TITLE: Intrauterine Pressure Catheter (IUPC)/Amnioinfusion
NUMBER: 7095
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Approved by: Childbirth Care Team
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Applies To: Birth Unit Physicians, Midwifery and Nursing Staff

POLICY STATEMENTS
1. Internal uterine monitoring is done via an intrauterine pressure catheter (IUPC). An IUPC may be useful in dysfunctional labour or obesity when uterine palpation may be difficult or impossible (SOGC, 2007). An intrauterine pressure catheter (IUPC) can be inserted once membranes are ruptured and the cervix is dilated.
2. Amnioinfusions can be helpful in the treatment of recurrent variable decelerations during first stage labour. During an Amnioinfusion, normal saline or lactated ringers solution is introduced into the amniotic cavity through the IUPC and is infused either by gravity or by an infusion pump.
3. Intrauterine pressure catheters are inserted by physicians. All registered nurses in the Birth Unit who have received instruction may care for women with IUPCs and initiate and manage an amnioinfusion based on a physician’s order. This policy outlines the insertion of the IUPC and the performance/management of an amnioinfusion.

GUIDING PRINCIPLES AND VALUES
An amnioinfusion may significantly resolve patterns of moderate to severe variable decelerations but does not affect late decelerations or patterns with absent variability.

An amnioinfusion is no longer recommended as a treatment for meconium stained fluid because it did not decrease or reduce the risk of moderate to severe meconium aspiration syndrome or perinatal death. Amnioinfusion should be limited to the treatment of recurrent variable decelerations during first stage labour which have not resolved with maternal position changes.

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PROCEDURE
Indications for an amnioinfusion include: oligohydramnios and/or suspected cord compression. The infusion may reduce the occurrence of variable heart rate decelerations.

The use of an IUPC should be carefully weighed in terms of relative risks and benefits in the circumstances of undiagnosed vaginal bleeding or intrauterine infection (SOGC, 2007).

Contraindications for use/placement of an IUPC include but are not limited to:

- Vaginal bleeding of unknown origin
- Placenta previa
- Active infection (HIV or herpes)
- Umbilical cord prolapsed
- Amnionitis/chorioamnionitis
- Uterine hypertonicity
- Severe fetal distress
- Impending birth

Complications following IUPC placement are rare. Most complications are believed to be related to improper placement in the extramembranous space between the fetal membranes and uterine wall. This can lead to placental abruption, laceration of the placenta or uterine perforation.

Guidelines for caring for women with an IUPC:

1. An Obstetrician is required to explain the procedure as it relates to the mother’s care and outcomes, along with potential risks. Verbal consent must be obtained and documented in patient’s permanent health record.

2. The Registered Nurse is responsible for gathering and preparing the following required equipment at the patient’s bedside:
   - reusable transducer cable and patient module cable
   - disposable IUPC monitoring kit
   - sterile gloves

3. Confirm the fetal monitor is on and tested.

4. The IUPC will be inserted by the obstetrical resident or obstetrician/physician after a thorough clinical assessment including dilation, fetal presentation, station, membrane status. The IUPC will be inserted as per the instructions based on the catheter package (Philips Disposable Intrauterine Pressure Sensor-Tip Catheter M1333A (Refer to Appendix B & C for details)
5. Assist the patient with positioning for a vaginal exam and IUPC insertion

6. Secure the catheter to the patient’s leg following insertion.

7. Plug the reusable transducer cable into the fetal monitor. The monitor is automatically zeroed. The IUP display shows “0”.

8. Once inserted, connect the reusable cable to the IUPC connection site. Ask the patient to cough following IUPC insertion, to observe for increase in pressure reflecting correct positioning of the IUPC.

9. Nursing will assess the patient’s contraction pattern, strength and resting tone and report to the physician.

   **Note:** Normal resting tone is 5-25 mmHg and adequate strength is 40-60 mmHg above resting tone. Variances may occur depending on the placement of the catheter and positioning of the patient.

10. Observe the patient for signs and symptoms of uterine rupture:
    - hypertonic
    - bleeding
    - sudden severe uterine pain
    - chest or shoulder pain
    - atypical/abnormal fetal heart tracing

11. If at any time you have a high resting tone greater than 25mmHg and the uterus feels relaxed you need to re-zero the system by:
    - Disconnecting the IUPC cable from the monitor cable
    - Re-zeroing the monitor
    - Wait 10-15 seconds before reconnecting the catheter to the cable

12. If you are having a dampened waveform and are in the amniotic space (amniotic fluid was seen in the catheter during insertion) then:
    - Disconnect the catheter from the cable
    - Rotate or retract the catheter a few centimeters to try and find a pocket of amniotic fluid
    - Wait 10-15 seconds then reconnect the catheter to the cable
    - If the dampened waveform continues the catheter may be flushed with normal saline

13. When the intrauterine pressure catheter is no longer required, the RN may disconnect the IUPC from the transducer cable and remove it by applying light pressure and pulling away from the introitus.
14. Accurate documentation is a critical component following the placement of an IUPC. Document the following on the patients' health record:
   - Insertion of IUPC
   - Indications for IUPC placement
   - Resting tone following insertion
   - Strength of contractions in mmHg
   - Patient tolerance

15. The patient may ambulate. Simply disconnect the IUPC from the reusable cable. When the patient returns the monitor may need to be re-zeroed. This is done by:
   - Connecting the reusable cable/patient module cable to the fetal monitor
   - Re-zeroing the monitor
   - Wait 10-15 seconds before reconnecting the catheter to the monitor cable

Guidelines for Care of a Woman with an Amnioinfusion

1. Explain to the patient and family, the need for the procedure, what it involves and how it will help. An informed (verbal) consent must be obtained.

2. The Registered Nurse (RN), is responsible for gathering and preparing the following additional equipment at the patient’s bedside:
   - room temperature 1000 ml NS/Ringer’s Lactate (RL) IV solution
   - IV tubing

3. Perform a vaginal exam to determine presentation, dilatation, and to rule out cord prolapse.

4. Flush IV tubing with NS/LR and connect to IUPC port.

5. Infuse the amnioinfusion by gravity. An infusion pump may be used for an amnioinfusion but only upon request/order of a physician.

6. Administer initial bolus of fluid 250-500mL NS or RL over 20-30 minutes per gravity through the IUPC infusion port. A maintenance rate of 100-150 ml/hr by gravity may be ordered. If using infusion pump, set appropriately.

7. Reassure patient that an increase of leaking fluid is expected.
8. Review the FHR pattern to determine whether the amnioinfusion is improving the fetal status. Improvements in the fetal heart rate may require 20-30 minutes following instillation of the amnioinfusion.

9. If recurrent variable decelerations have not resolved after the infusion of 800-1000mL, notify the patient’s physician. The infusion may be discontinued and alternate approaches used.

10. Assess the patient for:
- complications relating to the amnioinfusion which include: signs of uterine over distension, rupture, infection, prolapsed cord
- duration and intensity of uterine contractions to identify over distention or increased uterine tone.
- fluid leakage per vagina
- change in status of the fetal heart rate patterns
- intake and output of uterine fluid

11. As a general consideration if 250mL has infused with no return, the amnioinfusion is discontinued until the fluid has returned.

12. The uterine resting tone may appear higher than normal during the procedure (from 25-40mmHg). If there is a concern about an elevated resting tone (greater than 40mmHg), temporarily discontinue the infusion to attempt a more accurate assessment. If the uterine resting tone exceeds 25mmHg while the infusion is temporarily discontinued, consider discontinuing the infusion.

**DOCUMENTATION**

Document the following on the patient health care record:

- indications for amnioinfusion
- type and amount of fluid for amnioinfusion
- infusion onset
- method of infusion (pump or gravity)
- amount of fluid infused
- FHR response to amnioinfusion
- contraction intensity and frequency and pressures before, during and after the amnioinfusion should be continually assessed during the procedure
- amount, colour and odor of fluid leaking from vagina
- vaginal exam
- maternal position during and after amnioinfusion
- patient tolerance (i.e. comfort or pain during amnioinfusion) and interventions
REFERENCES


Additional References Reviewed:


BC Women’s Hospital & Health Centre (2010) Intrapartum Amnioinfusion Policy #WW 05.03.

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OP3PO150710
Fetal Maternal Newborn and Family Health Policy and Procedure Manual.


OB TraceVue Software Revision G.00 Patient Monitoring October 2010.

RELATED DOCUMENTS

Policies
IWK Health Centre Policy #7070 Intrapartum Fetal Health Surveillance
IWK Health Centre Policy #7115 Print Policy: Obstetrical TraceVue System
IWK Health Centre Policy #7116 Electronic Documentation: Obstetrical TraceVue System
IWK Health Centre Policy #7117 Down Time Procedures: Obstetrical TraceVue System
IWK Health Centre Policy #7118 Quality Practices for Paper Tracings
IWK Health Centre Policy #7119 Roles & Responsibilities: Obstetrical TraceVue System

Appendices
Appendix A – Definitions
Appendix B- IUPC Set Up and Insertion
Appendix C- Philips Disposable Intrauterine Pressure Sensor-Tip Catheter (M1333A) Instructions for Use (Adapted from Philips Koala manufacturers packaging August 2016)
Appendix D - Troubleshooting IUPC
Appendix A

DEFINITIONS

Intrauterine pressure catheter (IUPC) – a device placed through the cervix into the uterine cavity and transits pressure changes in mmHg via a transducer. An IUPC accurately records uterine resting tone, intensity, duration, and frequency of contractions.

Amnioinfusion: is the installation of fluid (Lactated Ringers (L/R)/Normal Saline (NS)) into the amniotic cavity to increase the volume of fluid cushioning the umbilical cord when oligohydramnios is present.

Contraction frequency is measured from the beginning of one contraction to the beginning of the next and is described in minutes (Simpson, 2014).

Duration is the length of contraction and is described in seconds.

Intensity refers to the strength of the contraction and is described as mild, moderate or strong by palpation or in millimeters of mercury (mmHg) or Montevideo units (MVUs) if an IUPC is used (Simpson, 2014).

Peak of a contraction with an IUPC, the peak is indicated on the fetal monitor as the actual strength of the contraction measured in mmHg pressure within the amniotic cavity. Normal values for peak IUP are 40-80mmHg. This is derived by subtracting the peak IUP from the resting tone.

The IUPC is an accurate direct measurement of intraamniotic pressure is recorded. It requires ruptured membranes for insertion and technical difficulties with insertion or set up requiring troubleshooting are not uncommon (Simpson, p.450).

Uterine Resting Tone, or baseline tone, is assessed in the absence of contractions or between contractions. By direct palpation, resting tone is described as soft or hard and via IUPC in terms of mmHg or MVUs. Acceptable baseline resting pressures are 5-25mmHg. It is important that resting tone by palpation be validated.

Hypertonus – a persistent increase in baseline tone over 25 mmHg. This causes prolonged occlusion of the maternal spiral arteries and can lead to fetal asphyxia. (Bakker, 2007).

Dampened wave form – low amplitude contraction that are poorly defined.

Montevideo units (MVUs) a measurement that is calculated by subtracting the baseline uterine pressure from the peak contraction pressure of each contraction in a 10 minute period when using an IUPC and adding the pressures generated by each contraction. 200-250MVUs is considered adequate and expected to result in a normal rate of cervical change and fetal descent. The dose of oxytocin can be titrated to produce MVUs in this range or the dose can

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be increased until there is normal progression of labor or strong contractions occurring every 2-3 minutes. We use mmHG.

**Tachysystole (uterine)** – more than five contractions in 10 minutes, average over a 30 minute window. Tachysystole should always be qualified as the presence or absence of associated FHR decelerations. Tachysystole also applies to both spontaneous and simulated labour.
Appendix B

What Equipment is Required for IUPC Placement

(Adapted from the Philips Avalon Fetal Monitor Instructions for Use Manual page 97.)

Illustration ① shows the complete connection chain from the IUP catheter to the fetal monitor using the patient module:

Illustration ② shows the complete connection chain from the IUP catheter to the fetal monitor using the Toco® transducer:
Appendix C

Philips Disposable Intrauterine Pressure Sensor-Tip Catheter (M1333A)

Instructions for Use (Adapted from Philips Koala manufacturers packaging August 2016)

Catheter Preparation

1. Gather necessary supplies (see Appendix A): Koala catheter, appropriate cable for connection to the fetal monitor and infusion fluid with IV tubing if performing amnioinfusion.

2. Switch on the fetal monitor (if not on)
3. Connect the Koala cable to the fetal monitor.
4. Open the sterilized Koala catheter package. The inner pouch may be used for sterile transfer.
5. According the standard protocol, using aseptic technique, remove the catheter from the package and prepare for insertion.

Catheter Insertion, Zeroing and Removal

6. Ensure amniotic membranes are ruptured and the cervix is adequately dilated.
7. Perform a vaginal examination and with your index finger palpate the fetal presenting part to determine the optimal position for placement.
8. Ensure the amnioport is vented by confirming the filtered vented cap is in place on the amnioport.
9. Insert the introducer and catheter through the vagina up to the cervical os. Secure the introducer between your examining fingers adjacent to the fetal presenting part. DO NOT EXTEND THE TRANSDUCER BEYOND YOUR FINGERTIPS.
10. Advance the Koala catheter 10-14 centimeters into the uterus by inserting the catheter until the bottom of the introducer is level with the text “Pause for flashback”
11. Ensure the catheter has been placed in the amniotic space by watching for amniotic fluid flowing through the catheter, EVIDENCE OF BLOOD INDICATES EXTRAOVULAR PLACEMENT.

12. If catheter placement does not proceed easily, or you cannot see fluid in the catheter:
   a. Pull back the catheter tip to the introducer and alter the catheter direction by changing the angle of the introducer
   b. Determine alternate position for placement and proceed with insertion. Repeat steps 10, 11, and 12 until you are comfortable the catheter is properly placed. DO NOT USE EXCESSIVE FORCE OR CAUSE PATIENT TRAUMA.

13. Advance the catheter until the double insertion depth indicator marks reach the introitus. This indicates that the tip of the catheter has progressed 30-45 centimeters into the uterus and should be positioned at the fundus of the uterus. THE “STOP” MARKING SHOULD STILL BE VISIBLE OUTSIDE THE VAGINA.

14. Following insertion and verification of placement carefully slide the transducer back along the catheter. Push the introducer along the ramp or pull the catheter through the introducer slot for removal.

15. The hydrophobic filtered vented cap may be removed and replaced by a tethered cap or left in place.

16. Remove the paper from the center portion of the adhesive pad and secure the catheter or Koala cable to the center of the pad (pinch the adhesive pad around it).
17. Remove the remaining paper from the adhesive pad and secure it to the patient's thigh as close to the introitus as possible. This prevents the catheter from working itself out of the uterus when the catheter is flexed.

18. Zero the fetal monitor. For true zero, first ensure that the catheter is disconnected from the Koala cable, then zero the monitor. Do not press the cable button (if present) when zeroing the monitor.

19. Remove the yellow protective cap from the catheter. Connect the Koala cable to the catheter. Connection to the catheter must be performed after placement into the uterus.

20. Verify that the catheter is properly positioned by encouraging the patient to cough and confirming a corresponding sharp spike on the uterine activity tracing.

21. Document the insertion in the patient's record. Record the time of insertion on the uterine activity trace (if this is not done automatically by the fetal monitor).

22. If the catheter does not respond:
   a. Confirm that the Koala cable is correct for the fetal monitor
   b. Disconnect the catheter from the Koala cable, flush 10—20cc through the amnio communication port, then reconnect it.
   c. Disconnect the catheter from the Koala cable, rotate, retract, or advance the catheter wait 15 seconds then reconnect it.

23. To remove the catheter grasp it and pull it gently until you have withdrawn it completely.

24. Disconnect the catheter from the Koala cable.

25. Discard the catheter, and dispense of it in accordance with local regulations and standard procedures in use in your institution.

26. Clean the reusable Koala cable according to the instructions
## Appendix D
### Troubleshooting IUPC

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible cause</th>
<th>Solutions</th>
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<tbody>
<tr>
<td>No change in pressure during contractions</td>
<td>Dry environment or possible extraovular placement of sensor tip</td>
<td>Flush with sterile solution or reposition sensor</td>
</tr>
<tr>
<td>Only pressure peaks can be visible</td>
<td>Zero adjustment is incorrect</td>
<td>Remove and touch catheter. If the trace does not show up and down movements, use a new transducer</td>
</tr>
<tr>
<td>Trace is superimposed with noise</td>
<td>End of catheter is in the uterine wall</td>
<td>Retract the catheter a little wait 15 seconds and reconnect and/or flush with 10-15 cc of sterile solution</td>
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## Version History

(To Be Completed by the Policy Office)

<table>
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<th>Major Revisions (e.g. Standard 4 year review)</th>
<th>Minor Revisions (e.g. spelling correction, wording changes, etc.)</th>
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