

## Drugs used in Obstetrics

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## **Drugs used in Obstetrics**

### **1- Oxytocin (Pitocin)**

#### **Definition:**

Oxytocin is a hormone secreted from posterior pituitary gland used to help start or continue labor and to control bleeding after delivery. It is also sometimes used to help milk secretion in breast-feeding.

#### **Types of oxytocics:**

##### **A) Syntocinon**

Syntocinon is a synthetic form of the natural oxytocin produced by the woman's anterior pituitary gland in the brain. It is the same drug given to induce labour or augment a slow labour, but it is given in one injection into the woman's thigh and in a much higher dose for managing the 3rd stage (rather than in gradual, small doses through a drip in the vein when inducing or augmenting the labour).

Syntocinon makes the uterus contract within 2 to 3 minutes after being given as an intramuscular injection into the woman's thigh and will last up to 5 to 10 minutes.

##### **B) Ergometrine**

Ergometrine, known as 'Ergot' is an ergot alkaloid medication. It became routine to use it to treat postpartum haemorrhage (PPH). It is an uterotonic drug that increases the tone of the uterine muscles, causing stronger more frequent and sometimes sustained contractions of the uterus. Ergometrine takes about 5 to 7 minutes to start working after being given as an intramuscular injection into the thigh, stimulating the uterus to contract almost continuously for up to 2 to 4 hours.

### **C) Syntometrine**

Syntometrine is a mix of Syntocinon and ergometrine, and became popular for routine use during the 3rd stage of labour. It contains 5 units (5IU) of Syntocinon and 500 micrograms (500 mg) of Ergometrine. If given intramuscularly the Syntocinon will act within 2 to 3 minutes (lasting 5 to 10 minutes) and the ergometrine within 6 to 7 minutes (lasting 2 to 4 hours). When combined, their action makes the uterus contract sooner and sustains more intense contractions for a longer period of time after the birth.

#### **Physiologic and pharmacologic effect:**

- 1- Uterine stimulation
- 2- Milk ejection
- 3- Water retention

#### **Indication of oxytocics:**

##### **Pregnancy:**

1. To induce abortion (inevitable, missed).
2. To expedite expulsion of hydatidiform mole.
3. For oxytocin challenge test.
4. To stop bleeding following evacuation
5. To induce labor.

##### **Labor:**

1. To augment labor
2. In uterine inertia.

##### **Postpartum:**

1. To prevent and treat postpartum hemorrhage
2. To initiate milk let-down in breast engorgement.

## **Contraindications**

Oxytocin is contraindicated in any of the following conditions:

- Significant cephalopelvic disproportion;
- Unfavorable fetal positions or presentations i.e., transverse lies.
- In obstetrical emergencies where the benefit for either the fetus or the mother favors surgical intervention.
- In cases of fetal distress.
- Hypertonic uterine patterns.
- Patients with hypersensitivity to the drug.
- Induction or augmentation of labor in those cases where vaginal delivery is contraindicated, such as cord presentation or prolapse, total placenta previa, and vasa previa.

## **Dosage and Routes of administration**

### **A) Dose for Induction:**

Initial dose: 0.5 to 1 milliunits IV infusion per hour.

### **B) Dose for Postpartum Bleeding:**

10 to 40 units IV infusion in 1000 mL at a rate sufficient to control bleeding. 10 units IM after delivery of placenta.

### **C) Dose for Abortion:**

After suction or sharp curettage for an incomplete, inevitable or elective abortion: 10 units in 500 mL IV infusion. Adjust rate to assist uterus in contraction.

## **Side effects and toxic effects**

- Water intoxication may occur when large doses of oxytocin have been infused for long periods.
- Allergic reactions may occur.

- Oxytocin can cause maternal death due to uterine rupture.
- Hypotension
- Hypertensive crisis and cerebral hemorrhage.
- Pelvic hematomas, bradycardia, and arrhythmias also occur. Arrhythmias may also occur in the fetus, and fetal death.

### **Nursing intervention for women taken oxytocin**

- 1- Monitor **FHR** and uterine contraction for (frequency, duration, intensity of contraction and resting tone).
- 2- Check blood pressure and pulse.
- 3- Once the desired frequency of contractions has been reached labor has progressed to 6 cm dilatation, oxytocin may be reduced by similar increment.
- 4- If hyper stimulation of the uterus occurs or non-reassuring **FHR** pattern occur, following action are taken:
  - Turn off oxytocin.
  - Change position (left lateral position).
  - Give oxygen face mask.
  - Monitoring of fetal heart rate.

## 2- Ergot Alkaloids

### Pharmacologic effect:

#### A) Effects on the uterus:

Ergot Alkaloids stimulate uterine contraction, because contraction may be prolonged, Ergot Alkaloids are not employed to induce labor

#### B) Effects on the cardiovascular system

Ergot Alkaloids can cause constriction of arteries and veins, vasoconstriction may contribute to treat postpartum hemorrhage.

### How does it work?

Ergot contains chemicals that can help reduce bleeding by causing a narrowing of the blood vessels. It is given IM injection or oral.

### Indications

- Treat excessive bleeding during menstrual periods, at the start of menopause
- Before and after miscarriage.
- After childbirth to expel the placenta and contract the uterus.

### Contraindications

- **Coronary artery disease:** Vasoconstriction or spasm of coronary arteries may exacerbate symptoms and lead to myocardial ischemia.
- **Hypertension:** The pressor effects of the ergots may raise blood pressure, exacerbating hypertension.
- **Peripheral vascular disease** may lead to limb ischemia because of vasoconstriction of stenotic arteries.
- **Avoid using within 24 hours of triptans or other vasoconstrictors** because of additive vasoconstrictive effects.

- **Pregnancy:** Ergots may cause fetal distress, or miscarriage. Although not used during pregnancy, ergots can be used during labor to control hemorrhage.
- Liver disease, kidney disease, toxemia.

### Side Effects

- **Nausea and vomiting:** Is likely a direct effect on the vomiting center in the brain.
- **Diarrhea:** Activation of serotonin receptors in the gut can enhance GI motility.
- **Numbness and tingling of extremities** are likely caused by vasoconstriction of micro vessels feeding nerves.
- **Angina** is likely caused by vasoconstriction or vasospasm of coronary arteries.
- **Hypertension** is caused by vasoconstriction.

### Nursing intervention for women taken Ergot

#### Assess

- Blood pressure pulse and respiration
- Watch for signs of hemorrhage

#### Administer

- Orally or IM in deep muscle mass
- Have emergency cart readily available.
- **Evaluate** Therapeutic effect--- decreased blood loss
- **Teach Client** To report increased blood loss, abdominal cramps, headache, sweating nausea, vomiting, dyspnea, chest pain).

### 3- Prostaglandins

#### Mechanism of action

Prostaglandins increase intramyometrial calcium concentration and enhance uterine contraction. They act on the G protein-coupled receptors and activate the calcium channels.

#### Clinical uses (indications) include:

- Inducing labor.
- Terminating pregnancy.
- As a second-line agent in treating postpartum hemorrhage.

#### Dosage

Misoprostol (PGE1) is cheap and easy to store. It is widely used during termination of pregnancy. It has also been used off label for the management of postpartum hemorrhage as a second-line agent. The most reliable route is sublingual, but it can also be used rectally or through the intravaginal route.

The recommended dosage for postpartum hemorrhage is 400-800 µg. However, higher doses are associated with side-effects.

Prostaglandin F<sub>2α</sub> (PGF<sub>2α</sub>) produces contraction of the uterine muscles, bronchial smooth muscles and vasoconstriction. The recommended dose is 250 µg intramuscularly or 500 µg intramyometrially.

**For** induction and maintenance of labour PGE<sub>2</sub> generally infused as 5 mg / litre [in 5% dextrose] Start with 2-6 drops /min. Increase by 2-6 drops every 2 hr [if no response]. Total maxis **600** µg [normally 100 - 400 µg]

#### Side-effects

The side-effects of prostaglandins include fever, diarrhea, nausea and vomiting, and an increase in pulmonary and systemic pressure.



## **Nursing intervention for women taken Prostaglandins**

### **Assess:**

- Respiratory rate, rhythm and depth
- Vaginal discharge; itching or irritation indicative of infection.

**Administer:**Antiemetic or antidiarrheal preparations prior to giving this drug

**Evaluate:** Length and duration of contractions, Fever and chills

**Teach** the client to remain supine for 10-15 min after vaginal insertion.

## **4- Antihypertensive drugs**

Antihypertensive drugs are used in hypertensive disorders of pregnancy. The commonly used drugs are:

- Adrenergic inhibitors ----- Methyldopa
- Adrenergic blocking agents ----- Labetalol, propranolol
- Vasodilators ----- Hydralazine, Diazoxide, sodium nitroprusside
- Calcium channel blockers ----- Nifedipine.

### **Methyldopa**

**Brand names:** (Aldomet, Dopamet).

### **Mechanism of action:**

Methyldopa affects the nerves that relax the walls of blood vessels, causing the blood vessels to widen (dilate) and thus reducing blood pressure.

### **Indications:**

This medication is used alone or with other medications to treat high blood pressure (hypertension). Lowering high blood pressure helps prevent strokes, heart attacks, and kidney problems

## **Contraindication**

- Patients with active hepatic disease, such as acute hepatitis and active cirrhosis
- Patients with liver disorders previously associated with methyldopa therapy
- Hypersensitivity to any component of these products.

## **Side effects:**

- Sleepiness.
- Dry mouth.
- Headache, dizziness, or lightheadedness.
- Nausea and vomiting.
- Diarrhea.

## **Nursing Considerations**

### **Assess**

- Blood values-----platelets
- Renal studies----protein,creatinine
- Liver function tests
- Blood pressure before beginning treatment and periodically thereafter.

**Perform:** Storage of tablets in tight containers.

### **Evaluate**

- Decrease in blood pressure ( therapeutic response)
- Allergic reaction--- Rash, Fever, Pruritis, urticaria
- Symptoms of congestive heart failure ( edema, dyspnea)
- Renal symptoms-----polyuria, oliguria, frequency.

### **Teach client**

- To avoid hazardous activities
- Administer one hour before meals

- Not to discontinue drug abruptly or withdrawal symptoms may occur
- Not to use over the counter (OTC) medications for cough, cold or allergy, unless directed by physician.
- To rise slowly to sitting or standing position to minimize orthostatic hypotension
- Not to skip or stop drug unless directed by physician
- Notify physician of untoward signs and symptoms.

## **5- Diuretics**

Diuretics are drugs that increase the volume of urine produced by promoting the excretion of salt and water from the kidneys.

### **Therapeutic Uses (indications):**

#### **1. Hypertension:**

The efficacy of these drugs is derived from their ability to reduce blood volume, cardiac output,

#### **2. Heart failure**

The primary use for diuretics in heart failure is to reduce pulmonary and/or systemic congestion and edema, and associated clinical symptoms (e.g., shortness of breath - dyspnea).

#### **3. Pulmonary and systemic edema**

Diuretics, by reducing blood volume and venous pressure, lower capillary hydrostatic pressure, which reduces net capillary fluid filtration and tissue edema.

**Contraindications:** Hypersensitivity, hypovolemia.

**Common preparation used:** Furosemide (**lasix**)

**Dosage:** 40 mg tab, daily following breakfast for 5 days a week. In acute conditions, the drug is administered parenterally in doses of 40- 120 mg daily.

### **Adverse Side Effects Loop diuretics**

- hypokalemia
- metabolic alkalosis
- hypomagnesemia
- hyperuricemia
- dehydration (hypovolemia), leading to hypotension
- dose-related hearing loss (ototoxicity)

### **Nursing considerations:**

#### **Assess**

- Weight, intake and output daily to determine fluid loss.
- Respiration—rate, depth and rhythm
- BP----Lying and standing.
- Electrolytes----sodium, chloride, potassium, blood sugar, CBC, serum creatinine
- Glucose in urine, if patient is diabetic.
- Administer with food, if nausea occurs.

#### **Evaluate:**

- Improvement in edema of feet, legs.
- Signs of drowsiness, restlessness.
- Signs of hypocalcemia, malaise, fatigue, tachycardia and leg cramps.
- Rashes and temperature elevation.

#### **Teach patient:**

- To increased fluid intake 2-3 L\ day unless contraindicated.
- To rise slowly from lying or sitting position
- To report adverse reactions, such as muscle cramps, nausea, weakness, or dizziness.
- To take with food or milk.
- To take early in day to prevent nocturia

## **6-Tocolytic agents**

Tocolytics (also called anti-contraction medications or labor repressants) are medications used to suppress premature labor

### **Contraindications to tocolysis**

1. Fetus is older than 34 weeks gestation
2. Fetus weighs less than 2500 grams or has intrauterine growth restriction (IUGR) or placental insufficiency
3. Lethal congenital or chromosomal abnormalities
4. Cervical dilation is greater than 4 centimeters
5. Chorioamnionitis or intrauterine infection is present
6. Mother has severe pregnancy-induced hypertension, eclampsia/preeclampsia, active vaginal bleeding, placental abruption, a cardiac disease, or another condition which indicates that the pregnancy should not continue.
7. Other cause of fetal distress or fetal death.

### **1)Ritodrine hydrochloride (yutopar)**

**Indications:** Tocolytic agents inhibit uterine contractions and suppress pre-term labor. Tocolytics can delay labor and give more time for fetal growth and for the fetal lungs to mature. They are most effective when given early in premature labor.

**Contraindications:** Poorly controlled thyroid disease and diabetes

### **Side effects**

#### **Maternal side effects**

Metabolic hyperglycemia, hyperinsulinemia, hypokalemia, antidiuresis, altered thyroid function, physiologic tremor, palpitations, nervousness, nausea or vomiting, fever, hallucinations

### **Fetal and neonatal side effects**

Neonatal tachycardia, hypoglycemia, hypocalcemia, hyperbilirubinemia, hypotension, intraventricular hemorrhage

### **Nursing considerations:**

#### **Assess**

- Maternal and fetal heart tones during infusion.
- Intensity and length of uterine contractions
- Fluid intake to prevent fluid overload, discontinue if this occurs.
- Positioning of patient in left lateral recumbent position to decrease hypotension and increase renal blood flow.

**Evaluate** therapeutic response: length of contraction, absence of preterm labor, decreased BP.

## **7- Anticonvulsants**

The commonly used anticonvulsant is magnesium sulphate.

### **Magnesium sulphate**

#### **Mechanism of Action**

Depresses CNS, blocks peripheral neuromuscular transmission, produces anticonvulsant effects; decreases amount of acetylcholine released at end-plate by motor nerve impulse

Slows rate of SA node impulse formation in myocardium and prolongs conduction time

Promotes movement of calcium, potassium, and sodium in and out of cells and stabilizes excitable membranes

Promotes osmotic retention of fluid in colon, causing distention and increased peristaltic activity, which subsequently results in bowel evacuation

## **Indications:**

1. **Convulsions (treatment)** - Intravenous magnesium sulfate injection is indicated for immediate control of life-threatening convulsions in the treatment of severe toxemias (pre-eclampsia and eclampsia) of pregnancy.
2. **Hypomagnesaemia (prophylaxis and treatment)** - Magnesium sulfate injection is indicated for replacement therapy in magnesium deficiency, especially in acute hypomagnesaemia, it is also used to prevent or treat magnesium deficiency in patients receiving total parenteral nutrition.
3. **Preterm of Labor (treatment)**- Magnesium sulfate injection is indicated in uterine tetany as a myometrial relaxant.

## **Contraindications**

- Hypersensitivity
- Myocardial damage, diabetic coma, heart block
- Hypomagnesaemia
- Hypocalcaemia

## **Magnesium sulfate Dose:**

### **Usual Adult Dose for Hypomagnesaemia:**

1 g IM every 6 hours for 4 doses (mild hypomagnesaemia) or as much as 2 mEq/kg (0.5 mL of a 50% solution) within 4 hours if necessary (more severe hypomagnesaemia) or 5 g in 1 L IV fluid over 3 hours.

Administration should be discontinued as soon as the desired clinical effect is achieved and the serum level is normal.

### **Usual Adult Dose for Seizure Prophylaxis:**

Seizure Prevention in Preeclampsia/Eclampsia:

**Initial:** IM: 4 to 5 g of a 50% solution every 4 hours as necessary.  
IV: 4 g of a 10% to 20% solution, not exceeding 1.5 mL/min of a 10% solution.

**Maintenance:** IV Infusion: 1 to 2 g/hour. Maximum dose should not exceed 30 to 40 g/day.

**Duration:** Continuous administration beyond 5 to 7 days can cause fetal harm

### **Side effects:**

#### **Maternal side effects**

Flushing, lethargy, headache, muscle weakness, diplopia, dry mouth, pulmonary edema, cardiac arrest

#### **Fetal and neonatal side effects**

Lethargy, hypotonia, respiratory depression, demineralization with prolonged use

### **Nursing considerations:**

#### **Assessment**

#### **Prior to administration:**

- Obtain a complete health history including allergies, drug history, and possible drug interactions.
- Assess respiratory status and deep tendon reflexes.
- Assess for the presence or history of malnutrition, hypomagnesemia, seizure activity, preeclampsia, and kidney disease.
- Obtain serum magnesium level and renal profile.

#### **During administration**

- Monitor renal function, blood pressure, respiratory rate, and deep tendon reflex when magnesium sulfate is administered parenterally



- Report urine output of less than 100 ml/h to healthcare provider
- Observe symptoms of magnesium toxicity (nausea, muscle weakness, loss of reflexes) occur during magnesium sulfate treatment. The medicine calcium gluconate is given to treat the problem.

### **Client Education**

- Instruct client that magnesium sulfate should only be taken on the advice of a healthcare provider.
- Instruct client to report any difficulty breathing, low pulse rate, or dizziness.
- Instruct client to report problems with urination or edema.
- Advise laboring mothers who are receiving magnesium sulfate that the newborn will be monitored closely after birth

## **8-Anticoagulants (Heparin sodium)**

### **Mechanism of action:**

Heparin inhibits reactions that lead to the clotting of blood and the formation of fibrin clots

### **Indications:**

Heparin Sodium Injection is indicated for:

- Prophylaxis and treatment of venous thrombosis
- For prevention of postoperative deep venous thrombosis in patients undergoing major abdominal surgery
- Prophylaxis and treatment of pulmonary embolism.

### **Contraindications:**

- Patients with severe thrombocytopenia
- Patients with an uncontrollable active bleeding state except when this is due to disseminated intravascular coagulation.

### **Side effects**

- 1. Haemorrhage:** Hemorrhage is the chief complication that may result from heparin therapy usually be controlled by withdrawing the drug
- 2. Local Irritation:** Local irritation, erythema, mild pain, hematoma or ulceration may follow deep subcutaneous injection or intramuscular use.
- 3. Hypersensitivity:** General hypersensitivity reactions have been reported, with chills, fever and urticaria as the most usual manifestations
- 4. Miscellaneous:**As Osteoporosis following long term administration of high doses of heparin or cutaneous necrosis after systemic administration.

### **Nursing considerations:**

#### **Assess:**

- Blood studies, prothrombin time, blood pressure (signs of hypertension).
- Avoid all IM injections that may cause bleeding.
- Evaluate therapeutic response
- Bleeding gum, hematuria, fever skin rash, urticaria.
- Teach patient: avoid use of drugs unless prescribed by physicians, use soft toothbrush to avoid bleeding gums.

## **9- Analgesics (Pethidine)**

### **Uses:**

- Postoperative and obstetric analgesia.

### **Dosage and administration**

#### **Obstetric analgesia**

A dose of 1 mg/kg, repeated as needed. The last dose should be administered, when possible, 1-3 hours prior to delivery in order to prevent neonatal depression.

Dosage should be reduced in elderly patients and those with cardiorespiratory disease.

### **Contraindication:**

- Pethidine should not be used intravenously within 2 hours and intramuscularly within 3 hours of the expected time of delivery of the baby, for fear of birth asphyxia.
- It should not be used in cases of preterm labor and when the respiratory reserve of the mother is reduced.

### **Side effects:**

- **Mother:** drowsiness, dizziness, confusion, headache, sedation, nausea and vomiting.
- **Fetus:** respiratory depression, asphyxia.

### **Nursing considerations:**

#### **Assess:**

- Urinary output-----may cause urinary retention.
- Administer antiemetic to prevent nausea and vomiting.
- Storage in light—resistant container at room temperature
- Safety measures---Side rails, night light
- Evaluate therapeutic response-----decrease in pain.
- CNS changes----- dizziness, drowsiness
- Allergic reactions-----rash, urticaria.
- Teach patient to report symptoms of CNS changes, allergic reactions.

## **Effects of maternal medications on fetus:**

During early embryogenesis, the drugs taken by the mother reach the conceptus through the tubal or uterine secretions by diffusion. In case of survival, there is chance of congenital anomalies.

Gross congenital malformations and even death of the fetus may result, depending on the route, length of time and dose of exposure.

### **Possible Teratogens:**

- Antithyroid drugs-----Goiter,mental retardation
- Oral antidiabetic drugs-----Abnormalities in the eyes, central nervous system and neonatal hypoglycemia
- Vitamin D-----Hypercalcemia and mental retardation
- Anticonvulsants-----Mental retardation, cardiac abnormalities, limb defects, neonatal bleeding, epilepsy.

### **Fetotoxic drugs:**

- Aspirin---high dose in the last few weeks can cause premature closure of ductus arterious in the newborn
- Corticosteroids-----doses above 10 mg daily may produce fetal and neonatal adrenal suppression.
- Antibiotics,e.g. amikacin,streptomycin----- Auditory or vestibular damage.
- Chloramphriphenicol-----peripheral vascular collapse (gray baby syndrome)
- Tetracycline---Dental discoloration (yellow wish) and deformity, inhibition of bony growth.
- Long acting sulphonamides-----Neonatal hemolysis, jaundice.
- Vitamin k (large dose)-----Hyperbilirubinemia
- Alcohol and smoking-----IUGR, pre-term labor, mental retardation.

- Narcotics-----depression-apnea, bradycardia and hypothermia
- Anesthetic agents-----convulsion, bradycardia, acidosis, hypoxia
- Antihistamines-----tachycardia, vomiting, diarrhea
- Beta-blockers (antihypertensive drugs) -----IUGR, fetal bradycardia.

### **Maternal drug intake and breastfeeding**

Maternal drug intakes of nursing mothers have adverse effects on lactation and also on the baby as it may be present in the breast milk.

Certain drugs in breast milk may cause hypersensitivity in the infant when used in therapeutic doses.

Transfer of drugs through breast milk depends on the following factors:

Chemical properties, drug concentration and exposure time such:

- Oral pill (combined preparations)-----Suppression of lactation
- Ergot-----Suppression of lactation.
- Metronidazole ( flagyl)-----Anorexia, irritability, weakness
- Anticoagulants----- Hemorrhagic tendency