

Clinical Evaluation of Maternal Medicine and Role of Diet in Pregnancy

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ABSTRACT

This review focus on the prescribing pattern of drugs and role of diet impact on the management of physiological changes occurs during the pregnancy, and some drugs are fetotoxic (e.g. Methotrexate, Thalidomide, Aspirin, Warfarin etc.) these are not prescribed during pregnancy, if there is individuals suffered with any physiological changes during pregnancy ,drug of selection must be based on pregnancy categories, During pregnancy causes changes in the normal reference ranges for several hormones, electrolytes and other analytes, drug selection should be appropriate and should not harm to the mother and foetus, manage the gestational Hypertension, Diabetes, Hypothyroidism by following proper guidelines, In pregnancy nutritional requirements are increased because of baby growth, iron, calcium, folic acid ,vitamins rich food helpful to healthy pregnancy

Key Words: Prescribing pattern, physiological changes, fetotoxic drugs, complications, Nutrition.

INTRODUCTION

Prescribing pattern of drugs and diet play important role in management of physiological changes of pregnancy and management of already existing conditions like thyroid, cardiac, gastrointestinal related problems and prevent further complications, so clinical evaluation of maternal medicine is necessary. ^[1]

Clinical evaluation of maternal medicine:

Take a careful history about: cardiac disease, renal disease, rheumatic disease, inflammatory bowel disease, diabetes, epilepsy ^[1]

Take a careful drug history

Stop fetotoxic drugs before conception: ^[2]

Drug	Teratogenic effect
Methotrexate	CNS and limb malformations ^[2]
ACE inhibitors	Prolonged renal failure in neonate, renal tubular dysgenesis, decreased skull ossification ^[2]
Anticholinergic drugs	Neonatal meconium ileus
Anti-thyroid drugs	Fetal and neonatal goitre and hypothyroidism, aplasia cutis
Carbamazepine	Neural tube defects
Cyclophosphamide	CNS malformations, secondary cancer ^[2]
Danazol	Masculinisation of female fetus
Lithium	Ebstein's anomaly
Diethyl stilbesterol	Vaginal carcinoma and genitourinary defects in female and male offspring's
Misoprostol	Moebius syndrome
Phenytoin	Growth retardation, CNS defects
NSAIDS	Constriction of ductus arteriosus, necrotising enterocolitis
Oral hypoglycaemic agents	Neonatal hypoglycaemia ^[2]
Tetracycline's	Anomalies of teeth and bones
Isotretinoin, etretinate	CNS ,craniofacial, cardiovascular defects
Thalidomide	Limb shortening, internal organ defects
Valproic acid	Neural tube defects ^[2]
Trimethadone	Malformed ears , cleft palate, cardiac, urogenital and skeletal defects
Warfarin	Skeletal and CNS defects, Wandy-walker syndrome
Psycho active drugs	drug is taken in late pregnancy it can leads to neonatal withdrawal syndrome

- Perform general examination,
- Palmar erythema,
- Check for anaemia and jaundice
- Check for oedema and deep venous thrombosis
- Check blood pressure regularly

Remember changes of pregnancy when interpreting laboratory results [1]

Test	Change	Cause
Haematocrit	Decrease	Extra cellular volume expansion
GFR	Increase	Increased renal blood flow
Urea and creatinine	Decrease	Increased GFR
Alkaline phosphatase	Increase	Released by renal placenta
Glucose	Decrease (fasting) Increased (post prandial)	Raised insulin levels leads to Insulin resistance
T4	Increase in first trimester Decrease in late pregnancy	Stimulation of thyroid by hcg Placental degradation
TSH	Decrease in first trimester	Increased T4

Pharmacokinetics during pregnancy:

Pregnant women do not differ qualitatively from the non-pregnant ones in their response to drugs, certain quantitative differences occur because of physiological changes during pregnancy, with consequent alterations in pharmacokinetics of the drugs

Drug absorption:

In pregnancy delayed gastric emptying as well as gut motility thus increasing the intestinal transit time because of high circulating levels of progesterone. Administration of iron and antacids may also interfere with the absorption of drugs. [4]

Drug distribution:

Pregnancy is accompanied by an increase in total body water by up to 8litres and 30% increase in plasma volume, with consequent decrease in plasma albumin due to hemodilution, low lipid soluble drugs are well distributed (warfarin, benzodiazepines), there is also increase in body fat which acts as reservoir for lipid soluble drugs. [4]

Drug metabolism:

High circulating levels of progesterone induces hepatic drug metabolizing enzymes

this can lead to more rapid degradation of highly lipid soluble drugs (phenytoin, theophylline). [5]

Drug excretion:

During pregnancy, the renal plasma flow increases by 100% and the GFR by 70%.results increase the unbound fraction of drug in plasma and for their elimination depends on kidney (ampicillin, aminoglycosides, cephalixin, digoxin). [4]

Placental transfer of drugs:

The placenta act as intravenous portal for entry of drugs into the fetus .it is connective link between fetal blood and maternal blood .as pregnancy progresses and the placenta develops, the surface available for transfer between the maternal and fetal circulations increases; at the same time, the placenta-fetal barrier becomes progressively thinner if drug from the maternal circulation to the fetal circulation by diffusion cause teratogenic or pharmacological effect on the fetus. [3] Lipid solubility, PH difference, molecular weight of drug also play important role in the transfer drugs into the fetal circulation. [6] Only low molecular weight drugs (<500g/mol) easily cross the placenta and high molecular weight drugs (>1000g/mol) do not cross the placenta. [6]

FDA categorization of drugs for use in pregnancy [7]

Category	Description
A	Adequate, well-controlled studies in pregnant women have not shown an increased risk of fetal abnormalities.
B	Animal studies have revealed no evidence of harm to the fetus; however, there are no adequate and well controlled studies in pregnant women.
C	Animal studies have shown an adverse effect and there are no adequate and well-controlled studies in pregnant women.
D	Studies, adequate well-controlled or observational, in pregnant women have demonstrated a risk to the fetus. However, the benefits of therapy may outweigh the potential risk.
X	Studies, adequate well-controlled or observational, in animals or pregnant women have demonstrated positive evidence of fetal abnormalities. The use of the product is contraindicated in women who are or may become pregnant

Commonly prescribed drugs and their categories: [8]

Drugs	Category
Analgesics and antipyretics	B and c
Aspirin	C
Acetaminophen	B
Phenacetin	B
Antiemetics	B and C
Doxylamine	B
Meclizine	B
Dimenhydrinate	B
Antibiotics	B,C and D
Penicillin, ampicillin, amoxicillin	B
Cloxacillin ,cephalosporin's	B
Erythromycin	B
Gentamicin	C
Amikacin	C/D
Streptomycin	D
Sulphonamides	B/D
Tetracycline's	D
Amoebicides	B
Antimalarials	C
Antifungals	C
Anti TB drugs	Band C
Vitamin B,C D,E,folic acid	A
Androgens	X
Oestrogens	X
Hydroxy progesterone	D
Medroxy progesterone	D
Bronchodilators	C

Drug of choice in pregnancy:

Nausea and vomiting of pregnancy:

Reassurance and high carbohydrate diet, If required an antihistaminic-antiemetic (cyclizine, meclizine, diphenhydramine, dimenhydrinate). Metoclopramide is safe in third trimester of pregnancy and may be prescribed in resistant cases [9]

Heart burn:

Relieved by a small carbohydrate meal, avoiding fatty food, smoking and alcohol and by maintenance of upright posture. Non-systemic antacids and metoclopramide is used [9]

Peptic ulcer:

Dietary modification and non-systemic antacids, H2-receptor blockers and bismuth subsalicylate. [9]

Constipation:

High fibre diet, plenty of liquids and mild laxatives such as milk of magnesia, docusate sodium, glycerine, mineral oil, bisacodyl. [9]

Headache:

May be treated with paracetamol, codeine and benzodiazepines, aspirin and NSAID may be used in first and second trimester but avoided in third trimester [9]

Migraine:

Treated with analgesics and propranolol, dimenhydrinate and amitriptyline [9]

Diabetes mellitus:

Dietary restriction and insulin if required, oral hypoglycaemic agents are not recommended. [9]

Thyrototoxicosis:

Propylthiouracil, carbimazole, methimazole dose kept as low as possible, stable iodine and radioactive iodine are contraindicated. [9]

Epilepsy:

Folic acid 5mg per day throughout pregnancy, Vitamink1 should be administered to such patients routinely for 3 weeks before delivery and to their new born babies at birth. [9]

Branchial asthma: Inhaled beta adrenergic agonists, inhaled glucocorticoids, with aminophylline. Avoid IV salbutamol it causes delay labour, pulmonary oedema. [9]

Pruritus:

Calamine lotion, zinc oxide cream or systemically with hydroxyzine, diphenhydramine or glucocorticoids. [9]

Cough

Diphenhydramine, codeine, dextromethorphan [9]

Hypertension:

Methyldopa, IV labetalol, nifedipine [1]

Tuberculosis:

Isoniazid, rifampicin [9].

Amoebiasis:

Metronidazole, diiodoquin, diloxanide [9].

Bacterial infections:

Penicillins and most of cephalosporins [9].

Diet role in pregnancy:

- ✓ folic acid,
- ✓ iron and vitamin C,
- ✓ calcium and vitamin D, and
- ✓ Omega-3 and omega-6 fatty acids

Folic acid

The important vitamin for a healthy pregnancy is folic acid. It helps prevent conditions such as spina bifida and other neural tube defects (NTDs) – problems that can affect the baby’s spine.

Spina bifida and NTDs are caused when the neural tube, which will become the baby’s spine, does not form properly in early pregnancy during this time you need to take a tablet that contains 400 micrograms (400µg) of folic acid every day. [10]

Good sources of folates

Green vegetables, such as broccoli, spinach, Brussels sprouts and Beans and peas, some fruits, such as oranges, Yeast or malt extract, some brands of bread, breakfast cereal, milk and other foods may have folic acid added to them. [11]

Iron and vitamin C

Iron plays an important to help make the extra blood used for baby and mother. Vitamin C is also important and it helps absorbs the iron from food.

Good sources of iron Red meat, such as beef, lamb and pork, Chicken and fish, Other (non-meat) sources of iron are Eggs, Breakfast cereals with added iron, Pulses, such as beans, peas and lentils, Dried fruit, such as prunes and apricots, Green vegetables, such as spinach, broccoli If you do not eat meat, make sure you include non-meat sources of iron every day combined with food rich in vitamin C to help your body use the iron. Some foods, such as high-fibre cereal, milk, tea and coffee, reduce your body’s ability to use iron. Try not to have these at the same time as you

take iron tablets or eat foods that are rich in iron. [11]

7 Good sources of vitamin C Citrus fruits, such as oranges, Kiwis, Berries, Tomatoes, Juice made from fruits , rich in vitamin C, Potatoes, Peppers, Green vegetables, such as broccoli, Brussels sprouts and Spinach. [10]

Calcium and vitamin D

Calcium is essential for the formation of healthy bones and teeth. Vitamin helps your body to use the calcium from food. [10]

Good sources of calcium: Milk, Hard cheese, such as cheddar, Yogurt. [11]

Good sources of vitamin D: Oily fish, such as herring, mackerel and sardine, Egg yolks. Small amounts of everyday sunlight – vitamin D is made in the body when skin is exposed to sunlight. [11]

Other sources of fatty acids: eat, chicken and eggs, Seeds, such as sunflower, safflower, pumpkin and sesame, Vegetables, Wholegrain breads and breakfast cereals [11]

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