CLINICAL PRACTICE GUIDELINE

Preterm labour

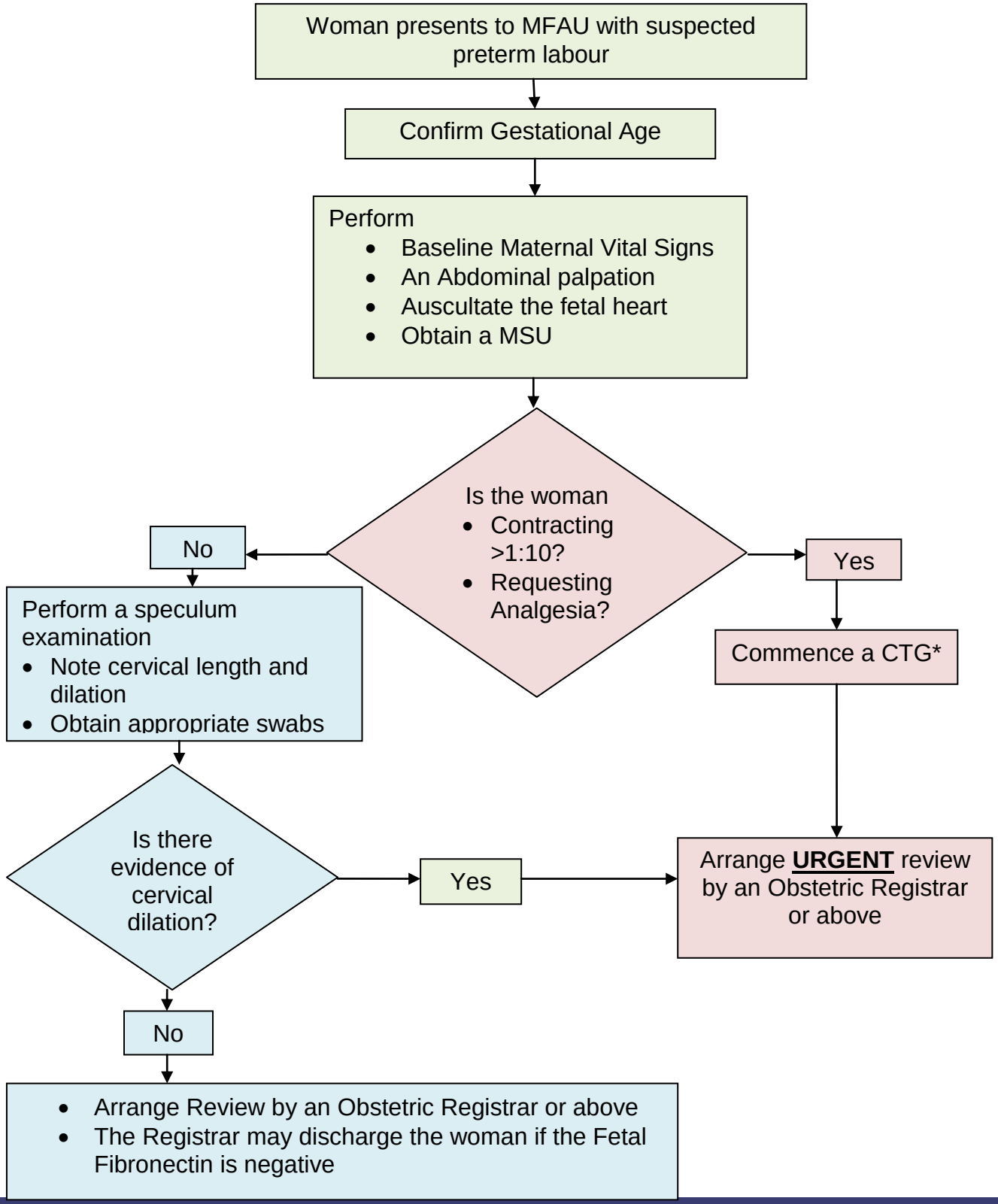
This document should be read in conjunction with the Disclaimer

Contents

Preterm labour (suspected) - MFAU: Quick reference guide

This Quick Reference Guide must be used in conjunction with this whole guideline: Preterm Labour. Medical and midwifery staff should be familiar with the contents of the full guideline.

***Between 23-25 weeks CTG monitoring should be discussed with the Senior Registrar or Consultant.**



Preterm labour

Aims

- To diagnose preterm labour i.e. labour at less than 37 completed weeks
- To establish a cause, if possible, of preterm labour, this may allow treatment of the primary cause of the preterm labour e.g. urinary tract infection.
- To assess the maternal and fetal condition in the situation of preterm labour.
- To establish **effective** suppression of labour (unless contra-indicated) prior to 34 weeks gestation without undue **delay**.

Key points

1. There is good evidence[2] that tocolysis alone does not improve neonatal outcome. However, tocolysis should be considered if the few days gained can be used for corticosteroid therapy.
2. In the case of preterm labour occurring at a site without appropriate nursery facilities, the time gained with tocolytic therapy can be used for transport.
3. The evidence suggests there is no benefit to the fetus in the following situations:
    - Using tocolytic therapy longer than 48 hours.
    - Prolonged or repeated tocolytic therapy after corticosteroids have been given and are current.
    - Employing tocolysis at a gestation greater than 34 weeks.
4. It may not be appropriate to suppress labour In situations such as:
    - Birth required immediately or as soon as possible because of maternal or fetal condition.
    - Labour is too far advanced to attempt suppression.
    - The fetus is sufficiently mature that the risks of suppression therapy outweighs benefits to the fetus (>34 weeks gestation).
5. The Consultant Obstetrician and / or Senior Registrar on call **must be notified of all such admissions,** and participate in the decisions regarding treatment. Their involvement in the management plan shall be documented in the woman's notes.
6. Labour is diagnosed on the basis of regular contractions (at least 1 per 10 minutes) which are associated with effacement and / or dilatation of the cervix.
7. The absence of fetal fibronectin (fFN) in the cervical secretions is a very useful negative predictor of imminent birth (negative predictive value for birth within 7 days 97-98%).
8. It is important to ascertain maternal and fetal well-being before instituting tocolytic and corticosteroid therapy. Fetal factors such as chorioamnionitis, antepartum haemorrhage and intrauterine growth restriction may make delay unwise.

9. The best results in postponing birth are obtained in women who have intact membranes and who are less than 5 cm dilated. However, ruptured membranes or excess dilatation are not absolute contraindications to treatment.
10. Any CMP client that presents at <37 weeks gestation with a history of regular uterine contractions or suspects TPL must be referred immediately to their supporting hospital for obstetric review.

This clinical guideline applies to women when the outcome for the fetus may be improved by delaying birth.

Admission and investigation

On admission, a thorough assessment of the woman shall include:

- History - particularly relating to rupture of the membranes, contractions and antepartum haemorrhage. Gestational age must be confirmed by menstrual history and any available previous ultrasound data.
- Examination - noting particularly temperature, uterine tone and tenderness, amniotic fluid volume and fetal size and presentation.
- Vaginal examination - a speculum examination shall be performed with full aseptic technique and not touching the cervix with the speculum. Cervical swabs shall be taken for immediate bacteriological assessment. If the cervix is closed and there is no blood or amniotic fluid to be seen in the vagina, a fetal fibronectin (fFN) test shall be performed (see below). Digital examination shall be avoided unless there is a significant possibility of a cord presentation or prolapse, or the cervix cannot be adequately visualised.
    - **For women < 33 completed weeks gestation (i.e. 32^{+6} weeks and below), an experienced practitioner (senior midwife or Registrar or above) should perform the speculum examination [NEW 2018-RCA recommendation].**
- Urine microbiology - if a mid-stream urine is unsatisfactory a catheter specimen of urine shall be obtained for microscopy and culture.
- Ultrasound - this may be necessary to assess presentation, gestation, fetal weight, fetal normality, and the possibility/advisability of amniocentesis. Additionally, a trans-vaginal ultrasound is the best way of detecting early changes in the internal cervical os in women who continue to contract.
- Electronic fetal heart monitoring (EFM) - shall be performed to assess fetal wellbeing in the case of a viable fetus. Ongoing, continuous electronic fetal monitoring (EFM) at gestations of less than 25 weeks is a decision which shall be taken in discussion with a consultant.
- Amniocentesis - this investigation may be appropriate to assess the presence or absence of intra-amniotic sepsis, or to assess fetal lung maturity. **The use of this investigation shall be made only by a consultant obstetrician.**
- Notify the on-call Paediatric Registrar of the woman's presence in the Birth Suite.

Ruptured membranes

- If there is evidence of ruptured membranes, continue as per the guidelines for premature rupture of membranes.

Maternal fever

- Any maternal temperature of 37.5^0C or more **MUST** lead to formal review of the woman and review of the treatment plan with the Consultant on call.

Fetal fibronectin (fFN) test[3]

- Fetal fibronectin is a screening test used to assess the risk of preterm birth within the next 7 days. “Point of Care” fFN testing should be utilised in the assessment of preterm labour.

Indications	• Symptomatic preterm labour between 22^{+0} and 36^{+0} weeks gestation and • Intact membranes and • Cervical dilatation less than or equal to 3cm
Contraindications	• Ruptured membranes • Cervical cerclage insitu • Cervical dilation more than 3cm • Presence of soaps, gels, lubricants or disinfectants
Relative contraindications	• Visual evidence of moderate or gross bleeding • Within 24 hours of coitus • A negative fFN result of less than 10ng/mL is still valid if: ➢ A woman reports having intercourse in the previous 24 hours ➢ In the presence of moderate or gross vaginal bleeding
Procedure	• Performed using a sterile speculum examination prior to any examination or manipulation of the cervix or vagina • Use only sterile water as a lubricant • Obtain sample for testing from the posterior fornix of the vagina • As per test instructions
fFN < 50ng/mL (negative)	• Low risk of birth within 7 – 14 days. • False negative result may occur due to ➢ Use of lubricant with speculum examination. ➢ Intravaginal disinfectants
fFN ≥ 50ng/mL (positive)	• False positive may occur as a result of recent ➢ Coitus ➢ Digital vaginal examination ➢ Transvaginal ultrasound ➢ Bleeding

See also section on fetal fibronectin results in section “Management of preterm labour” on next page.

Transvaginal ultrasound[3]

Transvaginal ultrasound of the cervical length (TVCL) is an additional screening test that can aid in assessing the risk of preterm birth. TVCL must be performed by a credentialed clinician. Lack of local capability to perform this test is not a reason for transfer.

Interpreting TVCL results

- Women **symptomatic** of preterm labour ≥24 weeks gestation (predicting preterm birth):
  - A cervical length less than 15mm is associated with an increased risk of spontaneous preterm birth.
  - Due to the distances required for transfer from WA regional centres, a TVCL ‘cut off’ of 20mm is appropriate.

- Women **asymptomatic** of preterm labour <24 weeks gestation (screening for overall risk of preterm birth):
  - A cervical length less than 25mm is associated with an increased risk of spontaneous preterm birth.[3] The shorter the cervical length, the greater the risk of preterm birth.[3]
  - See also KEMH Obstetrics & Gynaecology: Preterm Birth Prevention Guidelines

Management of preterm labour

The main strategies in managing preterm labour are tocolysis and steroids.[3]

Fetal fibronectin results

Negative fFN and no evidence of cervical change / TVCL > 20mm

There is a low risk of birth within the next 7 days therefore:

- If contractions are infrequent / irregular: offer discharge home with follow up as an outpatient within 7 days. Women discharged home should be advised that if they have increased pain or more frequent tightenings / contractions they must contact the hospital again. When this occurs the woman should be advised to attend MFAU for re assessment.
- If contractions are regular and painful: admit for observation, offer analgesia and reassess in 2 hours
- If contractions are persistent and painful: consider steroids and tocolysis.

Positive fFN and / or evidence of cervical change / TVCL < 20mm

There is an increased risk of birth within the next 7 days therefore:

- Admit and offer analgesia
- Administer steroids and commence tocolysis (if no contraindications)
- Continuous fetal monitoring with a CTG
- In established labour IV antibiotics should be given

Administration of magnesium sulphate infusion

- For information regarding the administration of antenatal magnesium sulphate prior to preterm birth for neuro protection of the fetus post birth see Clinical Guideline: Obstetrics & Gynaecology Preterm Labour: Magnesium Sulphate for Neuroprotection of the Fetus

Administration of corticosteroids

- For administration and dosing (including specific requirements for women with diabetes), refer to Clinical Guideline, Obstetrics & Gynaecology: Corticosteroids

Administration of antibiotic therapy

- If progressive labour occurs group B Streptococcus antibiotic prophylaxis shall be prescribed as per Clinical Guideline Group B Streptococcus
- If evidence of urinary tract sepsis is seen on urine microscopy antibiotics shall be prescribed. See Clinical guideline Antibiotic Treatment for Urinary Tract Infection
- If there is clinical chorioamnionitis or generalised sepsis associated with preterm labour, blood cultures, a urine specimen and vaginal swabs shall be

taken and broad spectrum intravenous antibiotics shall be commenced. See Clinical Guideline, Obstetrics & Gynaecology: Infections in Obstetrics: Diagnosis and Management of Chorioamnionitis and Postpartum Infections

Tocolytic therapy

- The decision to suppress labour with tocolytic medication shall only be made by a Registrar, Senior Registrar or the Consultant on call.
- Any decision to change tocolytic medication shall only be made by the consultant.

1. First line: Nifedipine

- Unless contra-indicated, the first line tocolytic to be used shall be Nifedipine Immediate Release (IR).[4]
- Other tocolytics which may be used in the event of the failure of Nifedipine tocolysis

Contraindications

- Contraindications to any suppression of labour including antepartum haemorrhage, pre-eclampsia, chorioamnionitis and fetal distress
- Cardiac disease including cardiac conduction defects and left ventricular failure
- Hypotension
- Concomitant use of betamimetics such as Salbutamol
- Caution should be taken with simultaneous administration of Magnesium Sulphate (MgSO4). This is not an absolute contraindication but care must be taken since hypotension may result.

Dosage

Initial dose (Crush or chew the first 2 doses to increase the rate of absorption[1])

1. Administer 20mg Nifedipine IR orally[1]
2. After 30 minutes, if the contractions persist, give another 20mg Nifedipine IR orally.[1]
3. After 3 hours if the contractions still persist, administer Nifedipine IR 20mg every 3- 8 hours until contractions cease or labour is established.[1] Maximum dose **160mg/day**.[1]

Maintenance dose

1. A maintenance dose of 20mg three times per day for 48- 72 hours may be given when indicated.

Notes

- Maximum dose of Nifedipine IR is **160mg/day**.[1]
- Onset of tocolysis is at 30 to 60 minutes and institution of a second line of tocolysis should **not** be considered in the first 2 hours. If contractions do not abate after 2 hours a second line tocolysis may be considered by the Obstetric Consultant on-call

Precautions and observations

- IV shall be inserted and baseline electrolytes, urea and creatinine and LFT levels measured
- Half hourly maternal pulse, BP and respiratory rate until the contractions cease. Maternal hypotension should be treated with IV fluids in the first instance.
- Continuous electronic fetal heart rate monitoring until contractions have settled.

For medication information including side effects refer to

- KEMH Pharmacy Medication Monograph: Nifedipine
- AMH Online: Nifedipine

2. Salbutamol

- Salbutamol may be used as a second line tocolytic, in the absence of contraindications.
- It must not be used in addition to Nifedipine IR, as the two drugs have potentially synergistic actions.
- Salbutamol is contra-indicated in the presence of
  - Maternal or fetal cardiac disease
  - Insulin dependent diabetes
  - Thyroid disease
- Salbutamol should be used with care, as it is associated with maternal tachycardia, hypotension, tremor, pulmonary oedema, hyperglycaemia and hypokalaemia.

Dosage

- If Salbutamol is to be used for tocolysis, 5mg (5mL ampoule Ventolin Obstetric Injection) is added to 100mL of normal saline to produce a 50 microg /mL solution
- An IV infusion pump must be used for administration
- Following the establishment of intravenous access, the salbutamol infusion is commenced at 12 mL/hour (10 microg/minute) and increased by 4 mL/hour (3.3 microg/minute) every 30 minutes until:
  - Contractions cease
  - Maternal pulse rate reaches 120 beats/minute or
  - The infusion rate reaches a maximum of 36 mL/hour (30 microg/minute)

Contraindications

- Maternal or fetal cardiac disease
- Thyroid disease
- Insulin dependent diabetes

Precautions

- Baseline electrolytes, urea and creatinine before commencement of infusion; repeat as necessary if abnormal
- Baseline maternal blood sugar level; repeat 4 hourly if abnormal
- Cardiovascular examination including auscultation of lung bases once in the first 24 hours of therapy
- No additional intravenous fluids to avoid fluid overload
- Half hourly maternal pulse, BP and respiratory rate until the maintenance dose is reached
- Reduce the infusion if the maternal pulse >120bpm
- **CEASE** the infusion and request medical review immediately if there is chest pain, dyspnoea or the respiratory rate >30/min
- Baseline electronic fetal heart rate monitoring
- Do not exceed 48 hours of salbutamol therapy. Only in exceptional circumstances should the treatment be continued for more than 24 hours

For medication information including side effects refer to

- KEMH Pharmacy Medication Monograph: Salbutamol
- AMH Online: Salbutamol

3. Glyceryl Trinitrate (GTN)

Glyceryl Trinitrate (GTN) is a nitric oxide donor and causes smooth muscle relaxation via the metabolite nitric oxide (NO) which acts as a 2nd messenger to increase Ca^{+2} uptake. Nitric oxide promotes uterine quiescence in pregnancy; current evidence does not support the routine administration of nitric oxide donors in the treatment of threatened preterm labour[5] . Peak action occurs 1-2 hours after application. It acts as a vasodilator. GTN patches provide continuous plasma nitrate concentration up to 24 hours.

Dosage

- Apply a 5-10mg (1 to 2 patches) transdermal GTN patch to abdominal skin, and repeat the dose in 1 hour if the contractions persist (maximum dose 20mg in 24 hours).

Side effects

- Headache
- Facial flushing
- Hypotension and Tachycardia

4. Indometacin

- Indometacin use may be indicated in association with the insertion of a cervical suture at pre-viable gestations.
- Indometacin, short term, may be considered when there is a failure or a contraindication to other tocolytics. Theoretical risks of fetal pulmonary hypertension and reduced renal function are debatable in short-term use but clear in the event of extended use .[6, 7]

Dosage

- Indometacin is administered as a 100 mg rectal suppository followed by a 25 mg oral dose every 4 hours for 48 hours.
- If regular uterine contractions persist 1 - 2 hours after the initial 100 mg suppository an additional 100 mg suppository is administered before beginning oral therapy.

Contraindication

- Peptic ulceration

Side effects

- Prolonged use of indometacin, especially in the presence of a relatively mature fetus, may lead to narrowing or occlusion of the fetal ductus arteriosus and/or reduction in fetal renal function.
- As there are no evidence-based indications to continue tocolysis for greater than 48 hours, or at gestations greater than 34 weeks, these potential side effects do not contraindicate the use of indometacin if other regimens are not safely available (e.g. in the absence of the ability to adequately monitor the possibility of side effects of other regimens and in transport situations).

Subsequent care on the antenatal ward

Maternal assessment	**On admission**	Full set of observations*, urinalysis, vaginal loss, uterine activity / pain
	First 24 hours	**4 hourly**- Full set of observations*, vaginal loss, uterine activity / pain
	After 24 hours	**4 hourly-** Vaginal loss, uterine activity / pain **8 hourly** – Full set of observations* **Daily**- Bowel activity
	Overnight	Observe and perform observations only as required between 22:00 and 06:00

1. **Avoid digital vaginal examination**
2. **Women with ongoing painful regular contractions should be urgently reviewed by Level 1 Registrar or above – if this cannot happen on the ward within 30 mins, transfer to LBS** [**Recommendation 2019]**
3. Following review if morphine is required, the woman should go to LBS for a period of monitoring. Morphine may be administered on the ward prior to planned transfer, provided this does not incur a significant delay.

Fetal assessment	**On admission and first 24 hours**	**4 hourly-** FHR and FM Report any decrease in movement or change in FHR or usual pattern of movements
	After 24 hours	**4 hourly-** FM **Twice daily-** FHR Report abnormalities promptly
CTG	As ordered	**Immediately** if bleeding or contracting (regular, frequent, painful) or pain/tenderness, requesting analgesia, >30 weeks gestation

***** Observations- as listed in point 1.1 of WNHS Policy Recognising and Responding to Acute Physiological (Clinical) Deterioration; Record and escalate as per Observation and Response Chart

Procedures to be considered

- Tocolytic therapy
- Corticosteroids
- Maternal laboratory investigations:
  - Ultrasound to exclude low lying placenta
  - Swabs: HVS/ LVS for MC&S, Fetal Fibronectin Test
  - Speculum Examination – for any cervical changes
  - MSU collected and sent in MFAU

Education

- Plan of care, tests and procedures
- Preterm birth
- Special Care Nursery
- Breastfeeding

Activity

First 48 hours- Rest in bed with toilet privileges

Day 3 and thereafter - Gentle ambulation

Documentation

- MR 285 - Observation Chart
- MR 810 - Medication Chart
- MR 250 - Progress Notes
- MR 410 - Neonatal History Sheet
- Baby notes prepared
- Perinatal Database record (STORK) updated

Referrals to be considered

- Neonatologist
- Aboriginal Liaison Officer
- Activities Coordinator
- Parent Educator
- Physiotherapist
- Social Worker
- Psychological Medicine

Abbreviations: **CTG**- cardiotocograghy; **FHR**- fetal heart rate; **FM**- fetal movement; **HVS**- high vaginal swab; **LBS**- Labour and Birth Suite; **LVS**- low vaginal swab; **MC&S**- microscopy culture and sensitivity; **MFAU**- Maternal Fetal Assessment Unit; **MSU**- mid-steam urine

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7. Morales WJ, Smith SG, Angel JL, al e. Efficacy and safety of indomethacin versus ritodrine in the management of preterm labour: a randomised study. **Obstetrics and Gynecology**. 1989;74:567-72.

Related WNHS policies, procedures and guidelines

KEMH Guidelines:

Antimicrobial Stewardship: Sepsis and Septic Shock: Antibiotics for Adult Patients at KEMH

Obstetrics & Gynaecology:

- Antibiotic Treatment for Urinary Tract Infection
- Infections in Obstetrics: Diagnosis and Management of Chorioamnionitis and Postpartum Infections
- Infections: Antibiotic Prophylaxis for Caesarean Section
- Group B Streptococcus
- Magnesium Sulphate (MgSO4) Therapy
- Preterm Birth Prevention guidelines
- Rupture of Membranes: Preterm

Pharmacy Medication Monographs:

- Glyceryl Trinitrate (GTN)
- Indometacin (Indomethacin)
- Nifedipine
- Salbutamol

Useful resources (including related forms)

Forms

- MR 285 - Observation Chart
- MR 810 - Hospital Medication Chart
- MR 250 - Progress Notes
- MR 410 - Neonatal History Sheet

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	April 2020: 1. Amended information in flowchart for care on the obstetric wards: • Women with ongoing painful regular contractions should be urgently reviewed by Level 1 Registrar or above – if this cannot happen on the ward within 30 mins, transfer to LBS. **[RCA recommendation]** • Following review if morphine is required, the woman should go to LBS for a period of monitoring. Morphine may be administered on the ward prior to planned transfer, provided this does not incur a significant delay. 2. Nifedipine section updated- maximum daily dose increased and removed auscultation of lung bases 3. Section added for TCL interpretation in asymptomatic women <24 weeks 4. Corticosteroid section now links direct to corticosteroid guideline 5. Updated indications for fFN – gestation and cervical length amended 6. Removed Nifedipine QRG – refer to main section of guideline		
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