

ANTIMICROBIAL USE IN PREGNANT AND BREASTFEEDING PATIENTS

Chapter

3

PREGNANCY

Antimicrobial agents administered to pregnant women may be harmful to the developing foetus. The major period of danger for teratogenic effects is during the first trimester, although some drugs can interfere with the functional development of organ systems and the central nervous system in the second and third trimester, and have serious consequences.

All antimicrobial agents should be avoided in the first 12 weeks of pregnancy. If antimicrobial agents are to be prescribed, the risk and benefits to the mother and/or foetus must be considered.

ANTIBIOTIC RISK CATEGORIES IN PREGNANCY

Category A – Drugs which have been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus.

Category B – Drugs which have been taken by only a limited number of women of childbearing age without an increase in the frequency of malformations or other indirect or direct harmful effects on the human foetus. Studies in animals have not yet shown evidence of an increased occurrence of foetal damage.

Category C – Animal reproductive studies have shown foetal adverse effects and/or malformations. There have been no controlled studies in humans. On a risk-benefit ratio it might be beneficial to use during pregnancy despite the risk.

Category D – Drugs which may be expected to cause an increased incidence of human foetal malformations or irreversible damage. These drugs may also have adverse pharmacological effects.

Category X – Drugs which have such a high risk of causing permanent damage to the foetus that they should not be used in pregnancy or when there is a possibility of pregnancy.

BREASTFEEDING

The benefits of breastfeeding are sufficiently important to recommend that breastfeeding should be continued, unless there is substantial evidence that the drug taken by the mother will be harmful to the infant and that no therapeutic equivalent can be given. Most drugs are excreted only to a minimal extent in breast milk, and in most cases the dose to which the infant is ultimately exposed, is very low and is well below the therapeutic dose level for infants. For this reason, there are few drugs which are totally contraindicated while breastfeeding.

ANTIMICROBIAL	PREGNANCY CATEGORY	BREASTFEEDING
Acyclovir	B	Safe
Albendazole	C	One time dose considered safe by WHO
Amantadine	C	Avoid, may suppress lactation
Amikacin	D	Probably safe
Amoxicillin	A	Safe
Amoxicillin-clavulanate	B	Caution, monitor infant for diarrhoea
Amphotericin B	B	Avoid, insufficient data
Ampicillin	A	Safe
Anidulafungin	B	Avoid, insufficient data
Artemeter-lumefantrine	C	Probably safe; insufficient data – avoid if possible
Atovaquone (\pm Proguanil)	C	Insufficient data
Azithromycin	B	Safe
Aztreonam	B	Safe
Benzathine penicillin	A	Safe
Benzyl benzoate	B	Caution
Benzyl penicillin	A	Safe
Capreomycin	C	Avoid, insufficient data
Caspofungin	C	Avoid, insufficient data
Cefaclor	B	Safe
Cefepime	B	Safe
Cefotaxime	B	Safe
Cefoxitin	B	Safe
Ceftazidime	B	Safe
Ceftriaxone	B	Safe
Cefuroxime	B	Safe
Cephalexin	B	Safe
Cephalothin	B	Safe
Cefazolin	B	Safe

Chloramphenicol	C	Avoid
Chloroquine	C	Probably safe; insufficient data
Ciprofloxacin	C	Safe
Clarithromycin	C	Safe
Clindamycin	A	Avoid if possible
Clofazimine	C	Avoid, may cause skin discolouration in the infant
Clotrimazole	A	Safe
Cloxacillin	B	Caution, monitor infant for diarrhoea
Colistin	C	Probably safe; insufficient data
Cotrimoxazole	C	Caution if premature, monitor for haemolysis and jaundice
Dalbavancin	C	Probably safe; insufficient data
Dapsone	C	Caution, monitor for haemolysis
Daptomycin	B	Probably safe; insufficient data
Doripenem	B	Probably safe; insufficient data
Doxycycline	D	Short-term use safe; avoid if possible
Econazole	A	Safe
Ertapenem	B	Safe
Erythromycin	B	Safe
Ethambutol	A	Probably safe
Famciclovir	B	Safe
Fidaxomicin	B	Probably safe; insufficient data
Flucloxacillin	B	Caution, monitor infant for diarrhoea
Fluconazole	D	Safe
Flucytosine	C	Avoid, insufficient data
Fosfomycin	B	Probably safe; insufficient data
Foscarnet	C	Avoid, insufficient data
Fusidic acid	C	Avoid, insufficient data
Ganciclovir	C	Avoid, insufficient data
Gentamycin	D	Probably safe

Griseofulvin	C	Avoid, insufficient data
Imipenem	C	Safe
Interferon alpha	C	Avoid, insufficient data
Isoniazid	C	Caution, monitor infant for hepatitis, vision changes; mother and child should receive pyridoxine
Itraconazole	C	Avoid, insufficient data
Ketoconazole	C	Avoid, insufficient data
Levofloxacin	C	Avoid if possible
Linezolid	C	Probably safe; insufficient data (avoid if possible)
Mebendazole	C	Probably safe – monitor for toxicity
Mefloquine	B	Probably safe – monitor for toxicity
Meropenem	B	Safe; insufficient data
Metronidazole	B	Avoid; data conflicting
Micafungin	C	Avoid, insufficient data
Miconazole	A	Safe
Moxifloxacin	C	Avoid if possible (short-term use probably safe; insufficient data)
Mupirocin	B	Safe
Neomycin	D	Safe
Nitazoxanide	B	Insufficient data; avoid if possible
Nitrofurantoin	B	Avoid if less than 8 days old
Nystatin	A	Safe
Ofloxacin	C	Avoid
Oseltamivir	C	Avoid, insufficient data
Pentamidine	C	Avoid, insufficient data
Phenoxymethylpenicillin	A	Safe
Piperacillin-tazobactam	B	Safe
Posaconazole	C	Avoid, insufficient data
Podophyllotoxin	D	Avoid

Praziquantel	B	Probably safe; monitor for toxicity
Primiquine	D	Safe
Procaine penicillin	A	Safe
Pyrazinamide	C	Safe
Pyrimethamine	C	Avoid, insufficient data
Quinidine	C	Insufficient data
Quinine	X	Probably safe; avoid in G6PD-deficiency
Quinupristin+dalfopristin	B	Avoid, insufficient data
Ribavirin	X	Avoid, insufficient data
Rifabutin	B	Avoid, insufficient data
Rifampicin	C	Caution, monitor infant for jaundice
Rimantadine	C	Insufficient data
Roxithromycin	B	Safe
Streptomycin	D	Probably safe, avoid if possible
Tedizolid	C	Avoid, Insufficient data
Teicoplanin	C	Avoid, insufficient data
Telbivudine	B	Avoid, Insufficient data
Terbinafine (systemic)	B	Avoid, insufficient data
Terbinafine (topical)	B	Avoid, insufficient data
Tetracycline	D	Short-term use safe; avoid if possible
Tigecycline	D	Avoid
Tinidazole	C	Avoid
Tobramycin	D	Probably safe
Valaciclovir	B	Avoid, insufficient data
Valganciclovir	C	Avoid, insufficient data
Vancomycin	C	Safe
Voriconazole	D	Avoid, insufficient data
Zanamivir	C	Avoid, insufficient data

ANTIRETROVIRAL	PREGNANCY CATEGORY	BREASTFEEDING
Abacavir	C	Benefits outweigh potential risk
Atazanavir	B	Benefits outweigh potential risk
Delavirdine	C	Benefits outweigh potential risk
Didanosine	B	Benefits outweigh potential risk
Dolutegravir	B	Benefits outweigh potential risk
Efavirenz	D	Benefits outweigh potential risk
Elvitegravir	B	Benefits outweigh potential risk
Emtricitabine	B	Benefits outweigh potential risk
Enfuvirtide	B	Benefits outweigh potential risk
Etravirine	B	Benefits outweigh potential risk
Fosamprenavir	C	Benefits outweigh potential risk
Indinavir	C	Benefits outweigh potential risk
Lamuvudine	C	Benefits outweigh potential risk
Lopinavir/ritonavir	C	Benefits outweigh potential risk
Maraviroc	B	Benefits outweigh potential risk
Nelfinavir	B	Benefits outweigh potential risk
Nevirapine	B	Benefits outweigh potential risk
Raltegravir	C	Benefits outweigh potential risk
Rilpivirine	B	Benefits outweigh potential risk
Ritonavir	B	Benefits outweigh potential risk
Saquinavir	B	Benefits outweigh potential risk
Stavudine	C	Benefits outweigh potential risk
Tenofovir	B	Benefits outweigh potential risk
Zidovudine	C	Benefits outweigh potential risk