

Obstetrics Guidelines

SUBJECT: MANAGEMENT OF PRETERM LABOR

I. Overview

Preterm labor can be defined as:

- 1) Regular uterine contractions that cause progressive dilation and effacement of the cervix after 20 weeks and before 37 completed weeks of gestation.
- 2) Patient presenting with contractions and cervix ≥ 2 cm and 80% effaced.
- 3) Based on efficacy data, our first line tocolytics will be indomethacin and nifedipine.

II. Incidence and Relevant Information

Approximately 11% of all births occur before 37 completed weeks of gestation. These preterm births account for 75% of neonatal deaths. Tocolytics have been shown to be effective in delaying delivery for 48 hours. In addition tocolytics may be used as prophylaxis in the following situations:

- Cerclage
- Intrauterine transfusion
- S/P abdominal, uterine, or other surgery during pregnancy
- External version
- Fetal therapy
- Entrapped breech head

Relative contraindications: Chorioamnionitis, severe preeclampsia, uncontrolled maternal bleeding [see medication specific contraindications in APPENDIX tables]

CRITICAL POINTS:

1. Preterm labor can be defined as regular uterine contractions that cause progressive dilation and effacement of the cervix after 20 weeks and before 37 completed weeks of gestation.
2. Hydration: Dehydration can lead to abnormal uterine activity. Careful oral or intravenous bolus of fluid may be given to decrease uterine activity.
3. If indicated and ordered, begin a tocolytic [See APPENDIX]
4. Betamimetics: Terbutaline may be administered subcutaneously [SC] to quiet uterine activity as a first line tocolytic in an acute situation such as uterine tachysystole or hypertonus or to temporize while another tocolytic is being prepared.
5. Nitroglycerin: may be useful for acute uterine relaxation during procedures such as removal of a retained placenta but long term use as a tocolytic is not advised.

Obstetrics Guidelines

III. **PROCEDURE**

RN experienced in the care of high risk antepartum patients administers drug with MD order, and monitors maternal-fetal effects. RN adjusts dose based on clinical judgment using clinical practice guidelines.

- A. Initiate EFM; apply external ultrasound and tocodynamometer
- B. Weigh the patient as expeditiously as possible, or retrieve the most recent [within 1 week] weight from the prenatal record.
- C. Place patient suspected of having preterm labor on strict bed rest in the lateral decubitus position. This position should additionally be modified to include raising the legs and hips when the presenting part is thought to be deep in the pelvis with a bulging lower uterine segment. The head of the bed should be raised 20-30 degrees. In order to obtain this position, the foot of the bed should be in Trendelenburg. It is important NOT to have the patient's head lower than her chest or it will be difficult for her to breathe with a gravid uterus.
- D. Obtain and document baseline temperature, pulse, respiration, and blood pressure.
- E. Test clean catch urine for glucose, ketones, protein, nitrates, leukocytes and specific gravity. **If nitrates or leukocytes are positive, send a urine culture and sensitivity.** Use of a catheter to obtain urine for testing, while not routine, may be warranted in select cases. Offer a bed pan to empty the bladder rather than ambulating to the bathroom in cases of suspected preterm labor.
- F. Have provider perform a sterile vaginal exam; record the results.
- G. Monitor at least thirty minutes to two hours if necessary documenting the frequency and length of contractions to determine if the patient has preterm labor.
- H. Palpate contractions to assess strength and document.
- I. Offer clear liquids up to one liter if the patient is dehydrated [specific gravity >1.025] or administer an intravenous bolus [Lactated Ringers (LR) 500-1,000 cc over 30-60 minutes].
- J. Have the provider recheck the cervix by the end of the two hour period of monitoring or sooner as indicated by uterine activity and record the findings.. Individual patients may vary such that each person's baseline uterine activity must be established. For multiple gestations, the baseline uterine activity may be six or more contractions in one hour.

Obstetrics Guidelines

- K. If a tocolytic is ordered, explain the procedure to the patient, initiate appropriate nursing and medical care, as ordered. See the nursing care relative to the specific tocolytic in the appendix that follows. Attend to the following key elements:
1. Repeat and record blood pressure, apical pulse, respiratory rate and auscultate lungs
 2. If not indicated earlier, initiate a #16 or #18 gauge intravenous line and obtain blood for labs as ordered. Start mainline intravenous line with 1 liter LR at a to keep open [TKO] rate (less than 25 cc per hour)
 3. Gather equipment needed for the specific tocolytic agent ordered
 4. Maintain STRICT bed rest until the patient is stabilized on a tocolytic agent; initiate bed rest exercises per bed rest protocol when stable
 5. Initiate STRICT I&O and FLUID RESTRICTION as indicated
 6. Suggest docusate 100-200 mg p. o. BID while on bed rest
 7. Provide emotional support to the patient and her family
 8. Initiate plan for pericare and hygiene per bed rest protocol

Obstetrics Guidelines

APPENDIX

INDOMETHACIN (INDOCIN): Actions, relative contraindications, dosage and administration, side effects

Actions: Indomethacin is a prostaglandin synthetase inhibitor. It works by inhibiting the synthesis of prostaglandins which are released from cervical and uterine tissues and cause uterine activity.

Relative Contraindications:

1. Any bleeding diathesis or platelet disorder
2. Active peptic ulcer
3. Significant renal impairment
4. Creatinine > 1.0
5. Amniotic fluid index [AFI] less than 6.0 excluding cases of preterm premature ruptured membranes [PPROM]
5. >32 weeks (Use nifedipine after 32 weeks gestation)

LOADING DOSE	MAINTENANCE DOSE	MAXIMUM DOSE
50 – 75 mg [1 x 50 mg tablet and 1 x 25 mg tablet] oral dose	25 - 50 mg p. o. every 4-6 hrs x 48 hrs	300 mg/24 hrs

SIDE EFFECTS	NURSING INTERVENTIONS	ANTIDOTE	FETAL/ NEONATAL EFFECTS
<ul style="list-style-type: none"> - Gastric irritation - Nausea - Renal toxicity (Creatinine) - Inhibits platelet aggregation 	<ul style="list-style-type: none"> - Give med after meals or with antacids - Patient may have amniotic fluid checks (per sono) periodically - Avoid concomitant use of ASA [aspirin] 	<ul style="list-style-type: none"> - None 	<p>Fetal</p> <ul style="list-style-type: none"> - Decreased amniotic fluid 2° to decreased fetal renal blood flow - Premature narrowing of the ductus arteriosus and tricuspid regurgitation <p>Neonatal</p> <ul style="list-style-type: none"> - Decreased renal blood flow and decreased urine output

Obstetrics Guidelines

			- Resistance to PDA closure with Indomethacin *All effects are transient
--	--	--	--

INDOMETHACIN: Nursing Care

VITAL SIGNS	BLOODS	I&O/WT	ACTIVITY/DIET	TOCO MONITORING	FETAL HR MONITORING & DOCUMENTATION
TPR BP baseline then TPR BP q 8 - 12 hrs Baseline AFI	Creatinine drawn at initiation	Strict I&O is not necessary unless renal function impaired Weigh first day of admission and weekly while in house	Bed rest until stable, then bedrest with BRPs General diet as tolerated Initiate bed rest exercises when stable	Continuous during stabilization, then as ordered.	Continuous until stable, then 20-30 minute strip q shift or as ordered. AFI measurements q day x 2 days and at least weekly in house thereafter Document at least one PIEP [problem focused] note q shift

Obstetrics Guidelines

NIFEDIPINE (Procardia): Actions, relative contraindications, dosage and administration

Actions: Calcium channel blocker. Nifedipine [given orally] inhibits contractions via its calcium channel blockade.

Relative Contraindications:

1. CHF
2. Aortic stenosis
3. Impaired liver function
4. Heart block

LOADING DOSE	MAINTENANCE DOSE	MAXIMUM DOSE
<p style="text-align: center;">20-60 mg p. o. as follows:</p> <ol style="list-style-type: none"> 1. Give 20mg p. o. every 30 minutes times three [maximum dose of 60 mg is given over 90 minutes] until uterine activity subsides 2. Obtain BP/P before & every 15 minutes after each loading dose. Continue BP/P every 15 minutes for one hour after loading dose is complete 4. No fluid restriction is necessary. IV access is needed and may be via saline lock 	<p style="text-align: center;">10-20 mg p. o. every 3 to 8 hours for 48-72 hours as indicated.</p> <p style="text-align: center;">Begin maintenance dose 3 hours after last loading dose</p> <p>Maintenance dose:</p> <ol style="list-style-type: none"> 1. Observe and document effects of initial loading dose 2. Obtain BP/P prior to each dose and 30 minutes after administration. Once stabilized, check BP every 4 to 12 hours 3. Observe for hypotension [systolic <90 or diastolic <50] 	<p>Not to exceed 20 mg in a single dose or 160 mg per day</p>

FINAL

Obstetrics Guidelines

NIFEDIPINE (Procardia): Side effects, nursing interventions, antidotes, fetal /neonatal effects

SIDE EFFECTS	NURSING INTERVENTIONS	ANTIDOTE	FETAL/ NEONATAL EFFECTS
<p><u>Common:</u></p> <ol style="list-style-type: none"> 1. Facial flushing (usually within 15 minutes of administration) 2. Headache 3. Maternal heart rate increased <p><u>Occasional:</u></p> <ol style="list-style-type: none"> 1. Hypotension 2. Light headedness 3. Dizziness 4. Edema 5. Heart burn 6. General weakness 7. Pruritis 8. Flushing and burning of skin 9. Tinnitus 10. Nausea <p><u>Infrequent:</u></p> <ol style="list-style-type: none"> 1) Precipitation of angina 2) Myocardial infarction 3) Congestive heart failure 4) Leg cramps 	<ul style="list-style-type: none"> - Notify MD if systolic < 90 or diastolic < 50 - Inform patient of common and occasional side effects 	<ul style="list-style-type: none"> - Increase IV fluids - ? ephedrine may be considered only with persistent hypotension 	<p>Unknown</p>

FINAL

Obstetrics Guidelines

NIFEDIPINE (Procardia): Nursing Care

VITAL SIGNS	BLOODS	I&O/WT	ACTIVITY/DIET	TOCO MONITORING	FETAL HR MONITORING & DOCUMENTATION
<p>Loading dose</p> <ul style="list-style-type: none"> - Obtain blood pressure and pulse every fifteen minutes during loading dose and every fifteen minutes for one hour after load <p>Maintenance dose</p> <ul style="list-style-type: none"> - Check blood pressure and pulse prior to each dose and 30 minutes after administration until stable. Then check BP & P every 4-12 hours. 	<p>None</p>	<p>I&O not necessary</p> <p>Weigh weekly when hospitalized</p>	<p>Bed rest until stable, then bed rest with bathroom privileges</p> <p>Regular diet</p> <p>Initiate bed rest exercises when stable</p>	<p>Continuous during stabilization, then as ordered</p>	<p>Continuous during stabilization, then a 20-30 minute strip q shift or as ordered</p> <p>Document at least one PIEP [problem focused] note q shift</p>

FINAL

Obstetrics Guidelines

MAGNESIUM SULFATE: Actions, Relative Contraindications, Dosage & Administration

PATIENT SAFETY UPDATE: DO NOT ABBREVIATE – WRITE OUT Magnesium sulfate

Action: Ionic Magnesium sulfate is thought to antagonize calcium and exert its effects on myometrial cells by:

1. Decreasing frequency of muscle cell action potential
2. Uncoupling the excitation and contraction of smooth muscles
3. Relaxing contractile elements.

Relative Contraindications:

1. Heart block
2. Myocardial damage
3. Impaired renal function (Urine Output < 30cc/ hr; creatinine > 1.0)
4. Myasthenia gravis

DILUTION	LOADING DOSE	MAINTENANCE DOSES	MAXIMUM DOSE
<p><u>Main Line:</u> 1 liter LR</p> <p><u>Magnesium sulfate bag:</u> 1 liter with 40 gms Magnesium sulfate</p> <p>Attach medication delivery set and bleed infusion device tubing; place in dual infusion pump</p> <p>Set rate for loading dose</p> <p>Set rate for maintenance dose to follow loading dose completion</p> <p>1 gm Magnesium sulfate = 25 cc</p>	<p>Infuse <u>4 gms</u> (100cc) via medication delivery set slowly over 20-30 minutes</p>	<p>USUAL MAINTENANCE DOSE = 2 GRAMS/HOUR</p> <p>.5 GRAM = 12 CC</p> <p>1.0 GRAM = 25 CC</p> <p>1.5 GRAM = 37 CC</p> <p>2.0 GRAM = 50 CC</p> <p>2.5 GRAM = 62 CC</p> <p>3.0 GRAM = 75 CC</p> <p>THERAPEUTIC LEVEL = 4-8 MG/DL</p> <ol style="list-style-type: none"> 1. Infuse 2-3 grams (20-30cc/hr) via infusion device until stable 2. Infuse main line at a rate equal to a total of 50-70cc/hr [MgSO₄ dose included] 3. If patient is NPO, <u>total IV rate</u> may be increased usually to 100-125 cc per hour 	<p><u>3 grams/hr</u></p> <p>OR</p> <p>serum Magnesium sulfate level of <u>8 mg/dl</u></p>

FINAL

Obstetrics Guidelines

MAGNESIUM SULFATE: Side effects, interventions, antidote, fetal, neonatal effects

SIDE EFFECTS/TOXICITY	NURSING INTERVENTIONS	ANTIDOTE	FETAL/NEONATAL EFFECTS
<ol style="list-style-type: none"> 1. Cutaneous flushing, sweating, general malaise. 2. Nausea and vomiting. 3. Respiratory depression - decreased rate and depth 4. Disappearance of deep tendon reflexes 5. Diuresis 6. Pulmonary edema 7. Phlebitis at IV site 8. Soreness at IV site 9. Heart block (decreased PR interval, increased QRS). 10. Hypocalcemia 	<ol style="list-style-type: none"> 1. Keep room cool 2. N&V often seen when magnesium level is > 7mg/dl. If N&V continues, evaluate for magnesium toxicity [see next page] 3. Check respiratory rate and depth <u>at least</u> q 6 hrs. 4. Check DTR <u>at least</u> q 6 hrs or whenever magnesium toxicity is suspected, notify MD for absence of DTR. 5 Strict I&O 6. Strict I&O; fluid restriction (3,000 cc per day) 7. Dilute no more than 2 gms in 20cc. 8. Warm soaks to site prn or ice to site. 	<p>Keep antidote below at bedside while Magnesium sulfate is infusing</p> <p>Remove antidote from bedside when Magnesium sulfate infusion is completed</p>	<p><u>Fetal:</u></p> <ul style="list-style-type: none"> • May cause decreased FHR variability • May cause decreased fetal movement
<p><u>Toxicity:</u></p> <ul style="list-style-type: none"> - Deep tendon reflexes disappear - Respiratory depression - Cardiac arrhythmias including cardiac arrest 	<p><u>Toxicity:</u></p> <p>Output must be documented at least every 4 hrs, since Magnesium sulfate is excreted exclusively in the urine; an output of <30cc/hr may lead to Magnesium sulfate toxicity</p> <p>Notify MD of decreased urine output or signs of Magnesium sulfate toxicity.</p>	<p>Ca Gluconate 10% [4.65 mEq/10 ml] 10 cc IV = 1 amp</p> <p>(Push slowly over 1-2 minutes)</p>	<p><u>Neonatal:</u> (rare)</p> <ul style="list-style-type: none"> • Hypotonia • Plethoric • Weak cry • Respiratory depression • Hypocalcemia

FINAL

Obstetrics Guidelines

MAGNESIUM SULFATE: Nursing Care

VITAL SIGNS	BLOODS	I&O/WT	ACTIVITY/ DIET	TOCO MONITORING	ELECTRONIC FETAL HEARTRATE MONITORING & DOCUMENTATION
<p>Baseline:</p> <ul style="list-style-type: none"> - T, P, R, BP - Lung Assessment - DTR <p>- Repeat P, R, BP, DTRs every hour while titrating</p> <p>- When stable repeat P, R, BP, DTR every 2-6 hrs. T q shift</p> <p>- Lung assessment every 6-12 hrs.</p>	<p>CBC, electrolytes prior to initiation of treatment</p> <p>Obtain serum Magnesium sulfate level if concerned to determine toxicity but routine levels are not necessary</p>	<p>Restrict total intake to less than 3000cc/24 hrs during treatment.</p> <p>After Magnesium sulfate treatment may increase p. o. fluid [only] to ad lib.</p> <p>Strict I&O (not fluid restriction) until 24 hrs after discontinuing IV therapy.</p> <p>Weigh: Daily.</p>	<ul style="list-style-type: none"> - Bed rest, lateral position, modified Trendelenburg if needed. - May have BRP if stable. - Regular diet - Bed rest exercises 	<ul style="list-style-type: none"> -Continuous during initiation of therapy - Usually continuous while on IV maintenance 	<ul style="list-style-type: none"> - Continuous during initiation of therapy until stable - 20-30 minute strip q shift when stable <p>Document initiation of therapy and changes in status thereafter. Record VS, DTR, Magnesium sulfate dose, I&O etc.</p> <p>PIEP [problem focused] note q shift</p>

FINAL

Obstetrics Guidelines

BETAMIMETICS: Actions, Relative Contraindications, Dosage

Actions:

Terbutaline (Brethine) is a betamimetic drug that produces the tocolytic effect by stimulating beta adrenergic receptors, which in turn activate an enzyme that produces cyclic AMP. Actin-myosin coupling is required for muscle contraction, and an elevated cyclic AMP level inhibits this coupling through two mechanisms: direct inactivation of the enzyme that joins actin and myosin, and increased removal of calcium from intracellular fluid.

Two types of Beta adrenergic receptors dwell in varying ratios in cell membranes throughout the body. Beta-1 receptors dominate the intestines and heart. Beta-2 receptors dominate the myometrium, blood vessels, and bronchioles. Their stimulation leads to uterine relaxation, vasodilatation, bronchodilatation, and glycogenesis. Terbutaline shows some degree of selectivity for Beta 2 receptors though it also affects Beta 1 receptors.

Relative Contraindications:

1. Moderate to severe maternal cardiac disease
2. Pulmonary hypertension
3. Severe anemia
4. Uncontrolled diabetes
5. Hyperthyroidism

BETAMIMETICS: Dosage and Administration

Terbutaline via subcutaneous administration

0.25 mg injection subcutaneously [SC] [1mg/ml]

Terbutaline via oral administration

2.5 mg or 5.0 mg tablet p. o.

FINAL

Obstetrics Guidelines

BETAMIMETICS: Side Effects, Interventions, Antidote, Fetal/Neonatal Effects

SIDE EFFECTS	NURSING INTERVENTIONS	ANTIDOTE	FETAL/ NEONATAL EFFECTS
<p>The following side effects are listed for information purposes but are rare when IV betamimetics are not being used</p>		<p>Propranolol (Inderal) 0.25mg IV Repeat as needed</p>	<p>Hypoglycemia Hypocalcemia [rare without IV infusion of betamimetics]</p>
<ul style="list-style-type: none"> - <u>Tachycardia</u>, bounding pulse, palpitation, tremor. 	<p>Check Apical pulse prior to dose. Hold med for AP > 120 and notify MD</p>		
<ul style="list-style-type: none"> - Slight increase or decrease in systolic BP with drop in diastolic BP to <40. 			
<ul style="list-style-type: none"> - Transient elevation of blood glucose - <u>Glycosuria</u>: occasional 	<p>Avoid <u>large</u> infusions of glucose containing IV solutions. In general, intravenous betamimetics are avoided in diabetes, though low dose SQ betamimetics may be tolerated after 72 hrs on a stable dose. Notify MD for random BS over 140.</p>		
<ul style="list-style-type: none"> - <u>Hypokalemia</u> (low potassium [K]): transient 	<p>K probably moves into the cell and is not lost to the system. Supplemental potassium is usually not given because this drop in K has not been associated with deleterious effects and is temporary.</p>		
<ul style="list-style-type: none"> - Sodium [Na] & water [H₂O] retention - Hematocrit [HCT] decreased 	<ul style="list-style-type: none"> - LR is generally used as mainline IV fluid - Betamimetics increase intravascular fluid volume, thus giving the appearance of decreased HCT. 		
<p>Nausea, vomiting</p>	<ul style="list-style-type: none"> - Notify MD 		
<ul style="list-style-type: none"> - Erythema sensation of <u>body warmth</u> 	<ul style="list-style-type: none"> - Keep room cool. 		
<ul style="list-style-type: none"> - <u>Constipation</u>, ileus 	<ul style="list-style-type: none"> - <u>Suggest docusate 100-200 mg po BID</u>; increase fiber diet; increase oral fluids whenever possible. Avoid Metamucil while patients are on fluid restriction. 		

FINAL

Obstetrics Guidelines

<p>SIDE EFFECTS</p> <p>[Continued]</p>	<p>NURSING INTERVENTIONS</p>	<p>ANTIDOTE</p>	<p>FETAL/ NEONATAL EFFECTS</p>
<ul style="list-style-type: none"> - <u>Emotional upset</u>, nervousness, jitteriness, anxiety, pounding heart. 	<ul style="list-style-type: none"> - Consistent staff; reassurance; facilitate verbalization of concerns. 		
<ul style="list-style-type: none"> - <u>Chest pain</u> or tightness - <u>Arrhythmias</u> - <u>EKG changes</u>, depressed ST segment, sub-endocardial ischemia 	<ul style="list-style-type: none"> - EKG if c/o chest pain - Notify MD 		
<ul style="list-style-type: none"> - <u>Dyspnea</u>, SOB 	<ul style="list-style-type: none"> - Auscultate lungs bilaterally q 6 hrs - 12 hrs - Notify provider if respiratory rate is > 28 per minute 		
<ul style="list-style-type: none"> - <u>Pulmonary edema</u> - <u>High output failure</u> 	<ul style="list-style-type: none"> - Strict I&O - Restrict total intake to < 3000cc (PO + IV) in 24 hrs for the first 72 hrs of therapy. - After 72 hrs may have po fluid ad lib, continue to restrict IV fluid to < 1500. 		
<ul style="list-style-type: none"> - <u>Lactic acidosis</u> 			

FINAL

Obstetrics Guidelines

BETAMIMETICS: Nursing Care

	VITAL SIGNS LABS	LABS	I&O/WT FLUID MANAGEMENT	ACTIVITY/ DIET	TOCO MONITORING	ELECTRONIC FHR MONITORING	DOCUMENTATION
INITIATE THERAPY [Sub- cutaneous]	T; BP; AP; RR; Chest assessment prior to initiation of drug	Obtain ordered labs	Strict I&O not indicated for subcutaneous dosing Weigh patient at admission unless weighed in last week	Strict bed rest PRN with modified Trendelenburg if ordered. (HOB up 20- 30 degrees). NPO or clear liquids PRN.	Continuous	Continuous	Document VS, activities, meds, and exam. At least one PIEP [problem focused] note per day
PO	Patient to take pulse prior to dose Nurse to take TPR BP q shift	None	No I&O or fluid restriction needed Weekly weight while inpatient	Bed rest or bed rest with BRPs or modified Bed rest with light ambulation + BRPs Regular diet Initiate bed rest exercises when stable	Continuous or intermittent [one hour q 4-6 hours]	20--30 minute strip every shift	Document VS, activities, meds and exams At least one PIEP [problem focused] note per shift

FINAL

Obstetrics Guidelines

References

Indomethacin:

King, J.F., Flenady, V., Papatsonis, D., Dekker, G., and Carbonne, B. (2003). Calcium channel blockers for inhibiting preterm labour; a systematic review of the evidence and a protocol for administration of nifedipine. Australian and New Zealand Journal of Obstetrics and Gynaecology, 43, 192-198.

Macones, G., Marder, S., Clothier, B., Stamilio, D. (2001). The controversy surrounding indomethacin for tocolysis. Am J Obstet Gynecol, 184(3), 264-272.

Suarez, R., Grobman, W., Parilla, B. (2001). Indomethacin Tocolysis and Intraventricular Hemorrhage. Obstetrics & Gynecology, 97(6), 921-925.

Parilla, B., Grobman, W., Holtzman, R., Thomas, H., Dooley, S. (2000). Indomethacin Tocolysis and Risk of Necrotizing Enterocolitis. Obstetrics & Gynecology 96(1), 118-123

Vermillion, S. & Newman, R. (1999). Recent indomethacin tocolysis is not associated with neonatal complications in preterm infants. Am J Obstet Gynecol 181(5), 1083-6.

Macones, G. & Robinson, C. (1997). Is there justification for using indomethacin in preterm labor? An analysis of neonatal risks and benefits. Am J Obstet Gynecol, 177(4), 819-824.

Niebyl, J.R., et al. (1980). The inhibition of premature labor with indomethacin. Am. Journal of OB/GYN, 136(8), 1014-1019.

Niebyl, J.R. (1986). Neonatal outcome after indomethacin treatment for preterm labor. Am. Journal of OB/GYN, 155(4), 747-749.

Zuckerman, H.K., Shaleu, E., Gilad, G., & Katzuni, E. (1984). Further study of the inhibition of premature labor by indomethacin part II double-blind study. Journal of Perinatal Medicine, 25-29.

Nifedipine:

Guglielmo, J.B. (1984). The calcium channel blockers. Pharmacy & Therapeutics Forum, 32.

King, J.F., Flenady, V., Papatsonis, D., Dekker, G., and Carbonne, B. (2003). Calcium channel blockers for inhibiting preterm labour; a systematic review of the evidence and a protocol for administration of nifedipine. Australian and New Zealand Journal of Obstetrics and Gynaecology, 43, 192-198.

Pfizer, Inc., Procardia (Nifedipine capsules), 182 Pfizer, Inc., June, 1986.

Schwab, M., and Singer, B. (1985). Nifedipine pharmacologic properties and clinical use. Hospital Formula, Jan., 85-99.

FINAL

Obstetrics Guidelines

Ulmesten, U., Anderson, K.E., & Foreman, A. (1978). Relaxing effects of Nifedipine on non-pregnant human uterus in vitro and vivo. *OB Gynecology*, 52, 436-441.

Ulmesten, U., Anderson, K.E., & Winger. (1980). Treatment of preterm labor with calcium antagonists Nifedipine. *Gynecology*, 229, 1-5.

Magnesium Sulfate:

Elliott, J.P., et al. (1979). Pulmonary edema associated birth magnesium sulfate and Betamethasone administration. *Am. Journal of OB/GYN*, 134(6), 717-719.

King, J.F., Flenady, V., Papatsonis, D., Dekker, G., and Carbonne, B. (2003). Calcium channel blockers for inhibiting preterm labour; Systematic review of the evidence and a protocol for administration of nifedipine. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 3, 192-198.

Stein, C., & Petrice, R. (1972). A comparison of magnesium sulfate and alcohol for the prevention of premature labor. *Am. Journal of OB/GYN.*, 129(1), 94-100.

Wilkins, et al. (1986). Long term use of magnesium sulfate as a tocolytic agent. *Obstetrics & Gynecology*, 67(3), 385-405.

Betamimetics:

Benedetti, Thomas, MD. (1983). Complications of parenteral B-sympathomimetic therapy for premature labor. *Am. Journal of OB/GYN*, 145 (1), 1-5.

FINAL

Obstetrics Guidelines

[Signatures on file]

Isabelle Wilkins, MD
Professor, Obstetrics & Gynecology
Director, Maternal Fetal Medicine
Director, Obstetric Services

Diana Tirol, RN, BSN
Administrative Nurse Manager
Women's Family Health Services

Date

Date

Beena Peters, RN, MS
Associate Hospital Director
Women's and Children's Services

Date