CMQCC **Peri-Partum Bleeding Algorithm: Checklist Format** Revision 22/01/12

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| **Stage O: All Births – Prevention & Recognition of OB Hemorrhage Prenatal Assessment & Planning** | | |
| * **Identify and prepare patients with special considerations:** Placenta Previa/Accreta, Bleeding Disorder, or those who Decline Blood Products * **Screen and prevent anemia:** if oral iron fails, initiate IV Iron Sucrose as per established protocol to achieve hemoglobin over 110 g/L at delivery. | | |
| **Admission Assessment & Planning** | | **Ongoing Risk Assessment** |
| **Verify Group & Screen** from prenatal record  **If no Group & Screen in this pregnancy,**   * Order Group & Screen   **If patient has red cell antibodies, (not passive anti-D from RHIG)**   * Order Group & Screen   **Patients at high risk for hemorrhage or transfusion**   * Order Group & Screen & Crossmatch (2 units) | * Evaluate for **Risk Factors** on admission, throughout labor, and postpartum. (At every handoff)   **If medium risk:**   * + Order Group & Screen   + Review Hemorrhage Protocol   **If high risk: (in addition to above)**   * + Order Group & Screen & Crossmatch (2 units)   + Notify OB Anesthesia   + set up cell saver on C5, consider TXA, uterotonics   **Identify** women who may decline transfusion   * + Notify OB provider for plan of care   + Early consult - OB anesthesia, cell saver, blood conservation RN   + Review Consent Form | * **Evaluate for development of additional risk factors in labor:**   + Prolonged 2nd Stage labor   + Prolonged oxytocin use   + Active bleeding   + Chorioamnionitis   + Magnesium sulfate treatment * **Increase Risk level convert to Group & Screen +/- Crossmatch (2 units)** * **Treat multiple risk factors as high risk** * **consider early uterotonics, set up cell saver on C5** * **consider preemptive tranexamic acid**   **□ Monitor women postpartum for increased bleeding and hemodynamic instability** |
| **Admission Hemorrhage Risk Factor Evaluation** | | |
| **Low (No blood bank testing)**  **Verify Group & Screen during pregnancy** | **Medium (Group & Screen)** | **High (Group & Screen & Crossmatch)** |
| No previous uterine incision | Prior cesarean birth(s) or uterine surgery | Placenta previa, low lying placenta |
| Singleton pregnancy | Multiple gestation | Suspected Placenta accrete or percreta |
| ≤ 4 previous vaginal births | > 4 previous vaginal births | Hemoglobin <100 g/L AND other risk factors |
| No known bleeding disorder | Chorioamnionitis | Platelets < 100 x109/L or falling on serial B/W |
| No history of PPH | History of previous PPH | Active bleeding (greater than show) on admit |
| Hemoglobin 110 g/L or higher | Large uterine fibroids | Known coagulopathy, fetal demise, physician concern |
|  | Hemoglobin 100-109 g/L |  |
| All Births – Prophylactic Oxytocin, Quantitative Evaluation of Blood Loss, & Close Monitoring | | |
| **Active Management of Third Stage**   * Oxytocin infusion: vaginal birth 10 units IM followed by 20-units oxytocin/1000 mL solution at 125ml/hr unless directed otherwise by OB C/S 1-2.5 units slow IV bolus by anesthesia plus infusion OR carbetocin 20-100 mcg IV.   **Ongoing Quantitative Evaluation of Blood Loss**   * Using formal methods, such as graduated containers, visual comparisons and **Ongoing Evaluations of Vital Signs** | | |
| **If: Cumulative Blood Loss > 500ml vaginal birth or > 1000ml C/S with continued bleeding -OR- Increased bleeding during recovery or postpartum proceed to STAGE 1**  ***As you progress through the stages 1-3, ensure checkboxes from previous stages are being completed concurrently*** | | |

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| **STAGE 1: Peri-partum Bleeding Algorithm**  **Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S with continued bleeding -OR- Increased bleeding during recovery or postpartum Vital signs >15% change or HR ≥ 100, BP normal or** **, urine output borderline, O2 sat <95% on room air -OR- Obstetrical shock index >0.9 (HR/SBP)** | | |
| **MOBILIZE** | **ACT** | **THINK** |
| **Primary nurse, Physician or Midwife** to:   * Record time of declaration.   **Primary nurse** to:   * Notify obstetrician or midwife (in-house and attending) * Notify charge nurse * Notify anesthesiologist (7010 days, 7071 nights)   **Charge nurse:**   * Assist primary nurse as needed or assign staff member(s) to help * **Bring PPH atony drug kits to room** * **Evaluate with care team the need to transfer the patient to the main or Connell 5 OR’s** | **Primary nurse or designee:**   * Establish IV access if not present, at least 18 gauge * Increased IV **Oxytocin** rate, up to 500 mL/hour of 20 units/1000 mL solution as per physician * Give bolus of Ringers Lactate as per physician (anticipate 1-2 litres via pressure bag) * Tranexamic acid 1 g IV over 10 minutes; repeat at 30 minutes if bleeding continues; do not give if over 3 hours since onset of hemorrhage * Apply vigorous fundal massage * Empty bladder: straight cath or place Foley with urimeter   **2nd Line Uterotonic:** (**Ergonovine** OR **Carboprost/ Hemabate**® OR **Misoprostol**)   * + - See chart page 5 for all dosing information     - Carboprost (Hemabate®) 0.25 mg IM or intramyometrially (avoid in asthma), may repeat Q15-20 minutes (total max 2mg)     - Ergonovine 0.25 mg IM (if not hypertensive); give once, if no response, move to alternate agent, C/S may give slow dilute IV; if good response may give additional doses q2 h.     - Misoprostol 400 mcg SL and 400 mcg PR per protocol (once) * Administer oxygen to maintain O2 sats at >95% * Vital Signs, including O2 sat & level of consciousness (LOC) q 5 min minimum * Monitor temperature q30 minutes and maintain temp >36.0°C * Calculate, **record & inform team of** estimated blood loss q 5-15 minutes * Record total fluids * Order 2-4 units of Red Blood Cells (RBC) STAT * Send for Group & Screen if not done   **Physician or midwife:**   * Rule out retained products of conception, laceration, hematoma   **Surgeon (if cesarean birth and still open)**  **□** Inspect for uncontrolled bleeding at all levels; broad ligament, posterior uterus, and retained placenta | Consider potential etiology:   * Uterine atony * Trauma/Laceration * Retained placenta * Amniotic Fluid Embolism * Uterine Inversion * Coagulopathy * Placenta Accreta   -C/S start using cell saver as soon as field clear of amniotic fluid and anticipate ongoing blood loss  **Once stabilized:** Modified Postpartum management with increased surveillance |
| **If Continued bleeding or Continued Vital Sign instability, and < 1500 mL cumulative blood loss**  **proceed to STAGE 2** | | |

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| **STAGE 2: Peri-Partum Bleeding Algorithm**  **Continued bleeding or Vital Sign instability, and up to 1500 mL cumulative blood loss**  **Vital Signs/Symptoms: HR >120, BP**  **, respiratory rate****, urine output** **, anxious, OSI >1.0 (HR/sBP)**  **\*\*Vital signs may be relatively normal if appropriate volume resuscitation has occurred\*\*** | | |
| **MOBILIZE** | **ACT** | **THINK** |
| **Primary nurse (or charge nurse):**   * Call obstetrician or midwife to bedside * Call Anesthesiologist 7071 * Call OM at 7021 * Consider contacting RACE Nurse and RT if resources needed   **PHONE #:**   * Notify Blood bank of hemorrhage; order products as directed   **Charge nurse:**   * Notify 2nd OB * Notify nursing supervisor * Bring hemorrhage supplies to the patient’s location * If considering selective embolization, call-in Interventional Radiology Team * Assign single person to communicate with blood bank * Assign second attending or clinical nurse specialist or medical social worker as family support person. | **Team leader** (OB Physician or OB Anesthesia or midwife):   * Continued IV oxytocin and provide additional warmed IV crystalloid solution * Additional 2nd line uterotonic medications: (**Ergonovine** OR **Carboprost/ Hemabate**® OR **Misoprostol) see** chart page 5 for dosing * **Do not delay interventions (see right column)** while waiting for response * Bimanual uterine massage * Consider move to OR (if on postpartum unit, move to L&D or OR), apply monitors including cardiac leads * Order 2 units RBCs and bring to the bedside (uncrossmatched if crossmatched RBC not already labelled and ready) * Order MHP bloodwork panel STAT, send immediately with red labels   **Transfuse**   * RBCs based on clinical signs and response, do not wait for lab results or crossmatch; use uncrossmatched O-negative, Kell-negative RBC if necessary * If fibrinogen <2.0 g/L transfuse 4 grams of fibrinogen concentrate * If INR<1.8 transfuse 4 units of Plasma * If PLT <50x109/L transfuse 1 pool of Platelets   **Primary nurse (or designee):**   * Establish 2nd large bore IV, at least 18 G on blood admin set with warmer * Assess and announce Vital Signs and cumulative blood loss q 5-10 minutes * Administer meds, blood products and draw labs, as ordered * Monitor temperature q30 minutes and maintain temp >36.0°C   **Second nurse** (or charge nurse):   * Place Foley with urimeter (if not already done) * Obtain portable light and OB procedure tray * Obtain blood products from the Blood Bank (or send designee) * Assist with move to OR   **Blood Bank:**   * Maintain 4 units of RBC ahead * Thaw 4 units of Plasma, label 1 unit of platelets, and label 4 grams of fibrinogen | **Sequential advance through procedures** and other interventions based on etiology: **Vaginal birth**  If **trauma (vaginal, cervical or uterine):**   * Visualize and repair If **retained placenta:** * D&C   If **uterine atony** or lower uterine segment bleeding:   * Intrauterine Balloon (Bakri) If **above measure unproductive:** * Selective embolization (Interventional Radiology if available & adequate experience)   **C-Section:**   * B-Lynch Suture * Intrauterine Balloon * use cell saver   If **Uterine Inversion:**   * Anesthesia and uterine relaxation drugs for manual reduction   If **Amniotic Fluid Embolism:**   * Maximally aggressive respiratory, vasopressor and blood product support   If **vital signs are worse than estimated or measured blood loss:** possible uterine rupture or broad ligament tear with internal bleeding; **move to laparotomy**  **Once stabilized:** Modified Postpartum management with increased surveillance |
| **Re-Evaluate Bleeding and Vital Signs**  **If cumulative blood loss > 1500mL, > 2 units PRBCs given, Vital Signs unstable or suspicion for DIC,**  **proceed to STAGE 3** | | |

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| **STAGE 3: Peri-partum Bleeding Algorithm**  **Cumulative blood loss > 1500mL, > 2 units PRBCs given, Vital Signs unstable or suspicion for coagulopathy**  **Vital Signs/Symptoms: HR >120 thready, BP** **, respiratory rate** **, urine output** **, confusion, shortness of breath, chest pain**  **\*\*Vital signs may be relatively normal if appropriate resuscitation has occurred\*\*** | | |
| **MOBILIZE** | **ACT** | **THINK** |
| **Charge Nurse or designee:**   * Activate Massive Hemorrhage Protocol * **Call “4444” for Code Transfusion Overhead**   **Switchboard will call**:   * Blood bank & Portering * Anesthesia OB staff (day 7010, night 7071) * Anesthesia OR manager (day 7071) * Anesthesia Assistant (day 7079, night pager) * Perfusion (on call) * RACE team   **Consider calling:**  2nd on-call gynecology surgeon  2nd on-call OB/GYN resident  general surgeon  adult intensivist/ICU  2nd Anesthesiologist  OR staff  Interventional Radiology  RN supervisor, CNS, manager  **Blood Bank:**   * + Keep 1 MHP pack ahead at all times | **Establish team leadership and assign roles**  **Team leader** (OB physician + OB anesthesiologist, anesthesiologist and/or and/or intensivist):  **□ Order Massive Haemorrhage Protocol (MHP) if required**   * Transfuse MHP blood packs (RBC and plasma) * Transfuse platelets (PLT<100x109/L) * Transfuse 4 grams of fibrinogen (fibrinogen <2.0 g/L) * **Move to OR** if not already there, apply all monitors immediately * Send MHP bloodwork stat with red labels and q60 min   **Anesthesiologist** (as indicated):   * Arterial line, ABG’s/hemocue/bloodwork * Vasopressor support * Call perfusionist for cell saver if abdomen open * Consider intubation & central hemodynamic monitoring * Calcium replacement (every 4 RBC units) * Electrolyte monitoring (monitor for hyperkalemia via q60 min labs & ECG)   □ Monitor temperature   * Announce VS and cumulative measured blood loss q 5-10 minutes * Warm patient (Bair hugger, fluid warmer for fluid and blood products)   □ Communicate all laboratory results q60min  **Primary nurse:**   * Apply sequential compression stockings to lower extremities * Circulate in OR   **Second nurse and/or anesthesiologist/AA:**   * Continued to administer meds, blood products and draw labs, as ordered * Set up arterial line, obtain induction drugs as needed (ketamine)   **Third Nurse (or charge nurse):**  □ Recorder, additional supplies (set up 2nd rapid infusion fluid warmer) | **Selective Embolization (IR), cell saver**  **Interventions based on etiology not yet completed**  **Prevent hypothermia, acidemia Conservative or Definitive Surgery:**   * Uterine Artery Ligation * Hysterectomy   **For Resuscitation: Aggressively Transfuse**  **Based on Vital Signs, Blood Loss**  **During uncontrolled hemorrhage transfuse a minimum of 1 plasma for every 2 RBC units:**  **4-6 PRBC: 4 FFP: 1 apheresis Platelets, Fibrinogen concentrates if <2.0**  **Unresponsive Coagulopathy:**   * Role of rFactor Vlla and PCC are unknown. May consider risk/benefit of rFactor Vlla and PCC in consultation with hematologist or transfusion medicine physician on call. * Dose of rFactor VIIa = 90 ug/kg (60 kg female = 5 mg iv push over 5 min) * Dose of PCC = 2000 IU over 10 minutes iv push   **Once Stabilized:** Modified Postpartum Management with increased surveillance; consider ICU |

See KHSC Parenteral Drug Therapy Manual for detailed information

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| **UTEROTONIC AGENTS for POST PARTUM Bleeding Algorithm** | | | | | | |
| **Drug** | **Dose** | **Route** | **Frequency** | **Side Effects** | **Contraindications** | **Storage** |
| Oxytocin  10 units/ml | 5-10 units IM  then 20 units per  1000 ml at 125ml/hour | IV infusion pump (anesthesia may give slow IV bolus 1-2.5 units) | Continuous infusion  (1-3 units slow IV bolus may be given Q3 minutes) | Nausea, vomiting, hyponatremia with prolonged IV admin, flushing, headache, coronary vasospasm, chest pain, ECG changes  **↓↓ BP and ↑ HR with high doses**, esp IV push and with hypovolemia,uterine hyperstim | Hypersensitivity to oxytocin, Cardiac disease, beware in Hypovolemia | Room temp |
| Ergonovine  0.25 mg/ml | 0.25 mg | IM  (anesthesia may give diluted slow IV) | -Q 2-4 hours  -Max total dose 1 mg for IV route | Nausea, vomiting  **Severe hypertension**, if injected undiluted or too rapidly | Hypertension, Preeclampsia, Cardiovascular disease Hypersensitivity to drug **Caution** if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral  hemorrhage | Refrigerate Protect from light |
| Carboprost (Hemabate®) (15-methyl prostaglandin F2 alpha)  250 mcg/ml | 250 mcg | IM or intra- myometrial (**NOT given IV)** | -Q 15-90 min  -Max 2 mg (8 doses)  -If no response after several doses, it is unlikely that additional doses  will benefit. | Nausea, vomiting, diarrhea Fever (transient), Headache Chills, shivering Hypertension **Bronchospasm** | Caution in women with hepatic and renal disease, asthma, hypertension, active cardiac or pulmonary disease Hypersensitivity to Carboprost | Refrigerate |
| Misoprostol (Cytotec®)  100 or 200 mcg tablets | 800 mcg Total dose | SL/PO/PR,  Suggest: 400mcg SL & 400mcg  PR | Once | Nausea, vomiting, diarrhea, abdominal pain  Shivering, Fever (transient) | Allergy to prostaglandin Hypersensitivity to Carboprost | Room temp |
| Carbetocin (Duratocin®) 100 mcg/mL | 100 mcg  (20-100mcg) | IV | Once  (max 100 mcg) | Same as oxytocin, **not reversible**  **ED95 for elective C/S ~20mcg** | Hypersensitivity to oxytocin or carbetocin. N&V, flushing.  Cardiac disease, beware in  hypovolemia | Room temperature |
| Tranexamic Acid 100 mg/mL | 1 g | IV | May repeat in 30 minutes | Nausea, vomiting, diarrhea Hypotension especially when  administered too rapidly | Relative contraindications: Prior active thromboembolic  disease, seizure disorder | Room temp Protect from light |

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| **BLOOD PRODUCTS** | |
| **Red Blood Cells (PRBC)**  (approx. 60 min. for crossmatch compatible – once sample is in the lab and assuming no antibodies present) | Best first-line product for blood loss - 1 unit = 300 ml volume  If antibody positive, may take hours for crossmatch, in some cases, such as autoantibody crossmatch compatible may not be possible; use incompatible in  urgent situations with guidance from transfusion medicine/hematology |
| **Frozen Plasma (FP)**  (approx. 30 min. to thaw for release) | Highly desired if > 2 units PRBCs given, or for prolonged PT, PTT - 1 unit = 280 ml  volume; during MHP 1:2 ratio with RBC and if coagulopathic 15 mL/kg (4 units) |
| **Platelets (PLTS)**  Platelets available 24/7 and can be released in minutes | Transfuse with Platelets < 50,000  Each unit provides an increment of 25-50 |
| **Fibrinogen concentrate** | Give 4 grams of fibrinogen if ongoing bleeding and levels less than 2.0 g/L or rate of  hemorrhage precludes waiting for test result |
| **rFactor Vlla** | 90 ug/kg (60 kg = 5 mg iv push over 5 minutes) |
| **Prothrombin Complex Concentrate** | 2000 IU over 10 minutes slow iv push |

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| **Massive Haemorrhage**  **Protocol (Obstetrics)** | **Transfusion Pack 1** | **Transfusion Pack 2** | **Transfusion Pack 3** | **Separate order** |
|  | **4 units RBC’s** | **4 units RBC’s** | **4 units RBC’s** | **platelets** |
|  |  | **4 units FFP** | **2 units FFP** | **Additional fibrinogen** |
|  |  | **Fibrinogen concentrates (4 grams )** |  |  |