy with positive immunofluorescence staining for C3 component confirms the diagnosis. PG is treated with systemic steroids, typically prednisone 0.5 mg/kg/day.

This was shown in meta-analysis of 4 retrospective case control studies in which woman took oral corticosteroids for various reasons in the first trimester; however, no study controlled for potential effect of the various underlying maternal diseases.

Because asthma may be associated with intrauterine growth retardation and preterm birth, it is important to establish pregnancy dating accurately by first trimester ultrasound when possible.

8. D, page 1438, section on Course and Management of Specific Diseases > Rhinitis.
Symptoms in vasomotor rhinitis of pregnancy tend to be most prominent in the second half of pregnancy and usually disappear within 5 days postpartum. Ellegard found elevated levels of serum placental growth hormone in patients with versus those without pregnancy rhinitis. In addition, he reported a higher nasal mucociliary transport speed in patients with pregnancy rhinitis.

9. C, page 1439, section on Course and Management of Specific Diseases > Rhinitis.
For patients with allergic rhinitis, intranasal cromolyn may be considered first because it is generally regarded as safe. For patients inadequately controlled by intranasal cromolyn, antihistamine therapy may be useful.
All venom-sensitive pregnant women with a history of Hymenoptera sting anaphylaxis should be re instructed in insect avoidance measures and receive a prescription for an epinephrine auto-injector. Benefit-to-risk considerations indicate that pregnant women receiving maintenance venom immunotherapy before pregnancy should continue such treatment during pregnancy. Pregnant women with histories suggestive of Hymenoptera sting anaphylaxis who have not been previously skin tested should receive avoidance instructions and an emergency kit, but the authors recommend deferring skin testing until postpartum.

**Allergy and Immunology Review Corner**: Chapter 82 of *Middleton’s Allergy Principles and Practice, 7th Edition*, edited by N. Franklin Adkinson, et al.

**Chapter 82**: Allergen Control

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1. Which of the following antigens would have the highest airborne levels in an undisturbed house?
   A. Cat
   B. Dust mite
   C. Cockroach

2. Which of the following is the most effective measure at reducing dust mite allergen exposure?
   A. HEPA filter
   B. Dust mite covers
   C. Dehumidifier
   D. Washing bedding

3. Which of the following methods is effective at reducing the amount of inhaled cat allergen in a home that has a cat?
   A. HEPA filters on air cleaning units
   B. Twice weekly washing
   C. Twice weekly vacuuming with HEPA filters and double-thickness bags
   D. None of the above

4. Pesticides and appropriate cleaning can control cockroach populations for up to how long?
   A. 1 month
   B. 2 months
   C. 6 months
   D. 12 months

5. Dust mite avoidance measures are most likely to be of benefit to patients with which of the following conditions?
A. Childhood asthma  
B. Adult asthma  
C. Allergic Rhinitis  
D. Eczema

6. How often should the washing of the cat be conducted to reduce airborne cat allergen level?  
A. Every other day  
B. Weekly  
C. Once a month  
D. Once in 6 month

7. By approximately what amount do the active covers for pillows, mattress, and duvets reduce mite allergen level?  
A. 30%  
B. 50%  
C. 75%  
D. 100%

8. If the carpets remain in place, what methods can be used to decrease the dust mite allergen level?  
A. Exposing carpets to direct strong sunlight  
B. Steam cleaning  
C. Use of acaricides or tannic acid  
D. Freezing with liquid nitrogen  
E. All of the above

9. What are the results of The Primary Prevention of Asthma in Children (PREVASC) study?  
A. At 2 years of age, the intervention group appeared to have fewer asthma-like symptoms.  
B. There was a significant difference in total and specific IgE.  
C. Incidence of asthma like symptoms during the first 2 years of life was different in both groups.

10. What are the main conclusions of the Manchester Asthma and Allergy Study (MAAS)?  
A. Slightly more atopy in the intervention group than in the control group at age 1 year  
B. Asthma-like symptoms were consistently lower in the intervention than in control group.  
C. No difference between the group for eczema.  
D. Increased risk of mite sensitization in the intervention group at age of 3 years.  
E. Better lung function at age 3 years in the intervention group.  
F. All of the above.

Answers  
1. A, page 1448
   Some cat allergen has a molecular weight of less than 5μm and will remain airborne for long periods. Levels are detectable in all homes. Dust mite and Cockroach allergens are greater than 10μm and settle quickly after being disturbed.
2. B, page 1448
The most effective measure to reduce allergen exposure is to cover the mattress, duvet, and pillows with casings that are impermeable to mite allergens. HEPA filters are more effective at reducing cat and dog allergen than the heavier mite allergen. Dehumidifiers and frequent washing of bedding in hot water are effective but not as important as mite covers.

3. D, page 1449
Removing the pet from the home is the only effective advice to patients with pet allergy who experience symptoms on exposure.

4. C, page 1450
Pesticides and appropriate cleaning can reduce exposure within two weeks, has maximal effect within 1 month, and will keep populations under control for up to 6 months.

5. A, page 1452
Several studies have indicated that simple environmental control interventions may improve airway reactivity, lung function, and reduce acute emergency room visits due to asthma among mite-sensitized asthmatic children. Cochrane reviews failed to find benefit in allergic rhinitis, eczema, or adult asthma.

6. B, page 1449
Several studies have investigated the effect of pet washing on allergen levels. A reduction in airborne cat allergens was reported following washing of one cat weekly over 4-week period, and a similar short-lived reduction was confirmed in a later study. However, it is unlikely that a modest reduction in allergen exposure achieved by pet washing would be sufficient to translate into a clinical benefit.

7. A, page 1452
A total of 279 mite-sensitized subjects aged 8-50 years with perennial rhinitis and a positive nasal challenge test to mite extract were randomized to receive either active or placebo covers, with the primary outcome measure being symptom scores. The active covers reduced mite allergen levels collected from the mattress to approximately 30% of the baseline, whereas the placebo covers had no effect.

8. E, page 1448
Ideally, carpets should be removed and replaced by hard flooring (e.g. wood or linoleum). If carpets remain in place, several methods have been suggested for reducing mite allergen levels (e.g. exposing carpets to direct strong sunlight, steam cleaning, use of acaricides or tannic acid, freezing with liquid nitrogen, etc). However, these methods are only partially effective.

9. A, page 1454
PREVASC study included 476 children who were recruited in the prenatal period and randomized to either a control group (receiving usual care) or an intervention group in which families received instruction from nurses on how to reduce exposure of newborns to mite, pet and food allergens, and passive smoking. At age of 2 years, the intervention group appeared to have fewer asthma-like symptoms, including wheezing, shortness of breath, and night-time
cough, than control group. No significant differences in total or specific IgE were found between the groups. Furthermore, the incidence of asthma-like symptoms during the first 2 years of life was similar in both groups.

10. F, page 1455
MAAS is a whole-population birth cohort study of more than 1000 children, with a nested intervention study in the high-risk group. Only children with 2 atopic parents who had no pets in their home were randomly allocated before birth to a stringent environmental control and normal regime. At age 1 year there was slightly more atopy in the intervention group than in the control group, but did not reach statistical significant. Asthma-like symptoms were consistently lower in the intervention than in control group. No difference between the groups was seen for eczema. Stringent environmental control was associated with an increased risk of mite sensitization but better lung function at age 3 years.