

The Basics

The following section is entitled “**The Basics of Caring for Medical Problems in Pregnancy**”. This section deals with some of the basic concepts important in caring for women with medical problems who may become or are pregnant. The section begins with a *learner handout* with space for the learner to make their own notes. The *learner handout* is followed by the *teaching script* for the educator. Lists of helpful reference texts, a table on drug use in pregnancy and a table on diagnostic imaging in pregnancy are included in this teaching script. The section then concludes with a brief bibliography for this topic.

THE BASICS OF CARING FOR WOMEN WITH MEDICAL PROBLEMS IN PREGNANCY

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Women with medical problems are sexually active and can get pregnant.

It's a cop-out to tell a woman "don't get pregnant."

**THE BASICS OF CARING FOR WOMEN
WITH MEDICAL PROBLEMS IN PREGNANCY**

*Don't say "NO"
because YOU don't know*

**Pregnancy is an altered
but NORMAL physiologic state.**

Key physiologic points about pregnancy

**Cardiac output and blood volume increase
during pregnancy.**

**Pregnant women have an increased Pa O₂
and decreased Pa CO₂**

**THE BASICS OF CARING FOR WOMEN
WITH MEDICAL PROBLEMS IN PREGNANCY**

Key physiologic points about pregnancy

**Pregnant women have an increased GFR.
Pregnant women have altered drug
pharmacokinetics.**

**Vaginal deliveries are safer than
cesarean sections,
even in women with medical problems**

**Fetal well being generally depends
on maternal well being.**

**THE BASICS OF CARING FOR WOMEN
WITH MEDICAL PROBLEMS IN PREGNANCY**

**Most pregnant women
really hate taking pills.**

Drug Safety

Drug safety classifications for pregnancy are not as helpful as a careful consideration of both the potential risks of a medication and its potential benefits for a given clinical situation. ACE inhibitors, tetracycline, and the flouroquinolones are almost never indicated.

Pregnant women can receive up to 5 rads of radiation during pregnancy without a demonstrable fetal effect.

Almost all common radiologic procedures involved amounts of radiation well below this level.

Table 1

Reference sources for medication prescribing in pregnancy

| Source | Type | Description |
|---|--|---|
| <u>Medications in Pregnancy and Lactation</u> Briggs GS, Freeman R, and Yaffe S.: 1998 published by Williams and Wilkins | Hardcover reference text. | Comprehensive evaluations by a panel of experts on all available data. Excellent reference. Provides reader with specific judgement regarding use of each agent in pregnancy and lactation. |
| <u>Shepard's catalog of Teratogenic agents.</u> | | Excellent summary of available data with respect to teratogenesis but does not provide clinical judgement about appropriateness of use in pregnancy and does not address lactation. |
| <u>Handbook for Prescribing Medications in Pregnancy.</u> Coustan DR and Mochizuli TK Third edition, 1998: Published by Lippincott-Raven | Pocket sized paperback reference text. | Convenient format with reliable information. Referencing extensive than other sources. |
| <u>Effects of Medications on the Fetus and Nursing Infant: A Handbook for Health Care Professionals.</u> Friedman JM and Polifka JE. 1996. Published by The John Hopkins University Press. | Paperback reference text. | Succinct summaries of risk based on more comprehensive reviews in TERIS. An excellent and affordable resource for the clinician. Provides specific comments on both estimate of safety risk and quality of data on which that estimate is based. |
| Reprox® <u>www.REPROTOX.org</u> also distributed by Micromedix , Inc.'s TOMES Reprorisk module | On line subscription or diskette. | Comprehensive evaluation of all available human and animal data on individual environmental hazards and medications. All aspects of human reproduction are considered. Similar to TERIS although less directive in linking risk to management. Frequently updated. Extensive references provided. |
| TERIS <u>www.weber.u.washington.edu</u> Also distributed by Micromedix, Inc.'s TOMES Reprorisk module. | On line subscription or diskette. | Comprehensive evaluations of all available human and animal data on individual medications by a panel of experts. Provides specific judgements of risk in pregnancy and lactation with rationale. Excellent reference. |
| FDA pregnancy categories found in most prescription medication package inserts/labeling and in Physician's Desk Reference published annually by Medical Economics Press. | Medication labels. | Well known categories ABCD and X. Inconsistently applied and rarely updated. Focus on teratogenies. Best used in combination with other reference sources. See table 4. |

Table 2

FOOD AND DRUG ADMINISTRATION PREGNANCY RISK CLASSIFICATION

Category A “Controlled Studies Show No Risk” Controlled studies in women fail to demonstrate a risk to the fetus in the first trimester, there is no evidence of a risk in later trimester, and therefore, the possibility of fetal harm appears remote.

Category B “No evidence of risk in humans”

Either animal reproduction studies have not demonstrated a fetal risk but there are no controlled studies in pregnant women, or animal-reproduction studies have shown an adverse effect (other than decrease in fertility) that was not confirmed in controlled studies in women in the first trimester (and there is no evidence of a risk in later trimester).

Category C “Risk cannot be ruled out”

Either studies in animals have revealed adverse effect on the fetus (teratogenic) or appropriate animal data is not available. Drugs should be given only if the potential benefit justifies the potential risk to the fetus.

Category D “Positive evidence or risk”

There is positive evidence of human fetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (e.g., if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective). There will be an appropriate statement in the “warnings” section of the labeling.

Category X “Contraindicated in pregnancy”

Studies in animals or human beings have demonstrated fetal abnormalities or there is evidence of fetal risk based on human experience, or both, and the risk of the use of the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in woman who are or may be pregnant.

Table 3

Drugs in Pregnancy for the Primary Care Provider

The following table is intended as a general guide only. It is NOT a drug safety table and for such data the reader is referred to the excellent references listed in the aforementioned table.

Reference sources for medication prescribing in pregnancy ”

Some of the assignments between the three columns are value judgements and therefore somewhat arbitrary.

All decisions about the use of medications in pregnancy should be made on an individual basis *in conjunction with the patient* on a careful consideration of both the potential risk and potential benefits of the medication.

Remember:

*No drug should be used in pregnancy without reasonable indication and all unnecessary medications should be held during the first trimester.

*Drug dosing may need to be changed in pregnancy because of the increased volume of distribution and increased renal and hepatic clearance of drugs in pregnancy.

*Try to avoid using newly introduced medications because many important drug toxicities in pregnancy have only been picked up in post marketing surveillance.

Legend: κ represents an agent that is preferred in its class for use in pregnancy.

_{ABCDX} subscript represents the FDA pregnancy risk classification (see below)

Table 3 continued

Drugs in Pregnancy for the Primary Care Provider

| Medication | data suggests use may be justified WHEN INDICATED | data suggests use may be justified in rare circumstances | data suggests use almost never justified |
|--------------------------|--|---|--|
| LAXATIVES | bisacodyl <i>c dulcolax™</i> docusate <i>colace™ / surfak™</i> glycerin <i>c</i> lactulose <i>B</i> psyllium <i>Metamucil™</i> sodium biphosphate <i>fleet enema™</i> magnesium hydroxide <i>milk of magnesia™</i> | | |
| DYSPEPSIA | ranitidine <i>B zantac™</i> famotidine <i>B pepcid™</i> ranitidine <i>c axid™</i> cimetidine <i>B tagamet™</i> ranitidine <i>B carafate™</i> antacids <i>maalox mylanta tums amphojel</i> | | omeprazole <i>B prilosec™</i> lansoprazole <i>c prevacid™</i> misoprostol <i>x cytotec™</i> |
| NAUSEA | metoclopramide <i>B reglan™</i> prochlorperazine <i>c compazine™</i> dimenhydrinate <i>B dramamine™</i> | ondansetron <i>B zofran™</i> | |
| DIARRHEA | loperamide <i>B Imodium™</i> diphenoxylate/atropine <i>c lomotil™</i> | | |
| ANTITUSSIVES | Guaifenesin <i>c robitussin™</i> Dextromethorphan <i>Benlyn DM™</i> codeine | | |
| ANTIHISTAMINES | diphenhydramine <i>B benadryl™</i> <i>Vbut avoid in first trimester</i> | cetirizine <i>B zyrtec™</i> fexofenadine <i>c allegra™</i> loratidine <i>B claritin™</i> | |
| NASAL CONGESTION | pseudoephedrine <i>c Sudafed™</i> nasal steroids <i>Beconase™ c</i> <i>Rhinocort™ c</i> <i>Flonase™ c</i> <i>Nasacort™ c</i> | | |
| ANTIMICROBIALS | erythromycin <i>B</i> (except esolate) penicillins <i>B</i> cephalosporins <i>B azithromycin B</i> vancomycin <i>c</i> nitrofurantoin <i>B</i> isoniazid <i>c</i> acyclovir <i>c</i> AZT <i>c</i> aminoglycosides <i>D</i> | antifungals: (all <i>c</i> except amphotericin <i>B</i> nystatin clotrimazole and terbinafine which are <i>B</i>) metronidazole <i>B</i> (okay after first trimester) trimethoprim <i>c</i> sulfonamides <i>c</i> | tetracycline <i>D</i> doxycycline <i>D</i> clarithromycin <i>c</i> fluoroquinolones <i>c</i> despite very concerning animal data, increasing human data suggests fluoroquinolones might warrant their placement in the “use may be justified in rare circumstances” category |
| BEHAVIORAL HEALTH | amitriptyline <i>B elavil™</i> fluoxetine <i>c prozac™</i> | lithium <i>D</i> benzodiazepines <i>D</i> | |

Table 3 continued

Drugs in Pregnancy for the Primary Care Provider

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| HYPERTENSION | <p>κlabetalol _c <i>trandate/normodyne™</i> κmethyldopa _B <i>aldomet™</i></p> <p>pindolol _B <i>visken™</i></p> <p>other beta blockers: acebutalol _B <i>sectral™</i> all others _c</p> <p>hydralazine _c</p> | <p>nifedipine _c <i>procardia™</i> <i>good data for use in third trimester</i></p> <p>other calcium channel blockers _c</p> <p>clonidine _c <i>catapres™</i> prazosin _c <i>minipress™</i></p> <p>hydrochlorothiazide _B diazoxide _c <i>hyperstat™</i></p> | <p>ACE inhibitors _D</p> <p>Angiotensin II antagonists _D</p> |
| ANALGESICS | <p>κacetaminophen _A codeine _c meperidine _c morphine _c low dose ASA</p> | <p>all NSAIDS _{B/C} ASA _D</p> | |
| HEADACHE | <p>κacetaminophen_A codeine _c meperidine _c morphine _c acetaminophen _A amitryptiline _B atenolol _c butalbital_c in <i>fioricet™</i> & <i>esgic™</i></p> | <p>all NSAIDS _{B/C}</p> | <p>sumatriptan _c <i>immitrex™</i> ergotamine _x in <i>cafergot™</i></p> |
| DIABETES | <p>insulin</p> | | <p>all oral hypoglycemics : chlorpropamide _c <i>diabinese™</i> tolbutamide _c <i>orinase™</i> glipizide _c <i>glucotrol</i> glyburide _B <i>diabeta™</i> <i>micronase™</i> metformin _B <i>glucophage™</i> troglitazone _B <i>rezulin™</i></p> |
| THROMBOSIS | <p>Heparin (both low molecular weight and unfractionated)</p> | | <p>Warfarin_x <i>coumadin™</i></p> |
| VACCINES | <p>diphtheria _c tetanus _c hepatitis A _c hepatitis B _c influenza _c immune globulin _c inactivated polio vaccine _c tuberculin test _c</p> | | <p>MMR sabin polio vaccine (oral) varicella</p> |
| SEIZURES | <p>phenytoin _D <i>dilantin™</i> carbamazepine _c <i>tegreto™</i> phenobarbital _D <i>phenobarb™</i></p> | <p>valproic acid _D <i>depakote™</i> gabapentin _c <i>neurontin™</i></p> | |

Table 3 continued

Drugs in Pregnancy for the Primary Care Provider

| Medication | data suggests use may be justified WHEN INDICATED | data suggests use may be justified in rare circumstances | data suggests use almost never justified |
|---------------|---|--|--|
| ASTHMA | beta agonists: albuterol _C <i>ventolin™, proventil™</i> terbutaline _C <i>brethaire™</i> metaproterenol _C <i>alupent™</i> salmeterol _C <i>serevent™</i> inhaled steroids: beclomethasone _C <i>beclovent™ vanceril™</i> flunisolide _C <i>aerobid™</i> fluticasone _C <i>flovent™</i> triamcinolone _D <i>azmacort™</i> systemic steroids _C ipatropium _B <i>atrovent™</i> cromolyn _B <i>intal™</i> theophylline _C aminophylline _C | | |

**THE BASICS OF CARING FOR WOMEN
WITH MEDICAL PROBLEMS IN PREGNANCY**

Teaching Script

First Principle

Women with medical problems are sexually active. Medical providers can easily forget this when managing the patient with chronic medical disease. Women with medical problems need to be recognized by their internists as sexual beings for many reasons but one particularly important reason is that women who have sex can get pregnant. **Medical providers are often the only individuals who have the opportunity to provide prepregnancy counseling to medical patients.**

Second Principle

One should **never say to a woman that she should never get pregnant.** The desire to have children, although not universal, is a common and strong one. As doctors we can get so comfortable with telling patients *not* to smoke, *not* to drive without a seatbelt, and *not* to keep a gun in the house, that we may find ourselves making bold directives with respect to a woman's reproductive choices. Although there is some very limited evidence that you may impact your patients' habits by recommendations regarding cigarettes, driving, and guns, you should definitely put away any misconceptions you have that patients will let you have the final word in their reproductive choices. In fact, instructing a patient not to get pregnant often simply leads the patient with medical problems not to seek out medical help when they do conceive. It may also set up a situation where the patient does not seek important information about her disease as it relates to pregnancy because she feels that your prohibitions preclude any

discussion. Women of reproductive age with medical problems do not need ultimatums from their providers about reproduction, but they do need a respectful, honest and balanced discussion regarding the potential risks of pregnancy, both for themselves and their fetus.

Third Principle

Another important basic principle for caring for the pregnant woman is one that should seem rather obvious, but often is neglected. This is the principle that says that **you should not say “no” when your real answer is that you don’t know.** It is unfortunately all too easy for a busy provider unknowledgeable about the pregnancy related risks of an indicated investigation of treatment to simply not offer that test or treatment to a pregnant patient because of fear of harming the fetus. However, the majority of indicated tests and treatments can be safely carried out during pregnancy and it is the responsibility of an internist to obtain information from the textbooks, published literature, and experienced providers as to the risk/benefit ratio of any potentially beneficial investigation or treatment. The following is a list of some useful reference tests about the medical care of pregnant women that can serve as helpful guides in this regard.

Medical Problems In Pregnancy Reference Sources For The Internist

Medical Complications During Pregnancy, 2nd Ed., Edited by Gerard N. Burrow and Thomas P. Duffy. Saunders. 1999, Philadelphia.

Medical Disorders During Pregnancy, 2nd Ed., Edited by William Barron and Marshall Lindheimer. Mosby Yearbook, Inc. 1995, St. Louis.

Maternal-Fetal Medicine: Principles and Practice, 3rd Ed., Robert K. Creasy and Robert Resnik. Saunders. 1994, Philadelphia.

Handbook of Obstetric Medicine. Edited by Catherine Nelson-Piercy. Oxford University Press. Mosby-Year Book, Inc. 1997, St. Louis.

Fourth Principle

When dealing with pregnant women with medical problems it is very important to remember that **pregnancy, although being an altered physiologic state, is a normal and even a wonderful physiologic state**. We believe that too often, pregnant women with medical problems are treated as oddities and that pregnancy is treated by physicians as an unfortunate complication rather than being recognized as the miracle that it is.

Fifth Principle

When taking care of pregnant women, it is important to be aware of some key physiologic changes that occur during pregnancy. First, **cardiac output and blood volume increase dramatically** during pregnancy. Knowing this helps a person understand some of the effects that pregnancy has on cardiac disease. Second, **pregnant women have an increased PaO₂ and a decreased PaCO₂**. Knowing this helps one to interpret blood gases and manage pulmonary disease during pregnancy. Third, **pregnant women have an increased glomerular filtration rate that is 150% of normal**. Lastly, because of altered absorption, decreased changes in protein binding, increases in renal clearance, and increases in hepatic clearance, **pregnant women have altered drug pharmacokinetics** and this should be remembered in choosing drug doses during pregnancy. One of the most striking examples of this is Digoxin. Because Digoxin has predominately a renal clearance and pregnancy is associated with a dramatic increase in glomerular filtration rates, it is common to see women in the third trimester requiring doses of Digoxin that approach 1 mg per day.

Sixth Principle

Another basic principle of caring for the pregnant woman that surprises many internists is that a **vaginal delivery is safer than cesarean sections, even in women with medical**

problems. There is a belief among internists that because a cesarean section is a surgical procedure with an experienced anesthetist at the head of the table that a cesarean section is a more controlled and therefore “safer” way to have a child. Nothing can be further from the truth. In fact, vaginal deliveries are almost always “safer”, particularly for women with medical disease. In accepting this fact, one must realize that a vaginal delivery is a normal physiological event and a cesarean section is a surgical intervention. One should no sooner take a pregnant woman with severe mitral stenosis to an elective cesarean section without an obstetrical indication than one would take the same patient to an unwarranted cholecystectomy. Even for those women for whom active pushing during labor is not recommended, vaginal delivery can occur safely. Uterine contractions alone, without any maternal pushing, can bring the fetus safely down to a level at which a forceps delivery can be performed. Concerns regarding the pain of delivery can be addressed by use of epidural anesthesia. There is almost no **medical** indication for a cesarean section.

Seventh Principle

In counseling women about medical illness in pregnancy, it is very helpful for both the physician and the mother to know that fetal well being generally depends on maternal well being. Although physicians and patients have a tendency to view the fetal needs and the maternal needs to be somewhat opposed when it comes to treating medical illness, this is not generally the case. Although some medications, investigations, and interventions may have potential fetal effects, these effects are often out-weighed by the benefits to the fetus of control of maternal disease.

Eighth Principle

When dealing with medical problems in pregnancy, it is very important for the managing physician to know that many **pregnant women really hate taking pills.** Although compliance

can be a problem with many patients, pregnancy can significantly affect a woman's attitude towards taking medications. If the woman is unsure of the safety of a medication during pregnancy or about her doctor's knowledge about the use of the drug in pregnancy, she may choose to not take her pills at all or even worse, choose to give herself lesser doses of medication to try and minimize fetal effects. The latter choice has the unfortunate effect of exposing a fetus to potential risks without exposing the mother (and fetus) to its potential benefit. Talking with the patient about her feelings about taking medication while pregnant is the best method of helping to increase compliance. However, it is wise to try to avoid getting yourself into a situation where you find yourself "bullying" a patient into taking medications against her will. Your role as the physician in prescribing medications in pregnancy is to provide the woman with information about the risks and benefits of the medication and allow her to decide for herself what she will do with the information given.

Ninth Principle

The next important principle of managing women with medical problems is that drug safety classifications for pregnancies are not nearly so helpful as a careful consideration of a medication's potential risks and its potential benefits for a given clinical situation. It is very hard to have a discussion about whether it is "okay" to use a particular drug in pregnancy in the absence of a clinical context. We try to avoid the term "safe" and "not safe" when talking about drugs in pregnancy. Rather, statements such as "warranted risk" or "risk not warranted" may be more helpful to clinicians making decisions about drug use in pregnancy. The only drugs for which this is not generally true are ACE inhibitors, tetracycline, NSAIDs and the fluoroquinolones, all of which are almost never indicated in pregnancy. When any drug is prescribed in pregnancy it is useful for the clinician to consider the following four questions:

- 1) Is the medication needed or is the symptom self limited and/or amenable to nonpharmacologic management?

- 2) If the medication is NOT administered, what are the possible outcomes for mother and fetus?

- 3) What data is available on the safety of this medication in pregnancy and is there a similar drug with better safety data available that could be used instead?

- 4) How is the patient's (and the provider's) value system effecting the decision about the use of this medication in pregnancy?

A list of excellent references about prescribing drugs in pregnancy follows this teaching script in Table 1.

Table 2 reviewed the FDA pregnancy risk classification for prescription drugs. Table 3, "Drugs in Pregnancy for the Primary Care Provider" provides some guidance regarding the appropriateness of some commonly prescribed medication. The recommendations contained in this table are somewhat arbitrary, and the learner and teacher are referred to the excellent sources listed in Table 1 for more definitive guidance.

Tenth Principle

Most imaging investigations including x-rays, ultrasound, CT, MRI, and unclear medicine scans can be safely performed during pregnancy. Total fetal radiation exposure during pregnancy should be kept below 5 rads because above 5 rads, an increased risk of adverse fetal effects becomes statically significant. Table 4 below reviews fetal radiation doses associated with some commonly performed diagnostic tests.

Conclusion

It is our hope that these basic principles will help guide general internists and subspecialists in their care of the pregnant woman. We believe that general internists have an important role to play in the care of the pregnant woman with medical problems and that such patients are always

best served when there is excellent collaboration between obstetricians and maternal fetal medicine, geneticists, obstetrical anesthesiologists and obstetric medicine.

Table 1

Reference sources for medication prescribing in pregnancy

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| <u>Handbook for Prescribing Medications in Pregnancy.</u> Coustan DR and Mochizuli TK Third edition, 1998: Published by Lippincott-Raven | Pocket sized paperback reference text. | Convenient format with reliable information. Referencing extensive than other sources. |
| <u>Effects of Medications on the Fetus and Nursing Infant: A Handbook for Health Care Professionals.</u> Friedman JM and Polifka JE. 1996. Published by The John Hopkins University Press. | Paperback reference text. | Succinct summaries of risk based on more comprehensive reviews in TERIS. An excellent and affordable resource for the clinician. Provides specific comments on both estimate of safety risk and quality of data on which that estimate is based. |
| Reprox® <u>www.REPROTOX.org</u> also distributed by Micromedix, Inc.'s TOMES Reprorisk module | On line subscription or diskette. | Comprehensive evaluation of all available human and animal data on individual environmental hazards and medications. All aspects of human reproduction are considered. Similar to TERIS although less directive in linking risk to management. Frequently updated. Extensive references provided. |
| TERIS <u>www.weber.u.washington.edu</u> Also distributed by Micromedix, Inc.'s TOMES Reprorisk module. | On line subscription or diskette. | Comprehensive evaluations of all available human and animal data on individual medications by a panel of experts. Provides specific judgements of risk in pregnancy and lactation with rationale. Excellent reference. |
| FDA pregnancy categories found in most prescription medication package inserts/labeling and in Physician's Desk Reference published annually by Medical Economics Press. | Medication labels. | Well known categories ABCD and X. Inconsistently applied and rarely updated. Focus on teratogenies. Best used in combination with other reference sources. See table 4. |

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*Drug dosing may need to be changed in pregnancy because of the increased volume of distribution and increased renal and hepatic clearance of drugs in pregnancy.

*Try to avoid using newly introduced medications because many important drug toxicities in pregnancy have only been picked up in post marketing surveillance.

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ABC₁₋₄X subscript represents the FDA pregnancy risk classification (see below)

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Drugs in Pregnancy for the Primary Care Provider

| Medication | data suggests use may be justified WHEN INDICATED | data suggests use may be justified in rare circumstances | data suggests use almost never justified |
|-------------------------|--|--|--|
| LAXATIVES | bisacodyl _C <i>dulcolax</i> TM docusate _C <i>colace</i> TM / <i>surfak</i> TM glycerin _C lactulose _B psyllium <i>Metamucil</i> TM sodium biphosphate <i>fleet enema</i> TM magnesium hydroxide <i>milk of magnesia</i> TM | | |
| DYSPEPSIA | ranitidine _B <i>zantac</i> TM famotidine _B <i>pepcid</i> TM naizatidine _C <i>axid</i> TM cimetidine _B <i>tagamet</i> TM rsulcrafate _B <i>carafate</i> TM rantacids <i>maalox mylanta</i> <i>tums amphojel</i> | | omeprazole _B <i>prilosec</i> TM lansoprazole _C <i>prevacid</i> TM misoprostol _X <i>cytotec</i> TM |
| NAUSEA | metoclopramide _B <i>reglan</i> TM prochlorperazine _C <i>compazine</i> TM dimenhydrinate _B <i>dramamine</i> TM | odansetron _B <i>zofran</i> TM | |
| DIARRHEA | loperamide _B <i>Imodium</i> TM diphenoxylate/atropine _C <i>lomotil</i> TM | | |
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| NASAL CONGESTION | pseudoephedrine _C <i>Sudafed</i> TM nasal steroids <i>Beconase</i> TM _C <i>Rhinocort</i> TM _C <i>Flonase</i> TM _C <i>Nasacort</i> TM _C | | |
| ANTIMICROBIALS | erythromycin _B (except esolate) penicillins _B cephalosporins _B azithromycin _B vancomycin _C nitrofurantoin _B isoniazid _C acyclovir _C AZT _C aminoglycosides _D | antifungals: (all _C except amphotericin B nystatin clotrimazole and terbinafine which are _B) metronidazole _B (okay after first trimester) trimethoprim _C sulfonamides _C | tetracycline _D doxycycline _D clarithromycin _C fluoroquinilones _C despite very concerning animal data, increasing human data suggests flouroquinolones might warrant their placement in the "use may be justified in rare circumstances" category |

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| Medication | data suggests use may be justified WHEN INDICATED | data suggests use may be justified in rare circumstances | data suggests use almost never justified |
|--------------------------|---|---|--|
| BEHAVIORAL HEALTH | amitryptiline _B <i>elavil</i> TM fluoxetine _C <i>prozac</i> TM | lithium _D benzodiazepines _D | |
| HYPERTENSION | labetalol _C <i>trandate/normodyne</i> TM methyldopa _B <i>aldomet</i> TM pindolol _B <i>visken</i> TM other beta blockers: acebutalol _B <i>sectral</i> TM all others _C hydralazine _C | nifedipine _C <i>procardia</i> TM <i>good data for use in third trimester</i> other calcium channel blockers _C clonidine _C <i>catapres</i> TM prazosin _C <i>minipress</i> TM hydrochlorothiazide _B diazoxide _C <i>hyperstat</i> TM | ACE inhibitors _D Angiotensin II antagonists _D |
| ANALGESICS | acetaminophen _A codeine _C meperidine _C morphine _C low dose ASA | all NSAIDS _{B/C} ASA _D | |
| HEADACHE | acetaminophen _A codeine _C meperidine _C morphine _C acetaminophen _A amitryptiline _B atenolol _C butalbital _C in <i>fioricet</i> TM & <i>esgic</i> TM | all NSAIDS _{B/C} | sumatriptan _C <i>imitrex</i> TM ergotamine _X in <i>cafergot</i> TM |
| DIABETES | insulin | | all oral hypoglycemics : chlorpropamide _C <i>diabinese</i> TM tolbutamide _C <i>orinase</i> TM glipizide _C <i>glucotrol</i> glyburide _B <i>diabeta</i> TM <i>micronase</i> TM metformin _B <i>glucophage</i> TM troglitazone _B <i>rezulin</i> TM |
| THROMBOSIS | Heparin (both low molecular weight and unfractionated) | | Warfarin _X <i>coumadin</i> TM |
| VACCINES | diphtheria _C tetanus _C hepatitis A _C hepatitis B _C influenza _C immune globulin _C inactivated polio vaccine _C tuberculin test _C | | MMR sabin polio vaccine (oral) varicella |

Table 3 continued

Drugs in Pregnancy for the Primary Care Provider

| Medication | data suggests use may be justified WHEN INDICATED | data suggests use may be justified in rare circumstances | data suggests use almost never justified |
|-----------------|---|---|--|
| SEIZURES | phenytoin _D <i>dilantin</i> TM carbamazepine _C <i>tegretol</i> TM phenobarbital _D <i>phenobarb</i> TM | valproic acid _D <i>depakote</i> TM gabapentin _C <i>neurontin</i> TM | |
| ASTHMA | beta agonists: albuterol _C <i>ventolin</i> TM , <i>proventil</i> TM terbutaline _C <i>brethaire</i> TM metaproterenol _C <i>alupent</i> TM salmeterol _C <i>serevent</i> TM inhaled steroids: beclomethasone _C <i>beclovent</i> TM <i>vanceril</i> TM flunisolide _C <i>aerobid</i> TM fluticasone _C <i>flovent</i> TM triamcinolone _D <i>azmacort</i> TM systemic steroids _C ipatropium _B <i>atrovent</i> TM cromolyn _B <i>inal</i> TM theophylline _C aminophylline _C | | |

Table 4

Radiation Exposure Associated with Some Common Diagnostic Imaging

| TYPE OF IMAGING | RADIATION EXPOSURE (RADS) | COMMENTS |
|-------------------------|---|--|
| Head CT | <.001 | Intravenous contrast generally avoided in pregnancy because of concern about iodine toxicity to the fetus. No harm to rat or rabbit fetuses have been noted. |
| Chest Xray | <.001 | |
| Lung Scan | 0.01 – 0.02 Ventilation 0.02 0.01 – 0.03 Perfusion | Procedure of choice for evaluation of pulmonary embolism. Breastfeeding mothers should bottle feed and pump and discard milk for 24 – 48 hours. |
| Pulmonary Angiogram | <.050 via brachial route 0.2 – 0.3 via femoral route | Actual amount of radiation exposure depends on fluoroscopy time. |
| Cardiac Catheterization | 0.5 | |
| Abdominal Xray | 0.268 | |
| IVP | 0.8 (complete series) 0.2 (limited series) | A “one shot” IVP is often done to limit the radiation exposure of the complete series. |
| Ultrasound of any kind | None | May provide necessary information in many instances making other investigations not needed. |
| MRI/MRA/MRV | None | No harm in pregnancy has been demonstrated but longterm effects less certain. Generally felt to be safe for use in pregnancy. |

THE BASIC OF CARING FOR WOMEN WITH MEDICAL PROBLEMS IN PREGNANCY

Case Discussion

Case #1

RADIOLOGIC PROCEDURES DURING PREGNANCY

A 17-year-old patient in your practice who is on INH prophylaxis for a new finding of positive tuberculin test after exposure to tuberculosis in her grandmother, comes to you and tells you she has stopped taking her INH when she found out she was pregnant 8 weeks ago. She reports that she has been having some low grade fevers at home with night sweats and some coughing of small amounts of blood tinged sputum.

After a complete physical examination you tell her you want to get a chest x-ray. She absolutely refuses because she does not want to harm her baby with radiation.

Key Points to Review

1. *Studies have suggested there is no teratogenic effect of radiation during pregnancy if total radiation exposure is kept below 5 rads throughout gestation. Between 5-10 rads there may be some increase in the incidence of childhood leukemias but this effect appears to be extremely small.*
2. *Necessary radiologic procedures should not be withheld during pregnancy because of concerns about the fetus. Almost all radiologic procedures involve far less than 5 rads of radiation. A PA and lateral chest x-ray involves a radiation exposure of less than 0.5 rads. Total radiation exposure from a ventilation perfusion scan is well under 1 rad. A CT Scan of the abdomen involves approximately 1 rad. Pulmonary angiography, coronary angiography, IVPs, upper GIs with small bowel follow through and barium enemas can all be carried out safely during pregnancy.*
3. *When discussing the risk of a radiologic test with a patient, it is best to emphasize both the hard data AND the potential benefits of appropriate diagnostic tests to the fetus.*

Emphasize to the patient that you value her concerns for her unborn child so that the woman does not feel that she needs to protect her child from you and your tests.

I often ask the patient if they would deny a chest x-ray to their newborn with similar symptoms. The mother will invariably answer of course not! I then tell the patient that during the course of pregnancy that it is her lungs performing the job of respiration for the fetus. Therefore, any test that leads to appropriate management of maternal condition is of great interest to the fetus.

4. ***There is no data to suggest that magnetic resonance imaging has any ill-effect upon fetuses.***

**THE BASICS OF CARING FOR WOMEN
WITH MEDICAL PROBLEMS
IN PREGNANCY**

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