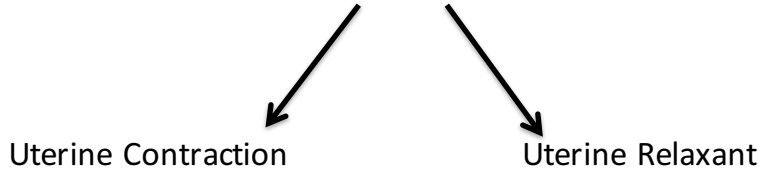
Drug acting on Uterus



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Oxytocin

- Oxytocin is a nonapeptide secreted by the posterior pituitary along with vasopressin (ADH).
- Oxytocin increases the force and frequency of uterine contractions.

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Mechanism of Action

- Binds to myometrial cell membrane receptor, (which is G-protein coupled oxytocin receptors) →promotes influx of Ca2+ from extracellular fluid and from endoplasmic reticulum in to the cell→ increase in cytoplasmic calcium stimulates uterine contraction.
- Oxytocin increases PG synthesis and release by the endometrium which may contribute to the contractile response.

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Uses

1. **Induction of Labour**
2. **Uterine inertia (**absence of effective uterine contractions during labor**)**
3. **Postpartum haemorrhage, Cesarean section**
4. **Breast engorgement (**the painful overfilling of the breasts with milk.)

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Adverse Effect

- Injudicious use of oxytocin during labour can produce too strong uterine contractions forcing the presenting part through incompletely dilated birth canal, **causing maternal and foetal soft tissue injury, rupture of uterus, foetal asphyxia and death.**
- Water intoxication: because of ADH like action of large doses given along with i.v. fluids, especially in toxaemia of pregnancy and renal insufficiency. It is a serious (may be fatal) complication.

Nursing Consideration

- Record maternal BP and other vital signs, I&O ratio, weight, strength, duration, and frequency of contractions, as well as fetal heart tone and rate, before drug administration.
- Monitor fetal heart rate and maternal BP and pulse at least q15min during infusion period. Report change in rate and rhythm immediately.
- Stop infusion to prevent fetal anoxia → Oxygen administration may be necessary.
- watch for symptoms of water intoxication (drowsiness, listlessness, headache, confusion, anuria, weight gain). Report changes in alertness and orientation and changes in I&O ratio (i.e., marked decrease in output with excessive intake)

Ergometrine, Methylergometrine

- Ergot alkaloids
- They increase force, frequency and duration of uterine contractions.
- The uterotonic action is believed to result from partial agonistic action on 5-HT_2 and α adrenergic receptors.
- Methylergometrine is $1_{1/2}$ times more potent than ergometrine on the uterus.

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Uses

1. The primary indication for ergometrine/ methylergometrine is to control and prevent postpartum haemorrhage (PPH)
2. After cesarean section/ instrumental delivery -to prevent uterine atony.
3. To ensure normal involution: A firm and active uterus involutes rapidly.

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Adverse Effect

- Nausea, vomiting and rise in BP occur occasionally.
- It can decrease milk secretion if higher doses are used for many days postpartum; this is due to inhibition of prolactin release (dopaminergic action).

Contraindication

- pregnancy and before 3rd stage of labour.
- patients with vascular disease, hypertension.

Nursing Consideration

- Monitor vital signs (particularly BP) and uterine response during and after parenteral administration until partum period is stabilized (about 1–2 h).
- Notify physician if BP suddenly increases.
- Do not breast feed while taking this drug.

Uterine Relaxants

- These are drugs which decrease uterine motility.
- They have been used to delay or postpone labour, arrest threatened abortion.

- Ritodrine: Beta 2 agonist
- CCB
- Magnesium sulphate
- Oxytocin antagonist (Atosiban)

Ritodrine

- β2 selective agonist having major uterine relaxant action.
- suppress premature labour and to delay delivery.
- started as 50 µg/min i.v. infusion, the rate is increased every 10 min till uterine contractions cease or maternal HR rises to 120/ min.
- Contractions are kept suppressed by continuing i.v. infusion or by 10 mg i.m. 4-6 hourly followed by 10 mg oral 4-6 hourly.
- Delivery can be postponed in about 70% cases by few hours to few weeks.

Adverse Effect

- anxiety, restlessness, headache.
- cardiovascular (hypotension, tachycardia, arrhythmia, pulmonary edema)
- metabolic (hyperglycaemia, hyperinsulinaemia, hypokalaemia) complications

It should not be used if mother is diabetic, having heart disease, or receiving β blockers or steroids.

Calcium Channel Blockers

- CCB reduce the tone of myometrium and oppose contraction.
- nifedipine has prominent smooth muscle relaxant action, can postpone labour if used early enough.
- Oral nifedipine 10 mg every 20-30 min till uterine contractions subside, followed by 10 mg 6 hourly has been used.
- Tachycardia and hypotension are prominent at doses which suppress uterine contractions.

Magnesium Sulphate

- control convulsions and to reduce BP in toxaemia of pregnancy.
- An i.v. bolus (2-4 g over 10-20 min) is followed by 1 g/hr i.v. infusion regulated by the response.
- also suppresses uterine contractions and has been used to delay preterm labour.
- The efficacy is rated similar to β2 agonists.
- Toxicity of i.v. mag. Sulfate includes cardiac arrhythmias, muscular paralysis, CNS and respiratory depression in the mother as well as the neonate.

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Oxytocin antagonist

- Atosiban is a peptide analogue of oxytocin that acts as antagonist at the oxytocin receptors.

Miscellaneous drugs

- Ethyl alcohol, nitrates, progesterone, general anaesthetics and PG synthesis inhibitors are the other drugs, which can depress uterine contractions

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