Please describe your institution’s current practice in response to the expected COE criteria outlined below. Provide detailed responses and mention specifics (such as personnel, equipment, location etc.) as they relate to each stipulated criterion.

**Institutional Details:**
1. Describe the institution where you provide obstetric anesthesia services
   - ☐ Academic/university affiliated
   - ☐ Private/community
   - ☐ Military/VA
   - ☐ Other (please specify)

2. How many deliveries are there at your institution? 2450 per year

3. What is the current cesarean delivery rate at your institution? 39%

4. What is your institution’s general anesthesia rate for cesarean delivery?
   - For scheduled/elective cesarean delivery 1%
   - For unplanned/intrapartum cesarean delivery 2%

5. What percentage of laboring women at your institution receive neuraxial analgesia? 89%
6. What is your institution’s “wet-tap” rate in the obstetric setting? 1 __ ___ %

7. How many labor and delivery rooms are in your obstetric unit? 10 __ __ __ __

8. How many operating rooms are in your obstetric unit? 3 __ __ __ __

**Staffing for your obstetric anesthesia service:**

1. How many faculty that cover the obstetric anesthesia service have completed an ACGME-accredited obstetric anesthesia fellowship and/or have equivalent expertise and experience in obstetric anesthesia?

Our core group of obstetric anesthesiologists includes seven core faculty members, all of whom have completed an obstetric anesthesiology fellowship or have equivalent expertise and experience in obstetric anesthesia.

2. On a daily basis, how many staff are assigned to provide dedicated coverage for the obstetric anesthesia service?

**Daytime:**

*Attending physician: 1 __
Fellows: 1-2 __
Residents: 2-3 __
CRNA/CAAs: 0 __
Others (specify): __ __

**Night-time/weekends:**

*Attending physician: 1 __
Fellows: __ __
Residents: 1-2 __
CRNA/CAAs: 0 __
Others (specify): __ __
COE Criteria for Anesthesia Care of Obstetric Patients

Personnel:

1. Obstetric anesthesiologist leadership
   - * The obstetric anesthesia lead is a board-certified physician anesthesiologist that has completed an ACGME-accredited obstetric anesthesia fellowship and/or has equivalent expertise in obstetric anesthesia. If equivalent expertise, the basis for this must be clearly delineated (e.g. specific training in obstetric anesthesia, years of practice with a focus on obstetric anesthesia, evidence of expertise based on academic contributions). Please provide the curriculum vitae of the lead obstetric physician anesthesiologist with your application.

Dr. Jamie Murphy serves as our Chief of Obstetric Anesthesiology. Dr. Murphy has completed Obstetric Anesthesia fellowship training and dedicate 98% of her clinical, education, and research time to the field of OB Anesthesia. She is a well-regarded leader in the field, with national recognition in high-risk obstetrics and post partum pain. Her curriculum vitae is attached to this PDF.

- The obstetric anesthesia lead and the majority of core faculty members are SOAP members and show evidence of ongoing participation in continuing medical education relevant to the practice of obstetric anesthesia (e.g. attendance at a SOAP conference or equivalent meeting at least every other year, and can provide examples of evidence-based updates to clinical practice).

Our division members and fellow are active members of SOAP and attend SOAP and or ASA conferences on an annual or biannual basis. In addition to presenting on average 5-10 posters annually, our members are actively involved in the SOAP community. Drs. Murphy and Isaac both are active members of SOAP committees. In addition, Dr. Murphy as served as an invited presenter at the East Coast SOAP conference in Washington DC.

All of our members are actively involved in either research and publication (with original publication), resident education, quality and safety and/or simulation development and training as it pertains to obstetric anesthesia.
2. Dedicated coverage
   - *In-house (24/7) coverage of obstetric patients, by at least one board-certified (or equivalent) physician anesthesiologist who is dedicated to covering the obstetric service without additional responsibilities for non-obstetric patients.

   Our labor floor is staffed by a 24/7 in-house anesthesiology team consisting of an attending physician anesthesiologist and at least one resident. The team is dedicated to labor and delivery without non obstetric patient responsibilities. This team has call rooms on the labor floor, and has the ability to call additional personnel from elsewhere in the hospital or home when necessary.

   - Institutional policy dictates the physician anesthesiologist dedicated to the obstetric floor should be present for placement and induction of neuraxial labor analgesia procedures with rare exceptions (e.g. simultaneous emergency), and should be present at induction and emergence from general anesthesia.

   This is our institution's policy. Except in the rare case of two emergent simultaneous procedures (at which point a second attending physician is summoned if necessary), it is our policy that the attending anesthesiologist be present for initiation of neuraxial anesthesia as well as induction and emergence from general anesthesia.

3. Backup system
   - *Ability to mobilize (within a reasonable (30-60 minute) timeframe) additional anesthesia personnel in case of obstetric emergencies or high clinical volume beyond the capacity of in-house staff assigned to the obstetric service.

   Our institution is a level I adult and pediatric trauma center, a burn center, a STEMI receiving center, a comprehensive stroke center and performs cardiac and transplant surgeries. As such, our call team includes three in-house attending anesthesiologists at all times (trauma OR attending, OB attending, pediatric attending) as well as 5-6 residents. In the event of an emergency on the labor floor requiring additional anesthesia personnel, additional anesthesia attendings and residents may be procured from other areas of the hospital.

   Additionally, our call system includes backup attending coverage, with a home call attending available within 30 minutes for obstetric anesthesiology coverage.
Equipment, Protocols and Policies:
1. Obstetric hemorrhage management
   - Hemorrhage risk stratification algorithm and management protocol instituted. Protocols should consider core elements of the National Partnership Obstetric Hemorrhage Bundle (1), California Maternal Quality Care Collaborative Obstetric Hemorrhage Toolkit (2), or comparable recommendations to manage obstetric hemorrhage.

   We perform a hemorrhage risk assessment on every patient who enters our labor floor. In addition a CMQCC toolkit for the management of obstetric hemorrhage is available on the unit at all time.

   Additionally, our obstetricians have created a hemorrhage cart which includes all of the surgical equipment necessary to reasonably handle a postpartum hemorrhage, either vaginal or cesarean. We have a backup system of gynecologic oncology surgery attending in the event of a complicated surgical patient, and have in-house trauma surgery residents and attending 24/7.

   - *Availability of a massive transfusion protocol with O-negative blood and other blood products, and emergency release system for available blood. Blood bank protocol needs to have been tested and functional on the obstetric unit.

   Our blood bank maintains an emergency release stock of 4 units of o-negative blood available in a refrigerator immediately next to our operating room suite on labor and delivery. This blood is available at all times on labor and delivery and checked daily by the blood bank service.

   Additionally, our institution has a well-developed and tested functional massive transfusion protocol specific to obstetric patients. Given its status as a trauma, cardiac and transplant center the blood bank is fully functional 24/7 and capable of handling multiple ongoing massive hemorrhage situations. We have in-house anesthesia technicians 24/7, who can courier the blood in a cooler from the blood bank (five floors down in the same building) directly to our labor suite and blood is available within minutes of notification to the blood bank for activation. Please see the attached TXA and massive transfusion protocols for more information.

   The blood bank maintains a supply of 70-100 packs of platelets in stock, always maintains at least 6 units of thawed universal-recipient FFP and has approximately 1000-1200 units of PRBCs in stock at any given time.

   All of our operating rooms also have tranexamic acid stocked in our in-OR Pyxis medication manager.

   - *Rapid-infuser device to assist with massive resuscitation (e.g. Belmont® Rapid Infuser, Level 1® Fast Flow Fluid Warmer) readily available for use on the obstetric unit.

   Our labor floor is stocked at all times with a dedicated Belmont rapid infuser and all the necessary equipment for massive transfusion. The equipment is checked daily by our in-house anesthesia-critical care technicians, as well as our residents.
• Plans for difficult peripheral and/or central intravascular access, e.g. ultrasound and intraosseous kits available.

We have a dedicated ultrasound machine on L&D, capable of using three transducers. Our transducers include a vascular probe for ultrasound-guided venous access.

We maintain a full set of central line supplies in our anesthesia workroom, including 9Fr 10cm introducer catheters, 16Ga 16cm single-lumen catheters, 7Fr 16cm triple-lumen catheters, and 8.5Fr RIC catheters.

We also have an intraosseous drill with multiple starter kits available for emergency use.

• Point-of-care equipment to assess hematocrit and/or coagulation. Outline if thromboelastography (TEG®) and thromboelastometry (ROTEM®) are available to guide management.

Our hospital maintains a critical care lab available for use 24/7. This lab runs all our specimens with minimal delay, and is able to run a blood gas with hemoglobin, lactate, and electrolyte levels within 5 minutes.

Additionally, this lab is able to run thromboelastography with a variety of different assays in order to assess hematologic function. We are capable of running standard Kaolin TEGs, heparinase TEGs, and rapid TEGs 24 hours a day, and can also run platelet function studies and platelet mapping when a perfusionist is in-house.

• Availability of intraoperative cell salvage in patients who refuse banked blood and/or during high-risk cesarean deliveries.

Our center is a world leader in bloodless medicine services, as a result of the work of Dr. Steve Frank. He has published a number of blood management algorithms and programs to decrease the use of perioperative transfusion.

Part of this program includes antepartum bloodless medicine and obstetric anesthesiology consultation for patients who refuse blood transfusions, and also includes the availability of cell salvage for patients who will accept it. In house perfusionist for cell salvage are available with less than 30 minutes notice.

During our abnormal placentation procedures, we routinely employ the use of cell-saver technology to decrease the number of units transfused and the associated cost and complications. We employ the use of leukocyte filters to decrease the risk of cell saver during obstetric hemorrhage.

For more information about some of our institution's leadership in blood management and blood conservation strategies, see the publications below:


• *Provide your institution’s obstetric hemorrhage protocols, checklists and/or algorithms.*

Please see the PDFs attached to this application for our obstetric hemorrhage protocol, TXA protocol, and massive transfusion protocol.

Note that our obstetric hemorrhage protocol is currently undergoing revision, but will include the use of tranexamic acid as well as the use of thromboelastography for transfusion management. This upcoming version is due to be revised in the fourth quarter of 2018.

Also attached is our difficult airway response team protocol.

2. Airway management

• *Difficult airway cart (with laryngoscopes, endotracheal tubes, rescue airway devices (e.g. supraglottic airway device, such as a laryngeal mask airway), video-laryngoscope, and surgical airway equipment) immediately available on the obstetric unit.

Johns Hopkins Hospital developed the first-of-its-kind Difficult Airway Response Team, whose protocol is attached to this application as a PDF. In addition to a dedicated video laryngoscope and a wide variety of standard endotracheal tubes, LMAs and rescue devices, we also have a DART cart which includes a fiberoptic bronchoscope, a tracheostomy tray and equipment for jet ventilation in our operating room cluster on labor and delivery. This equipment is checked by our critical care technicians daily, and is dedicated for use on L&D.


• *Suction and a means to deliver positive pressure ventilation (e.g. bag-valve mask device) immediately available in readily accessible locations where neuraxial analgesia/anesthesia and/or general anesthesia are administered.*

All of our operating rooms are supplied with suction and anesthesia machines as well as bag valve mask devices to support positive pressure ventilation. In addition our labor suites and triage rooms have a dedicated anesthesia suction setup, as well oxygen supply line with bag valve mask device to support positive pressure ventilation and suction.

Additionally, our code carts are equipped with portable suction machines. We have a code cart in our PACU, our OR cluster (next to our DART cart), and in a central location on our labor floor.
• In-house (24/7) backup of personnel with surgical airway access skills.

Our DART team is easily activated with a call to the operator, and immediately broadcasts a page to the rest of the anesthesiology team in-house, the trauma surgery attending and senior resident, the in-house ENT resident, and the in-house central intensivist. These providers all respond to the call for a difficult airway, and ENT or trauma surgery are both capable of providing a surgical airway if that is necessary.

3. Other emergency resources
   • *Lipid emulsion, appropriate supplies and protocols that will allow a timely response to local anesthetic systemic toxicity.

Lipid emulsion is stocked in our workroom for immediate use. We maintain two 500mL bags for use as a bolus and infusion.

Protocols for management of LAST are attached to our carts which contain our neuraxial kits. These protocols include the standard LipidRescue protocol published by ASRA.

• Dantrolene and sterile water vials, along with other supplies to allow a timely response to malignant hyperthermia.

Our anesthesia workroom on labor and delivery is stocked with an MH response kit. This includes cooled saline, dantrolene vials, and carbon filters for immediate application.

Our OR pxyis contains all of the medications required to maintain total intravenous anesthesia during an MH emergency, and our workroom is also stocked with two arterial line setups (checked daily and replaced every 3 days by our anesthesia technicians).
• Cognitive aids and clinician awareness of resources to manage emergencies, and training to facilitate team member awareness of the location and means to retrieve resources to better manage emergencies.

We have a number of cognitive aids attached to our anesthesia machines and epidural carts. These include standard management of local anesthetic toxicity, malignant hyperthermia and cardiac arrest in pregnancy. We routinely review these protocols with our residents when they rotate with us.

Additionally, there are cognitive aids for these and other emergencies present on all our code carts throughout the labor suite. Our electronic medical record also includes decision support algorithms accessible in one click from the intraoperative anesthetic record, with drug dosages calculated from the patient's dosing weight.

4. Multidisciplinary team-based approach

• Describe systems in place to ensure inter-professional communication and situational awareness on your obstetric unit such as: board sign-out at each shift change of anesthesiology staff; pre-procedural timeouts; post-procedural briefings, as indicated; daily multidisciplinary rounds or huddles to discuss management plans for women on labor and delivery, antepartum and postpartum.

Every change of shift, our anesthesiology staff signs out every patient. After this occurs, we attend a multidisciplinary signout with the outgoing and incoming teams from OB anesthesiology, L&D, and nursing teams. We discuss all patients on the labor floor, all "coming ins", any antepartum or postpartum complicated patients, and all patients who are admitted to other services who are pregnant or recently delivered.

Additionally, we employ routine huddles during times of clinical overflow or high-risk patients: these "MedTeams" are announced via our phone messaging system, and consists of the nursing, OB, and anesthesia teams joining together to prioritize and practice a shared mental model.

Before every procedure (with the exception of "level red" or stat procedures), we have a multi-disciplinary huddle with the involved physician and nursing teams caring for the patient.

• Timeout performed prior to all anesthetic interventions.

We perform a time out (with computer verification using a barcode scanner) before every procedure, and verify patient identification, allergies, relevant medical conditions and labs, as well as the intended procedure prior to proceeding. Additionally, we review anticoagulation plans with the patient and bedside nurse as well as recent thromboprophylaxis medications prior to proceeding with neuraxial anesthesia.
• Timely evaluation by the anesthesiology service of: 1) all women undergoing scheduled cesarean delivery and other obstetric-related surgeries, and 2) the vast majority of women presenting to labor and delivery. Women presenting to labor and delivery should be triaged and/or evaluated by the anesthesiology service soon after admission.

All pregnant women undergoing cesarean or other obstetric surgeries are evaluated by our team on arrival to the labor floor, and a pre-procedure evaluation is placed into our EMR in real time during the patient interview.

If women present to L&D in labor or for admission, our team sees them within 30 minutes of presentation to L&D in order to perform an evaluation and write a pre-procedure evaluation.

• A system in place to screen and identify all high-risk patients. Early evaluation of high-risk antenatal patients prior to admission for scheduled surgery or labor and delivery (e.g. high-risk clinic).

Our division runs a high-risk antepartum clinic service known as the Center for Peripartum Optimization. This center addresses all patients with high risk maternal diagnosis or concerns for previous or anticipated anesthesia complications. We maintain a list of high-risk conditions that serves as a referral guide for providers to direct referral of patients into the clinic in a timely manner. This center is staffed by an OB Anesthesiologist as well as an OB Anesthesia fellow 3 times a month, and averages up to 12 new patient consultations per day.

• Multidisciplinary evaluation of cardiac and other high-risk obstetric patients.

Our center for peripartum optimization clinic visits serves as the coordinated care center in charge of facilitating evaluation and multidisciplinary discussion and planning for all high risk patients. Patients who require cardiac, hematologic, and other subspecialty follow-up, are referred to a network of specialists who routinely follow complex parturients.

We follow up on the recommendation of our consultants, and a coordinated care plan for delivery and post partum management is constructed in collaboration with our maternal fetal medicine and obstetric providers. Those patients with highly complex presentations and delivery plans are then discussed at a multidisciplinary meeting with OB Anesthesia, Obstetrics / Maternal-Fetal Medicine, Neonatology and the applicable subspecialties.
• Availability (24/7) of surgical backup, ideally in-house (e.g. trauma and/or gyn-onc surgeons).

We have 24/7 in-house trauma surgery staffed by a fellowship-trained trauma surgery attending. Additionally, gyn-onc is available in-house during the day and on call from home at night.

• Protocol or pathway to activate interventional radiology.

Our interventional radiology residents are on in-house call 24/7 and are frequently used due to our standing as a level I trauma center. They are available by page, and perform in-person consultations within minutes of notification.

Our IR suites are located next to our trauma ORs, and are available with 24/7 IR and Anesthesiology staffing for any obstetric emergency.

• Intensive care unit available to receive obstetric patients.

Johns Hopkins hospital has 2 surgical ICU's, 1 medical ICU, 1 CCU (Coronary Care Unit), 1 Progressive Cardiac Care Unit (PCCU), 1 Cardiac Surgical Intensive Care Unit (CSICU), 1 Neuro Critical Care Unit with step down (NCCU) all available and capable of caring for obstetric patients. These units are closed units with specialized providers and nursing staff capable of caring for OB patients. In addition, the labor and delivery staff (OB, anesthesia and nursing) closely coordinate with those providers to provide comprehensive care for mother and baby in those units.

We have operating rooms directly communicating with all of the above ICU's and private ICU rooms. For instance, our cardiac operating rooms are located on the same floor as our cardiothoracic ICU. We are capable of performing emergency C-sections within minutes of all ICU locations and all rooms are equipped to allow for vaginal deliveries if necessary.
• Nursing staff who provide post-anesthesia care in the obstetric unit with appropriate competencies to recover surgical patients.

Our PACU is on the labor and delivery suite within immediate approximation to our labor and delivery OR's. All labor and delivery nursing staff are PACU and ACLS certified and qualified to recover surgical patients. All PACU's and nursing staff meet AWOHN standards of care.

• *Obstetric emergency response team with a policy that includes obstetric conditions and/or vital sign parameters that warrant activation, and means of notifying all members of the response team.

Labor and delivery is staffed 24/7 with an OB rapid response/STAT team. We have the ability to activate an "OB STAT TEAM" page which reaches the phones of all the medical staff on L&D. There is a list of cases necessitating this activation available at our nursing station.

Our OB Stat team policy and a list of personnel and their responsibilities is attached.

• *Simulation drills: An active multidisciplinary program with obstetric and anesthetic emergency simulation drills (e.g. stat cesarean delivery, maternal cardiac arrest, difficult/failed intubation, obstetric hemorrhage, eclampsia). Outline drill scenarios as well as the percentage of anesthesiology faculty (who cover obstetric anesthesia call), obstetricians, nurses, and other personnel who have participated in obstetric simulation (or inter-professional team training) in the last five years. Ideally, physicians providing obstetric anesthesia should participate in at least one simulation drill or training session every four years. Simulation drills for anesthesiology providers only, if no formal multidisciplinary program exists or to supplement pre-existing drills.

Our labor and delivery team runs yearly multidisciplinary simulation drills for maternal arrest, hemorrhage, stat cesarean delivery, shoulder dystocia, difficult intubation and neonatal arrest. These simulations are run as live unscheduled drills on the unit as well as planned events in the simulations center. These simulations take place several times a year to ensure that rotating staff are all experienced in the above scenarios.

Additionally, our anesthesiology trainees undergo a rigorous simulation curriculum throughout their residency as a part of our "college day" program. Every other Thursday throughout their residency, our residents are excused from clinical duties and participate in simulation, hands-on demonstrations, cadaver labs and case discussions. Our obstetric anesthesia faculty are among the educators for our college day curriculum and specific obstetric emergency scenarios including failure to intubate, hemorrhage, and seizure are included in the curriculum.
5. Institutional resources

- Ability to provide anesthesia care for postpartum tubal ligation procedures within 24 hours of delivery, or urgent cerclage placement within 12 hours of surgical request.

All post partum tubal ligations and cerclages are performed on the labor and delivery suite. When medically feasible, tubal ligation procedures are performed within hours of vaginal delivery. Urgent cerclage placements can also be performed within 12 hours or sooner if necessary.

- *Additional operating room (with nursing/techs/obstetric and anesthesiology personnel) available at all times for emergency obstetric procedures (if all obstetric unit operating rooms are occupied).

We have three operating rooms on the labor floor, and do not run more than two elective procedures simultaneously. In the rare event that this does occur and the third room is occupied, we will call the trauma operating rooms and place a hold on one of our trauma OR suites with a full anesthesia/nursing/OR tech team until an L&D OR is available.

Additionally, when all three ORs are in use, it is standard procedure to pause all oxytocin infusions on all laboring patients and delay artificial rupture of membranes in any laboring women until an operating room in our suite is cleaned and ready for use.

- Ability to provide invasive monitoring and other advanced management techniques for high-risk patients on the obstetric unit, including arterial lines, central lines, cardiac output monitoring, and transthoracic/transesophageal echocardiography.

Three of our labor and delivery suites are equipped with ICU-level monitors capable of monitoring invasive pressures and measuring cardiac output.

Our dedicated anesthesia ultrasound has a TTE probe and is located in our anesthesia workroom. Cardiology is in house 24/7 for emergency TTE as well as consultation. Our cardiac anesthesia team is in-house during the day and on home call at night, and are TEE certified. Our TEE machines are housed in the same building as our labor floor, several floors below our suite.

A member of our OB anesthesia faculty is in the process of obtaining National Board of Echocardiography TEE certification as well.
• Ability to manage women who need vasoactive drug infusions, intensive care or cardiac care, and/or additional monitoring requirements (e.g. monitored bed, telemetry).

Our labor and delivery unit has three telemetry monitored beds. Per nursing protocol basic vasoactive drug infusions including labetalol and cardizem are managed on labor and delivery. Advanced resuscitations, ICU level care, cardiac care and additional vasoactive infusion and monitoring requirements are managed in one of our 7 ICU’s. We have attached our vasoactive drug policy for reference.

The hospital is staffed 24/7 with a rapid response team that is responsible for aiding in the escalation of care of all patients (including obstetric patients) to ICU’s or step down units. In addition, we have a "central intensivist" who is a board-certified anesthesiologist with critical care training in-house 24/7 for immediate consultation if needed.

Cesarean Delivery Management:

* A standardized clinical care pathway (e.g. enhanced recovery protocol) utilized by the institution and all obstetric anesthesia providers. Describe the institution’s general approach to standardizing care; specific aspects of the protocol can be outlined next to each criterion listed below.

1. *Routine utilization of a pencil-point needle, 25-gauge or less for the provision of spinal anesthesia.

   We routinely utilize either 26-gauge Gertie Marx needles or 25-gauge Whitacre needles for spinal anesthesia.

   For our repeat cesarean sections, those who are morbidly obese and those with multiple prior abdominal surgeries, we perform a combined spinal-epidural technique using a 26-gauge Gertie Marx needle. Given our patient population (higher-order cesarean sections, morbidly obese, and multiple prior abdominal surgeries), a significant percentage of our cesarean deliveries are performed using the CSE technique.

2. Multimodal analgesia protocols
   • *Analgesic protocols which include low dose long-acting neuraxial opioid (such as 100-150 mcg intrathecal morphine or equivalent long-acting opioid, or 2-3 mg epidural morphine or equivalent long-acting opioid), and supplemental multimodal oral analgesics (ideally scheduled non-steroidal anti-inflammatories and acetaminophen).

   We routinely employ spinal or epidural morphine for post-cesarean analgesia. In addition all post operative and post vaginal delivery patients receive a multimodal analgesic protocol that also includes scheduled NSAIDs and acetaminophen. For patients who are not candidates for long-acting opiates for post-cesarean analgesia, we perform one of the following:

   1. Maintain a low-dose opiate and local anesthetic patient-controlled epidural analgesic for post-surgical pain, alongside scheduled NSAIDs and acetaminophen.

   2. Utilize an opiate IV PCA for these patients, as well as the standing medications described above.

   3. Perform regional anesthetic blocks (TAP, QL, or erector spinae blocks) for post-surgical pain, as well as the standing medications described above.

   Our pain management protocol for post-cesarean delivery pain is attached, as is our morphine PF monitoring pathway.
• Ability to provide local anesthetic wound infusions or regional nerve/fascial plane blocks when appropriate.

We have an in-house regional anesthesia team and on call acute pain service who can perform blocks for those patients who cannot receive long-acting neuraxial opiates and who do not have an epidural catheter.

A number of our faculty are credentialed by our department for performing TAP and QL blocks.

• *Institutional effort to minimize opioid usage, such as limiting rescue opioid doses (e.g. <30 mg oxycodone/24 hours), non-opioid rescue analgesic options (e.g. transversus abdominis plane blocks, gabapentin), and efforts to limit the number of opioid tablets (e.g. 20-30 tablets) prescribed on discharge.

Hopkins is dedicated to minimizing opioid usage in our patient population. Our post partum protocol emphasizes the use of non opioid analgesics including acetaminophen, ibuprofen, lidocaine duragesic patches and gabapentin. In addition we have an acute pain service available 24/7 to provide additional alternatives that are safe in nursing mothers including TAP blocks, QL blocks, and other non opioid alternatives. Patients are discharge home with tylenol and ibuprofen. If opioid are required they are dispensed in limited quantity (<1 week supply). For those patients who are expected to have issues with pain that in the post partum period beyond that which is normal, we recommend routine follow-up in our post-discharge acute pain clinic. That clinic focuses on minimizing opioid use and pain treatment.

3. Temperature management

• *Strategies to prevent maternal and fetal intraoperative hypothermia, e.g. active warming, warm intravenous fluids, appropriate ambient delivery/operating room temperature. Measurement of maternal temperature during general and neuraxial anesthesia. Report your standardized minimum operating room temperature for cesarean delivery.

We routinely warm our operating rooms prior to cesarean delivery. Our standard minimum OR temperature depends on gestational age, but is typically 76°F for term neonates and at least 78° for preterm neonates.

All our blood products are transfused warm, and our IV fluids are warmed if being administered expeditiously.

For all general anesthetics, temperature is monitored via pharyngeal or esophageal temperature probes and forced-air warming is applied. For procedures under neuraxial anesthesia, temporal temperature monitoring is standard and warmed blankets are used and added for patient comfort.
4. Appropriate antibiotic prophylaxis to prevent surgical site infection.
   - *Protocols to ensure timely administration (prior to skin incision) of an appropriate antibiotic(s),
     dosed according to the patient’s weight, appropriate re-dosing strategies, alternative antimicrobial
     agents if allergies known/detected, and additional antibiotics considered for high-risk patients.

   For all cesarean deliveries, we routinely administer 2 grams of IV cefazolin (3 grams if >120 kg).
   Additionally, for all laboring women we administer 500mg of IV azithromycin prior to skin incision.
   We made this change in early 2017 in response to literature showing a decreased risk of surgical
   site infections when azithromycin is administered to laboring or ruptured women undergoing
   cesarean delivery (Tita ATN, Szychowski JM, Boggess K, et al. Adjunctive Azithromycin Prophylaxis

   For penicillin-allergic patients, we usually employ clindamycin and weight-based gentamicin dosing.

   - Outline which antibiotics are immediately available in the operating room for emergency cesarean
     deliveries, and describe how additional antibiotics are acquired urgently from pharmacy.

   Our pyxis contains cefazolin, metronidazole, vancomycin, azithromycin, and
   clindamycin for immediate use.

   For antibiotics not available from the pyxis, we place a STAT order in Epic and it is
   sent to the labor floor via our pneumatic tube system. A tech then goes to the
   pharmacy and runs the antibiotics to the operating room for urgent use.

5. Spinal hypotension prevention and treatment
   - A standardized approach to prevent and treat hypotension after spinal anesthesia. Ideally,
     prophylactic infusion of phenylephrine to maintain blood pressure within 10% of baseline, with
     boluses of phenylephrine and ephedrine as appropriate to treat hypotension, as well as utilization
     of an intravenous fluid pre-load or co-load prior to, or during spinal anesthesia.

   Our patients routinely receive fluid pre-load and co-load during spinal anesthesia.

   Additionally, some of our anesthesiology faculty employ routine use of phenylephrine
   infusions during spinal anesthetics. Others prefer small intermittent boluses of
   phenylephrine and ephedrine to treat hypotension. All pressures are maintained
   within 10-15% of baseline, and titrated to the patient’s symptoms as well as fetal
   status.
6. Postoperative nausea and vomiting prophylaxis and treatment
   - Risk stratification method to identify women at increased risk for postoperative nausea and vomiting.

   We routinely ask about postoperative nausea and vomiting in prior anesthetics, as well as a history of motion sickness. Additionally, women who undergo general anesthesia are more likely to have postoperative nausea and vomiting as compared with neuraxial anesthesia: these serve as our main risk factors.

   Addition, we perform a modified Apfel score for women undergoing cesarean delivery, and specifically inquiring about a history of PONV or motion sickness, anticipated high opiate use postoperatively, or exposure to general anesthesia.

   - *At least one prophylactic antiemetic agent routinely administered. Alternative class of antiemetic agent available for additional prophylaxis and/or treatment of nausea and vomiting.

   All women who undergo cesarean delivery are given ondansetron unless there is a contraindication to its use.

   For cesarean deliveries performed under general anesthesia, a number of our team members perform these procedures under a propofol infusion rather than using volatile anesthetic agents. Additional antiemetics are stocked in our Pyxis for use, and can be used at the discretion of the treating team.

7. Postpartum monitoring
   - Risk stratification for women at increased risk for respiratory depression, and screening for obstructive sleep apnea.

   STOP-BANG scoring is routinely employed by our nursing team during their admission intake. In patients with multiple risk factors for obstructive sleep apnea (or those whose diagnosis is confirmed), we will avoid the use of long-acting neuraxial opiates for post-cesarean pain. We aim to minimize opioid use in all of our patient population, however for those patients at high risk for respiratory depression we avoid opioids and especially opioids in combination with other sedative agents such as sleep aids, benzodiazepines, barbituates, etc.

   Additionally, for our highest-risk patients, we have the ability to monitor end-tidal CO2 in our labor rooms with the aid of a portable monitor. This is particularly helpful when utilizing an IV remifentanil PCA for labor analgesia when patients are not eligible for neuraxial anesthesia. Those patients at high risk for respiratory are kept for prolonged monitoring on labor and delivery after delivery if general anesthesia or narcotics are administered.
• Monitoring for respiratory depression consistent with the SOAP Consensus Recommendations for the Prevention and Detection of Respiratory Depression Associated with Neuraxial Morphine Administration for Cesarean Delivery Analgesia (3), and the American Society of Anesthesiologists (ASA) Practice Guidelines for the Prevention, Detection, and Management of Respiratory Depression Associated with Neuraxial Opioids (4).

Our neuraxial morphine order set includes monitoring parameters and recommendations consistent with those set forth by the organizations mentioned above.

We have attached our standard policies and procedures for monitoring of patients after the administration of neuraxial morphine.

• Nursing care and monitoring consistent with the Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) and ASA recommendations.

Our routine nursing care exceeds these standards. We have attached our policies and procedures for post-partum nursing care.

8. Neonatal care

• Anesthesiology service supportive of baby-friendly breastfeeding practices (e.g. ability to safely facilitate skin-to-skin in the operating room, when possible).

Johns Labor and Delivery is a designated baby friendly hospital. As such our anesthesiology services meet those criteria. We routinely place our ECG electrodes on the patient's back and away from her chest to allow for skin-to-skin time in the operating room. We are very supportive of this practice, and encourage parents to hold and bond with their newborn during the conclusion of the surgery. In the event that the mother is unable to hold the newborn we encourage the partner to participate in skin to skin and facilitate that practice.
• In-house (24/7) clinician (separate from the anesthesiology service) with appropriate training to provide neonatal resuscitation.

We have in-house neonatology services, including a NICU fellow and pediatrics residents in-house 24/7 and an attending available from home.

Our faculty also maintain active certification in neonatal resuscitation, and our fellows are required to become certified in neonatal resuscitation by the halfway point of their fellowship.

Labor Analgesia:

1. Low concentration local anesthetic solutions for administering neuraxial labor analgesia
   • *Use of low concentration local anesthetic solutions. Ideally ≤0.1% bupivacaine or ≤0.15% ropivacaine.

We use 0.125% bupivacaine as the local anesthetic backbone of our intrapartum labor analgesia. We use a PCEA system with an 8mL basal rate per hour, and a 5mL PCEA bolus every 20 minutes.

For post-cesarean delivery, we use a 0.0625% bupivacaine solution with a 6mL per hour basal rate and a 4mL PCEA bolus every 10 minutes.

• *Use of neuraxial opioids (e.g. fentanyl or sufentanil) and/or other adjuvants (e.g. clonidine) added to epidural local anesthetic solutions.

Our intrapartum labor analgesia epidural solution also includes fentanyl at 2 mcg/mL concentration. We use a PCEA system with an 8mL basal rate per hour, and a 5mL PCEA bolus every 20 minutes.

Our post-cesarean 0.0625% bupivacaine solution includes fentanyl at 5 mcg/mL, and is administered via PCEA with a 6mL per hour basal rate and a 4mL PCEA bolus every 10 minutes.
• Standardized epidural solutions used by all providers. Ideally, pharmacy-provided pre-mixed epidural solutions.

Our epidural solution bags are pre-mixed by either our pharmacy or Pharmedium, and we use standardized order sets to decrease provider error and variability.

This applies for both our labor epidurals as well as our postpartum epidural solutions.

2. Neuraxial techniques
   • *Combined-spinal epidural techniques available/offered in addition to standard labor epidural analgesia.

   CSE techniques are offered as part of our standard neuraxial options for both labor and cesarean delivery and are employed by all faculty members.

   • *Patient controlled epidural analgesia (PCEA) and ideally background programmed intermittent epidural boluses (PIEB) utilized for the provision of neuraxial labor analgesia.

   Our labor analgesic epidural solutions are administered in a PCEA format as described above.
• *Routine utilization of flexible (flex-tipped/wire-reinforced) epidural catheters for labor epidural analgesia.

Our catheters are multi-orifice catheters that are flex-tipped and wire-reinforced. We currently utilize Arrow MRI-conditional multi-orifice catheters at Johns Hopkins and all of our affiliate sites.

3. Regular assessment of labor analgesia effectiveness

• *Regular assessment of neuraxial labor analgesia effectiveness. Ideally, pain scores documented by nursing staff (e.g. every 1-2 hours) supplemented with regular anesthesia provider rounds or evaluations (e.g. every 2-4 hours).

Our nurses document pain scores at least every hour in our EMR, and our team rounds on patients every 2-4 hours in labor to evaluate the adequacy of our labor analgesia.

The residents who placed the epidural are encouraged to follow their own patients in order to assess their adequacy of analgesia. This affords a continuity of care for our patients as well serving to give our residents instantaneous feedback about their techniques.

• Ongoing monitoring (e.g. blood pressure, assess motor/sensory levels) and protocols to manage potential side effects or complications associated with neuraxial analgesia.

We have attached our protocol for labor analgesia that is currently in use at our institution.

Patients undergo blood pressure monitoring every 5 minutes for the first 30 minutes after neuraxial anesthesia administration, and every 30-60 minutes thereafter unless otherwise medically indicated. Additionally, most of our patients have continuous fetal monitoring to evaluate for adequacy of fetal/placental perfusion. Oxygen saturation is continuously monitored for 30 minutes after epidural initiation and every 30-60 minutes thereafter unless medically indicated. Maternal sedation, motor and sensory exams are performed by nursing every 4 hours while in labor.

Our epidural order set also includes the use of diphenhydramine, nalbuphine, and naloxone for pruritus.
• Postpartum monitoring consistent with AWHONN recommendations.

All post partum monitoring strictly adheres to the AWHONN standard. Our postpartum monitoring policy is attached.

Recommendations and Guidelines Implementation:

• *At a minimum, evidence of implementation of the Practice Guidelines for Obstetric Anesthesia by the ASA Task Force on Obstetric Anesthesia and SOAP (5). Select key recommendations not otherwise addressed in other areas of this application:
  ✔ Platelet count prior to neuraxial block placement: No requirement for routine testing in healthy women

In healthy women, our group does not routinely wait for platelet counts prior to proceeding with block placement.

  ✔ Appropriate liquid and diet restrictions: Intrapartum (allow clear liquids in uncomplicated patients); cesarean delivery (clear liquids up to 2 hours prior)

Our low risk uncomplicated patients are allowed to consume clear liquids in labor, and are encouraged to adequately self-hydrate to avoid exogenous fluid boluses. For c-sections we permit clear liquids up to 2 hours prior to the case. High risk patients or those at high risk for urgent/emergent c-section are maintained NPO.

Additionally, for our patients undergoing fetal surgery, we employ an ERAS protocol including multimodal analgesia, encouraging the use of carbohydrate-rich energy drinks until 2 hours prior to OR entry.
Timing of neuraxial analgesia: Allow neuraxial analgesia in early labor (no specific cervical dilation required)

Our group does not restrict neuraxial administration based on a pre required cervical dilation. Provided there are no contraindications to placement, we do not have a cutoff regarding cervical dilation or labor progress.

- Evidence of implementation of the SOAP Consensus Statement on the Management of Cardiac Arrest in Pregnancy (6).

We have employed these recommendations, and drill regularly for these rare events. Additionally, we have a peri-mortem cesarean section tray on our code cart in L&D.

Attached to this application is our policies and procedures document regarding maternal cardiac arrest.

- Examples of implementation of key aspects of the National Partnership Maternal Safety Bundles (7).

We encourage our patients to ambulate in early labor, and routinely use standard thromboprophylaxis measures.

Low-risk patients receive sequential compression devices, whereas higher-risk patients are administered pharmacologic prophylaxis while in latent labor.
• A system to coordinate care for women receiving ante- and postpartum thromboprophylaxis as outlined by the SOAP Consensus Statement on Neuraxial Anesthesia in Obstetric Patients Receiving Thromboprophylaxis (8). A process by which obstetric anesthesia providers are informed about women receiving thromboprophylaxis.

Our EMR notifies us of thromboprophylaxis medication administrations via an alert when we begin charting our labor analgesic. In addition, anticoagulation administration is included in our pre-procedure timeout with the patient and her labor and delivery nurse.

**Quality Assurance and Patient Follow-up:**

• *An anesthesiologist serves as a member of the team that develops and implements multidisciplinary clinical policy, e.g. quality improvement committee, patient safety committee.

One of our core faculty members serves as head of our division's QI team and reviews all reports submitted to our medical error reporting system. This faculty member works closely with our obstetrics and nursing quality teams to provide the best care for patients.

We have monthly QI conferences as a division, where we discuss complicated procedures as well as any equipment or systematic issues which could impact patient safety.

• *Follow-up with structured interview/consultation on all patients who received either labor analgesia, cesarean anesthesia or anesthesia for other procedures (e.g. postpartum tubal ligation, cerclage). Patients should be reviewed, or protocol criteria fulfilled prior to discharge or transfer from labor and delivery. All patients who received an anesthetic procedure should be reviewed by the anesthesia service on the postpartum floor prior to hospital discharge.

We evaluate all patients after delivery (either vaginal or cesarean) prior to their transfer to our postpartum floor. This constitutes our level 1 signout process, and a note is documented in the chart with any relevant findings.

On postpartum day 1, we evaluate all patients to assess for their comfort and satisfaction. In addition to an in-person evaluation, we give them a feedback form and encourage them to share any feedback with us about how to better perform our jobs. This feedback has been instrumental in changing our workflows to better care for patients.

We have attached a copy of our postpartum day 1 survey to this application.
A robust system in place to follow-up on all patients with anesthesia-related complications.

We maintain a log of any patients with anesthesia-related complications, and follow up with the patient and all necessary services. We routinely contact patients at home after discharge if their peripartum course was complicated or as a result of their survey responses.

Our EMR allows us to flag a patient's chart for anesthetic follow-up, which serves as another centralized list of patients requiring further care.

For our highest-risk patients, we continue to follow up with them throughout their ICU or hospital stay and offer to help the primary team with any management assistance.

*A system in place to evaluate and treat (with an epidural blood patch, if necessary) a post-dural puncture headache (PDPH) in a timely fashion. Optimally, outpatient PDPH should be evaluated and treated on the obstetric unit and not in the emergency department.

Any patient with a PDPH after discharge is referred back to labor and delivery for evaluation and possible treatment. All our providers are comfortable with performing epidural blood patches, and do so with regularity if the clinical situation is appropriate and the patient is properly consented.

A means to routinely collect patient feedback on maternal experience of care, with a specific focus on anesthetic and analgesic care.

As described above, all patients are given a feedback survey to fill out on postpartum day 1 while still inpatients. This survey is given to the patients the morning after delivery, and is returned to their bedside nurse and collected by our division director for analysis. This evaluation is available in English and Spanish.

Additionally, patients are given contact information for our division should they have any questions post-discharge.
• The anesthesiologist is an active participant in multidisciplinary root cause analysis or equivalent program to evaluate maternal and/or fetal adverse events. Provide examples of effective implementation of identified system solutions.

Dr. Murphy is directly involved in all root cause analysis events evaluating maternal and/or fetal adverse events.

Examples of identified system solutions include:
1. Delayed operative case due to poor communication
   Actions: 1. Implementation of an ASCOM phone alert for all urgent/emergent cases
             2. development of a operative leveling system that eradicates the need to use ambiguous language to define urgency of a case (e.g. level 1, 2, 3 instead of STAT, emergent, urgent)

2. Underestimation of blood loss in post vaginal delivery hemorrhage
   Actions: Mandatory weighing of all bloody materials during vaginal delivery for any delivery that meet the defined criteria (e.g. EBL>750, additional laps required, patient tachycardia, patient AMS, etc)

• A system to educate nurses, obstetricians and allied professions on obstetric anesthesia-related care.

We routinely give lectures to our obstetrics residents, fellows and attendings about topics related to anesthetic care. This takes place during the OB residents’ dedicated learning time, during multi-disciplinary fellows’ conferences, or during the maternal fetal medicine - OB anesthesia joint conferences that take place every Wednesday afternoon.

Additionally, our faculty engage in nursing education on key anesthesia and critical care topics. Specifically when there are patients on the labor floor with complex histories or medical states, our team serves as educators to the nursing staff about conditions as varied as complex congenital cardiac lesions to intracranial tumors to end-stage liver disease.
References:


2. California Maternal Quality Care Collaborative. OB Hemorrhage Toolkit V 2.0. 

3. SOAP Neuraxial Morphine Consensus Statement for Membership Review. 


Keywords: airway, airway cart, airway equipment, D.A.R.T., DART, difficult airway, Emergency

I. OBJECTIVES

To provide a multidisciplinary difficult airway response team (DART) composed of personnel who have specialized medical training in managing adult difficult airway patients, and who can respond in an emergency with specialized equipment to assist with airway management.

II. INDICATIONS FOR USE

A. The Adult DART is activated to provide emergency airway management for:
   1. Difficult airway patients who require intubation or who experience loss of airway.
   2. Patients who cannot be intubated via standard intubation techniques and require advanced airway management.
   3. Providing support and assistance at the direction of the pediatric code, rapid response team (RRT) or pDART teams during pediatric airway emergencies.

B. An adult DART response should not be activated for airway consultation, which can be requested for non-emergent or elective airway management (e.g. extubation of a difficult airway patient) through the DART consultation pager.

III. DEFINITIONS

| Rapid Sequence Intubation | Rapid Sequence Intubation (RSI) involves the administration of a potent sedative or induction agent, followed by administration of a rapid-acting neuromuscular blocking agent, which enables the rapid insertion of an endotracheal tube for patient ventilation. |
**Difficult Airway Response Team (DART) Adult Policy**

DART carts are unique, dedicated carts containing specialty equipment for managing difficult airway patients by the DART service providers when activated.

### Difficult Airway Response Team (DART) cart
- The DART physician responders includes attending, resident and CRNA coverage 24/7 from each service unless noted otherwise:
  - Anesthesiology Critical Care Medicine (ACCM)
  - Halsted Trauma Surgery
  - Otolaryngology Head & Neck Surgery senior resident and in-house attending 7:30 AM-5PM, with on-call notification 24/7. Junior resident in-house 24/7.
  - Emergency Medicine physicians when a patient is in the (Emergency Department) ED.

Other responders include:
- Respiratory Care Practitioners (RCP)
- ACCM Critical Care Technicians (CCT)
- Nursing shift coordinators
- Charge nurses and/or their designees on units responsible for cart delivery.
- Pharmacist.

### Difficult Airway Identification Bracelet
- A blue wristband identifying the patient as having a known or anticipated difficult airway (Appendix A).

### Adult Difficult Airway Response Team (DART) Committee
- The adult DART committee includes clinical and administrative representatives from DART service departments and reports to the CPR Advisory Committee.

---

**IV. RESPONSIBILITY**

**A. Difficult Airway Response Team (DART) Committee**

1. The DART committee is responsible for:
   a. Standardizing DART cart contents, and approving any changes
   b. Evaluating the procedures and policies related to DART team activation and cart use.
   c. Designating DART cart storage locations and deployment responsibilities.
   d. Reviewing DART activations to evaluate cart use, supplies, maintenance, and operational practices.
   e. Ensuring staff DART education is updated as required to support the program.
   f. Participating in difficult airway provider education curriculum.

**B. Department of Surgery, OHNS, Emergency Medicine, ACCM, and Department of Medicine DART Providers**

1. Maintain specialty training in the use of the adult DART cart equipment or management of difficult airway patients as defined in their written job descriptions.
2. Report all DART activations in the ACCM Airway Registry.
3. Determine if the patient requires a bright blue “Difficult Airway” identification bracelet (Appendix A) and write an order for application if indicated.
4. Participate in scheduled multidisciplinary difficult airway educational conferences and case reviews.
5. Ensure any new difficult airway patient has:
   a. A "difficult airway" alert placed in the patient's electronic medical record, which is visible in the header.
   b. A difficult airway diagnosis added to patient's problem list.
   c. A difficult airway note documented in the medical record.
C. The Medical Director of the Johns Hopkins Airway Program or their designee shall:
   1. Review all DART calls reported via the ACCM Airway Registry or patient safety event reporting system to ensure:
      a. Adequate response times of team members and coordination of care.
      b. Timely delivery of DART carts to the patient bedside.
      c. Identification of barriers to effective DART implementation.
   2. Reviews any DART related patient safety event report submissions and makes system based recommendations for change or evaluation as needed.

D. Critical Care Technicians (CCT)
   1. Replace, maintain, and test DART cart equipment to ensure it is available and in proper working condition prior to use.
   2. Exchange, restock and reprocess used DART cart equipment and return it to the appropriate location. (See Procedure section C)
   3. Collect DART cart count sheets (Appendix B) when the carts have been used for submission to the Operations Administrator for the Department of Surgery.
   4. Ensure that the elevator key or key card is present on all DART carts.
   5. Report broken equipment to the Medical Director of Johns Hopkins Airway Program and the ACCM assistant administrator.

E. Nursing Staff
   1. Ensure used carts have patient information (name, history #, date, time and isolation status) placed on the count sheet for collection by the CCT who will pick up the cart for reprocessing.
   2. Ensure the bright blue “Difficult Airway” bracelet (Appendix A) is placed on the patient when ordered by an authorized prescriber or when the patient is readmitted with an active Difficult Airway alert.
   3. Post a Bedside Difficult Airway Alert Card (Appendix C) with special instructions or equipment if ordered by the DART prescriber at the patient's bedside.
   4. Provide the patient and family difficult airway education and MedicAlert registration materials as outlined in Appendix D.
   5. Notify the CCT when a DART cart is used and needs to be picked up for reprocessing or return the DART cart to the designated unit if not used during the DART activation.
   6. Complete the required DART online education modules.
   7. Nursing staff in the areas where DART carts are located shall also:
      a. Ensure the DART cart locks are in place as part of the daily emergency equipment check.
      b. Ensure delivery of the carts to the assigned areas during a DART emergency if indicated.
      c. Ensure that the person transporting the DART cart in an emergency knows how to use an elevator key or card key.

F. Respiratory Care Practitioners
   1. Assist with scope, equipment, and airway management during a DART event.
   2. Complete required DART educational training.

G. Pharmacist
   1. Assist with medication selection and preparation during DART event.

H. ACCM OR Operations Manager
   1. Notify the Medical Director of Johns Hopkins Airway Program or ACCM assistant administrator if any DART cart needs to be temporarily taken out of service due to missing or broken equipment.

V. PROCEDURE
   A. The adult DART can be activated by calling the emergency Lifeline operator at 5-4444 and requesting the adult difficult airway response team when actual or potential emergent difficult airway intervention is needed for a patient using...
Appendix F as a guide. The paging operator will activate the DART members on-call (OHNS, trauma surgery, ACCM, RCP, nursing).

B. In non-ICU settings the code team or RRT, if not already activated, shall be activated when the DART call is made.

C. Indications for activation of the adult DART include but are not limited to:
   1. Known difficult airway patients who require urgent intubation or who experience loss of airway.
   2. Patients who cannot be intubated via standard intubation techniques and require advanced airway management in the non-operative setting.
   3. Providing support and acting as a resource at the direction of the pediatric DART (PDART), code or RRT team during pediatric airway emergencies.

D. DART members may call the unit where the DART call originated on their way to the patient's bedside, to gain additional information about the patient, and to begin formulating a potential approach to airway management. The unit staff should be able to provide basic information so that interventions can be planned and proceed as soon as possible after the DART service arrives on the unit. The DART provider may request set up of a specific scope by the RCP staff if RCP is available prior to their arrival.

E. The staff activating DART services should know the location of the nearest Blue Difficult Airway Response Team (DART) cart (Appendix G). The nearest DART cart location and the back up DART cart locations (Appendix H) should be listed on the emergency phone card. (Appendix F).

F. Staff are responsible for knowing whether the cart will be delivered to their unit when the DART team is activated or if they will be responsible for retrieving the cart from the nearest cart location. The chart outlining expectations for cart delivery, location and contact numbers are found in the DART cart location, distribution, and deployment table (Appendix G).

G. Staff from the unit activating the DART service, who anticipate delivery of a DART cart, should delegate someone to call the delivering unit to ensure the page was received and the cart is en route.

H. The authorized prescriber, nursing and/or support staff retrieving a DART cart from the nearest storage unit shall notify the charge RN or appropriate staff member from the storage unit prior to removal. (Appendix G & H).

I. Elevator keys or key cards are attached to each DART cart. Staff may use the elevator keys or approved key cards to call the elevators during an emergency to facilitate rapid cart transport to the unit in need. (See Appendix I-Use of Elevator Call Keys).

J. DART Carts are not to be used for diagnostic procedures when other, more appropriate, diagnostic tools or specialty carts are available. Items in the DART carts shall not be used as a source of supplies for non-DART events.

K. Only authorized prescribers with specialty training in the use of the DART cart equipment, or management of difficult airways as defined in their written job descriptions, may use the DART cart equipment.

L. Upon removal of the DART cart’s outside, plastic blue cover the staff will note a large, light blue disposable paper drape. This drape can be retained to cover equipment after use.

M. A RCP staff member will assist with scope set up and use if requested by the DART providers.

N. In order to avoid damage to internal equipment, please do not stack heavy items on top of the DART cart.

O. Patient care providers using the DART cart will discard all contaminated disposable items and sharps. Contaminated non-disposable items will be placed back on the top of the cart and covered with the blue disposable drape provided. The outside dark blue cover may be placed on top of the cart.

P. The nursing staff where the DART cart is used will write on, stamp, or apply a patient label to the Equipment Count Sheet For the Difficult Airway Response Team (DART) Cart (Appendix B) with patient identification information (name, medical record # and isolation status). This form is found in the front pocket of the cart cover, must remain on the cart after use, and will be collected by the CCT.

Q. When the DART members arrive they will be expected to:
   1. Identify themselves and their specialty.
   2. Obtain a brief summary of the patient’s medical status.
Subject
Difficult Airway Response Team (DART) Adult Policy

3. Coordinate a plan for airway management with other DART members, the code team, RRT providers, and the unit based staff.
4. Inform unit based staff of any need to transport the patient to the operating room for additional airway management to facilitate coordination of care.

R. If the patient is identified as having a difficult airway, the prescriber making the determination will:
1. Add a "difficult airway" diagnosis to the problem list in the patient's EHR, in order to trigger a difficult airway alert in the header of the EHR. If the patient is admitted from the ED, the admitting provider should ensure the difficult airway alert is visible and the diagnosis is entered into the patient's EHR if not already documented by an ED prescriber.
2. Write an order for a blue "Difficult Airway" identification bracelet to be applied to the patient's wrist if the patient is newly identified as having a difficult airway (or has a history of difficult airway). "Difficult Airway" bracelets can be obtained from central supplies, the DART cart or ordered through Taylor Communications.
3. Enter a difficult airway note into the patient's medical record.
4. Write an order for any special instructions or equipment to be placed at the patient's bedside in the event of a difficult airway emergency.

S. If a patient is hospitalized with a previously diagnosed difficult airway, the admitting service should consider an anesthesia consult to develop an airway management plan in case of emergency. Page the DART consult pager in Corus or PING.

T. The RN staff will place the Bedside Difficult Airway Alert Card (Appendix C) and any required specialty equipment at the patient's bedside based on the difficult airway orders in the patient's medical record.

U. The RN staff is responsible for application of the blue difficult airway alert bracelet (Appendix A) in the non-operating room setting. ACCM providers shall place the bracelet on the patient identified in the operating room.

V. Each DART call must have a corresponding ACCM prescriber entry in the Anesthesiology and Critical Care Medicine Difficult Airway Registry.

W. Prior to discharge, the patient should receive the Difficult Airway Patient Information Handout (Appendix D) and the registration information for the MedicAlert Foundation (Appendix J).

X. Staff education regarding the activation of the DART personnel and carts should be part of the JHH/JHU orientation for new employees, house staff and faculty. Online education is included in the annual updates for the emergency response teams (See CPR policy PAT004).

Y. DART Cart Cleaning & Assembly
1. The CCT is responsible for cleaning and assembling the DART carts. Nursing staff will notify the CCT at pager number: 3-1912 when a DART cart has been used or removed from the unit, when the cart has expired, and/or when discrepancies are identified during the daily check of the cart (Appendix E).
2. The CCT shall provide a replacement DART cart when retrieving a used cart.
3. The CCT shall ensure used carts have patient information (name and history #) placed on the count sheet.
4. The CCT shall:
   a. Assemble the carts as outlined in Appendix B. Verify all listed supplies are on the cart, sign and date the count sheet.
   b. List the cleaned cart’s expiration date, and include the disposable bronchoscope lot and reference number on the Difficult Airway Cart Assembly and Tracking Sheet (Appendix B).
   c. Apply locks to the carts once reprocessed and record the lock numbers on the DART Cart Assembly and Tracking Sheet (Appendix B).

Z. DART event submissions into the ACCM Difficult Airway Registry Database will be reviewed by members of the DART Committee to evaluate effectiveness of interventions and to follow up on any potential operational issues identified during DART activation. Interesting events shall be pulled for review at scheduled multidisciplinary difficult airway committee meetings for the purposes of education and quality improvement.
VI. REPORTABLE CONDITIONS

A. If problems are identified (e.g., broken, missing equipment) with the DART cart supplies, the staff will complete a safety event report and notify the CCT.
B. Report any DART cart availability delays through safety event reporting system.
C. Report any problems resulting in delay of DART members arriving to the needed unit (e.g. paging delay) in the safety event reporting system.
D. If patient injury occurs during the use of the DART cart equipment, the staff will sequester the equipment, retain any packaging or related disposables, complete a safety event report, and notify Risk Management (5-7949).
E. CCT will notify the Director of the Airway Program and/or the ACCM Assistant Administrator overseeing the DART program, if DART cart components are missing, in need of repair or replacement, or backup instruments are required. Incomplete carts will not be redeployed for use.
F. Director of the Airway Program and/or the ACCM Assistant Administrator overseeing the DART program, will notify members of the DART Committee if any cart needs to be temporarily taken out of service due to missing or broken equipment.
G. CCT will report to the Director of the Airway Program and/or the ACCM Assistant Administrator overseeing the DART program, any drawers containing disposables not marked with an expiration date.

VII. DOCUMENTATION

A. On units where DART carts are stored, a nurse will document on the unit’s daily Emergency Equipment Checklist or the checklist provided in policy Appendix E, the DART cart lock numbers and ensure the locks are intact.
B. The CCT will document the DART cart contents, scope lot and reference numbers, cart expiration date, and lock numbers on the DART Cart Count and Tracking Sheet (Appendix A.)
C. Physician DART members responding to DART calls will document difficult airway patient encounters requiring cart use in the ACCM Difficult Airway Registry. The registry access link can be found at www.hopkinsmedicine.org/anesthesiology/sitemap.cfm.
D. Physician providers who deem a patient to have a difficult airway will:
   1. Document the “Difficult Airway” diagnosis in the problem list of the patient's EHR to activate the “Difficult Airway” alert in the patient's EHR.
   2. Document a "Difficult Airway" procedural note, including the size of the scope used.
   3. Write an order for nursing staff to apply a “Difficult Airway” bracelet to the patient’s wrist and place any specialty equipment at the patient's bedside.
E. Nursing staff will document or stamp the patient information (name and medical record #) on the DART Cart Assembly and Tracking Sheet following use (Appendix B). Count sheets will be collected by the CCT when picking up the carts for processing. If a count sheet has incomplete patient information upon arrival of the CCT for cart pick up, the nursing staff will be responsible for providing the CCT with the appropriate patient information.
F. The nurse will provide and document difficult airway patient education in the medical record (Appendix D and J).

VIII. EDUCATION AND COMMUNICATION

A. Nursing units will be responsible for initial and on-going staff DART education and training.
B. Residency training directors will be responsible for initial/on-going DART house staff education and training.
C. Departmental Physician Advisors will be responsible for communication of policy requirements to relevant authorized prescribers.
D. Departmental Physician Advisors will be responsible for ensuring the maintenance of hospital privileges by DART team members.
E. Physicians with whom nurse practitioners or physician assistants have contractual arrangements will be responsible for communication of policy requirements.
F. Respiratory Care Practitioner Directors will be responsible for initial and on-going RCP training.

G. Policy revisions will be posted in the Interdisciplinary Clinical Practice Manual on the JHH HPO Policy website and The Johns Hopkins Nursing Intranet. In the event of web access difficulty, the policy can be obtained from the downtime computer on any clinical nursing unit.

IX. SUPPORTIVE INFORMATION

See Also:
The Johns Hopkins Hospital, Interdisciplinary Clinical Practice Manual

• PAT004 Cardiopulmonary Resuscitation (Arrest/Code) and Rapid Response Teams Policy
• PAT083 Pediatric Difficult Airway Response Team (PDART) Policy.
• PAS015 Patient Care Equipment and Devices, Appropriate Use, Management and Reporting Policy.

Documentation Manual

• S&T040 Bronchoscope Cleaning Sign
• S&T041 Difficult Airway Alert Sign
• S&T042 Emergency Paging Phone Card
• CHECK019 DART Cart Daily Equipment Checklist

References:

Sponsor
Risk Management Committee

Developer:

• DART Committee
• Critical Care Committee
• ICU Nursing SOC
• PACU Nursing SOC
• CPR Advisory Committee

Review Cycle = Three (3) years

Medical Board Approval Date = 08/29/2017

Effective Date = 10/02/2017

X. SIGNATURES

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<td>Vice President, Medical Affairs, The Johns Hopkins Hospital</td>
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Subject
Difficult Airway Response Team (DART) Adult Policy

Deborah Baker
Vice President, Nursing and Patient Care Services, The Johns Hopkins Hospital
09/14/2017

Supersedes 06/27/2013

Page 8 of 8

Policy Number PAT053
Effective Date 10/02/2017
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Anesthesia: I-Care – Anesthesia Emergency Management

Reference Material for Anesthesia Providers in an Emergency

Anesthesiologist have access to reference materials for anesthesia emergencies through the I-Care link in the Intraprocedure sidebar.

Try It Out

1. Open the chart to the Intraprocedure workspace.
2. In the sidebar, scroll down to see the I-Care Emergency section. Click the I-Care link to open I-Care.

3. When I-Care opens, you will see links to information under headers for Emergency Management, Airway Management, and ACLS/PALS.

4. Choose the emergency for which you are looking for information and click on the blue hyperlink.

5. Close the page when done to return to the Intraprocedure workspace.
Keywords: Bakri Balloon, Emergency blood release, hemorrhage, Massive Blood Transfusion, PPH, Uterotonics

<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. OBJECTIVES</td>
<td>1</td>
</tr>
<tr>
<td>II. INDICATIONS FOR USE</td>
<td>1</td>
</tr>
<tr>
<td>III. DEFINITION OF TERMS</td>
<td>2</td>
</tr>
<tr>
<td>IV. RESPONSIBILITY</td>
<td>3</td>
</tr>
<tr>
<td>V. PATIENT CARE MANAGEMENT</td>
<td>4</td>
</tr>
<tr>
<td>VI. REPORTABLE CONDITIONS</td>
<td>6</td>
</tr>
<tr>
<td>VII. DOCUMENTATION</td>
<td>7</td>
</tr>
<tr>
<td>VIII. SUPPORTIVE INFORMATION</td>
<td>7</td>
</tr>
<tr>
<td>IX. APPROVAL</td>
<td>8</td>
</tr>
</tbody>
</table>

Appendix A: Obstetric Hemorrhage Risk Screening Tool Click Here
Appendix B: Quantification of Blood Loss Click Here
Appendix C: Obstetric Hemorrhage Interventions Click Here
Appendix D: Satellite Blood Depot Refrigerator - Emergency Blood Release Click Here
Appendix E: Intrauterine Balloon Tamponade (SOS Bakri) Click Here

I. OBJECTIVES
1. Screen admitted patients for obstetric hemorrhage risk.
2. Recognize clinical symptoms of obstetric hemorrhage and implement recommended interventions.
3. Ensure a coordinated response of the multidisciplinary team to an obstetric hemorrhage.

II. INDICATIONS FOR USE
A. All patients shall be screened for obstetric hemorrhage risk upon admission, pre-birth and post-birth.
B. The Obstetric Hemorrhage Risk Tool shall be used to screen patients (See Appendix A)
   1. The purpose of the tool is to screen patients for risk factors that predispose them to obstetric hemorrhage so that preparation for management and potential use of the massive transfusion process can begin early.
   2. Patients screened as low-risk or medium-risk on admission shall have a Type and Screen and patients screened as high-risk shall have a Type and Cross sent to Transfusion Medicine.
C. This protocol is implemented on admission to Labor and Delivery and provides guidelines through the stages of hemorrhage as a “trigger” for heightened surveillance and/or more aggressive treatment. (Stage 1-4).
### III. DEFINITION OF TERMS

| Postpartum Hemorrhage (PPH) | 1. **Estimated blood loss:**  
| | a. At the time of delivery, estimated blood loss (EBL) > 500 ml for vaginal birth OR > 1000 ml for cesarean delivery. |
|  | 2. **Classification:**  
| | a. PPH is classified as primary when the bleeding occurs in the first 24 hours postpartum. PPH is classified as secondary when the bleeding occurs > 24 hours postpartum and prior to 6 weeks postpartum. Secondary PPH is usually caused by abnormal involution of the placental site or retained placenta (placental polyp). |
|  | 3. **Clinical symptoms related to increase blood loss:**  
| | a. Hemodynamic abnormalities  
| | i. Pulse (Tachycardia)  
| | ii. Blood pressure (Hypotension)  
| | iii. Urinary output (Oliguria)  
| | b. Lab abnormalities:  
| | i. Hemoglobin/Hematocrit abnormal  
| | ii. ABG abnormal (pH, base deficit, lactic acid)  
| | iii. Coagulopathy (PT, PTT, INR, fibrinogen, platelets)  
| | c. Change in mental status (anxious, confused, lethargic) |
|  | 4. **PPH Clinical Indicators:**  
| | a. STAGE 1 –  
| | i. Blood loss >500 mL vaginal OR blood loss >1000 mL cesarean WITH normal vital signs and lab values |
| | b. STAGE 2 –  
| | i. Continued bleeding with EBL up to 1500 mL OR any patient requiring ≥ 2 uterotonics WITH normal vital signs and lab values |
| | c. STAGE 3 –  
| | i. Continued bleeding with EBL >1500 mL OR  
| | ii. Greater than 2 units PRBCs given OR patient at risk for occult bleeding (post-cesarean, coagulopathy) OR  
| | iii. Any patient with:  
| | • UNSTABLE vital signs (e.g. persistent tachycardia >120 bpm; SBP < 80 mmHg or 15% drop from baseline; O2 saturation <96% on room air)  
| | • OLIGURIA (e.g. urinary output < 30 mL/hr. for 2 hours)  
| | • ABNORMAL labs (e.g. Hgb < 7 gm/dL) |
|  | d. STAGE 4 – Cardiovascular (CV) Collapse |

| Type and screen (T&S) | Determination of the ABO/Rh blood type with screening for existing antibodies. |
| Type and cross match (T&C) | Determination of the ABO/Rh blood type and the patient’s plasma and the donor’s red cells are tested against each other for compatibility. |
IV. RESPONSIBILITY

A. A multidisciplinary team shall work together to coordinate a response in the event of an obstetrical hemorrhage.

B. OB Resident/CNM:
   1. Complete risk screening on admission and throughout labor and delivery. (See Appendix A).
   2. Counsel patients at high risk for obstetrical hemorrhage about the likelihood of blood transfusion and other interventions.
   3. Obtain pre-operative consults (e.g. Anesthesiology, ICU physician, Transfusion Medicine)
   4. Complete obstetric hemorrhage orders (e.g. labs, IV fluids, utero-tonics, and blood products)
   5. Manage obstetric and surgical care

C. OB Attending:
   1. Determine timing and location of delivery to ensure availability of appropriate surgical personnel and equipment. (e.g. L&D OR vs. Non-Ob OR).
   2. Coordinate care as physician team leader with anesthesiologist.
   3. Activate massive transfusion policy - See ICPM PAT064 “Massive Transfusion for Adult Patients” for the standard pack or cooler contents, and massive transfusion algorithm.
   4. Notify Transfusion Medicine of implementation of Massive Transfusion policy
   5. Request recombinant factor VIIa dosing (Factor 7, rFactor VIIa). **Note:** Pharmacy will dispense Factor products.
   6. Determine need for additional resources (e.g. Gyn Oncologist, Adult Surgical Intensivist, General Surgery, Urology, Trauma, Surgical Critical Care support).

D. OB Anesthesiologist:
   1. Maintain responsibility for airway management.
   2. Provide central hemodynamic monitoring (e.g. arterial line, CVP)
   3. Order required labs, IV fluids, and blood products
   4. Order Emergency Blood Release from L&D unit blood refrigerator
   5. Notify Transfusion Medicine of implementation of Massive Transfusion policy
   6. Request recombinant factor VIIa dosing (Factor 7, rFactor VIIa). **Note:** Pharmacy will dispense Factor products.
   7. Administer blood products
   8. Determine need for additional resources (e.g. Gyn Oncologist, Adult Surgical Intensivist, General Surgery, Urology, Trauma, Surgical Critical Care support).

E. Registered nurse (RN):
   1. Verify that all patients have been screened on admission for hemorrhage risk and that indicated lab work was ordered and completed.
   2. Review medical record for hemorrhage risk screen and include risk factors during hand-off/change of shift report.
   3. Report clinical indicators for hemorrhage (e.g. blood loss and/or abnormal vital signs) to MD/CNM
   4. Ask MD/CNM if assistance is needed.
   5. Ask PSC to notify appropriate staff of hemorrhage:
   6. Draw required labs, administer IV fluids, medications, and blood products.
   7. Arrange pick up and return of blood containers from Transfusion Medicine.
   8. Perform circulator duties in OR
   9. Provide support/spiritual care to family/significant other (e.g. call social work, clergy)

F. OB Clinical Technician (CT):
   1. Stock and maintain emergency supplies, carts, instrument sets used for obstetric hemorrhage.
   2. Perform activities as delegated by the RN (e.g. insert IV, obtain labs, and insert urinary catheter).
   3. Prepare L&D OR as directed by charge nurse.
   4. Perform scrub duties in OR
G. Patient Service Coordinator (PSC):
   1. Notify OB STAT Team via message sent to Ascom phone and include the room # in message
   2. Notify additional personnel as requested:
      a. 2nd Anesthesiologist
      b. 2nd OB CT
      c. 2nd RN/charge nurse
      d. JHH Rapid Response Team
      e. GYN Oncologist, if needed
      f. Adult Surgical Intensivist, General Surgery, Urology, Vascular, Interventional Radiology, Trauma, Surgical/Critical Care support, if needed

H. Unit Assistant (UA):
   1. Serve as runner to Blood Bank and Critical Care Lab
   2. Perform activities delegated by the RN

I. Transfusion Medicine:
   1. Prepare and stock 4 units of O-negative/uncrossmatched PRBCs for release of emergency blood product in Labor and Delivery blood refrigerator – See Emergency Release Protocol (Appendix D)

V. PATIENT CARE MANAGEMENT

A. Admission
   1. All patients shall be screened for hemorrhage risk on admission, throughout the labor and delivery process, and postpartum.
   2. All patients shall be monitored for hemorrhage risk (See Obstetric Risk Screening Tool – Appendix A)
      a. All patients screened as low-risk and medium-risk for obstetric hemorrhage shall have a Type and Screen sent to the lab. If their condition changes to high-risk for hemorrhage during labor, the provider shall consider whether an order for a Type and Cross match is needed.
      b. All patients screened as high-risk for obstetric hemorrhage on admission shall have a Type and Cross match for 2 units PRBCs sent to the lab.

B. Stage 0 – Implement standard care at delivery/third stage of labor if:
   1. Criteria met:
      a. Blood loss ≤500 mL vaginal OR blood loss ≤1000 mL cesarean WITH NORMAL VITAL SIGNS and LAB VALUES
      b. Administer oxytocin per MD/CNM order.
         i. All patients shall receive oxytocin IV infusion (30 units in 500 mL NS) for 4 hours.
         ii. Patients at risk for obstetric hemorrhage shall receive oxytocin beyond 4 hours post-delivery.
         iii. Patients without IV access shall receive oxytocin 10 units IM at delivery.
      b. Assess blood loss - See Appendix B
         i. Weigh blood soaked materials on gram scale (1 gm = 1mL)
         ii. Zero scale with comparable dry material
         iii. Subtract known dry material weight from total weight to determine blood loss
      c. Monitor vital signs per postpartum/PACU protocol
      d. Assess and massage fundus as indicated
      e. Keep bladder empty
f. Maintain IV access (e.g. saline lock) for patients at high-risk for obstetric hemorrhage

g. If hemorrhage develops, notify prescriber immediately and implement interventions for each stage of hemorrhage.

C. **Stage 1 - Activate Obstetric Hemorrhage protocol if:**

1. **Criteria met:**
   a. Blood loss >500 mL vaginal **OR** blood loss >1000 mL cesarean **WITH**
   b. NORMAL VITAL SIGNS and LAB VALUES

2. **Patient Care Management:**
   a. Notify MD//CNM immediately; use chain of command if first MD/CNM contact does not respond or is not available
   b. Massage fundus until firm; express blood clots as necessary.
   c. Place patient on bedrest in flat position with lower extremities elevated and keep on bed rest until stable or per MD/CNM order.
   d. Bring supplies and medications to patient's bedside
   e. Insert IV, if not present, at least 18 gauge with LR or NS infusing
   f. Assess every 5-10 minutes: and communicate out loud, clearly and directly to the team
      i. Cumulative blood loss
      ii. Vital signs with O2 saturation every q 5-10 minutes
      iii. Mental status and LOC
      iv. Urine output
   g. Administer oxygen by mask at 10 L/min to maintain O2 sats at > 95%
   h. Empty bladder: straight cath or insert urinary catheter
   i. Draw and send labs STAT per MD/CNM order
   j. Keep patient warm (warming blanket)
   k. Assist with pelvic exam
   l. Administer utero-tonic agents per MD/CNM order (See Appendix C)
   m. The MD/CNM and charge nurse will determine appropriate level of care for patient (e.g L&D, Postpartum).
      i. Consider the risk for further bleeding.
      ii. Include obstetric hemorrhage history in hand-off and sign-out
      iii. Maintain an IV or heparin lock for 24 hours
      iv. Ensure a medical evaluation within 4-8 hours post hemorrhage.

D. **Stage 2 - Activate OB STAT Team or Rapid Response Team (RRT) if:**

1. **Criteria met:**
   a. Continued bleeding with EBL up to 1500 mL **OR** any patient requiring ≥ 2 uterotonics **WITH**
   b. NORMAL VITAL SIGNS and LAB VALUES

2. **Patient Care Management:**
   a. Mobilize additional support as necessary (e.g. 2nd RN, 2nd OB MD, Anesthesiologist, OB CT, OB STAT Team, and/or RRT).
   b. Insert 2nd large bore IV, at least 18 gauge with LR or NS infusing
   c. Administer additional uterotonic agents per MD/CNM order
   d. Massage fundus
   e. Assess every 5 minutes and communicate out loud, clearly and directly to the team:
      i. Cumulative blood loss
      ii. Vital signs with O2 saturation
      iii. Mental status and LOC
      iv. Urine output
   f. Administer oxygen by mask at 10 L/min to maintain O2 sats at > 95%
g. Insert urinary catheter with urimeter, if not in place  
h. Draw and send additional labs, as ordered  
i. Keep patient warm (warming blanket)  
j. Prepare for potential transfer to operating room  
k. Prepare for blood transfusion:  
   i. Notify Blood Bank of hemorrhage  
   ii. Set up blood administrations set and blood warmer for transfusion  
   iii. Obtain emergency blood release (PRBCs), per MD order  
l. Notify the OB CT to prepare OR for possible procedures:  
   i. Repair of tears/lacerations  
   ii. Intrauterine balloon (Bakri) – See Appendix E  

E. Stage 3 - Activate Massive Transfusion Protocol if:  

1. **Criteria met:**  
   a. Continued bleeding with EBL >1500 mL OR  
   b. >2 units PRBCs given OR Patient at risk for occult bleeding (post-cesarean, coagulopathy) OR  
   c. Any patient with:  
      i. UNSTABLE vital signs (e.g. persistent tachycardia >120 bpm; SBP < 80 mmHg or 15% drop from baseline; O2 saturation < 96% on room air)  
      ii. OLIGURIA (e.g. urinary output < 30 mL/hr for 2 hours)  
      iii. ABNORMAL labs (e.g. Hgb < 7 gm/dL)  

2. **Patient Care Management:**  
   a. Transfer patient to L&D OR, if not already done  
   b. Keep patient warm (e.g. warming blankets; IV fluid warmer) to prevent hypothermia, coagulopathy and arrhythmias  
   c. Notify GYN Oncologist, if needed  
   d. Send staff to Blood Bank to pick up blood container (PRBCs, FFP, cryoprecipitate, platelets).  
   e. Draw labs and hand carry to the Critical Care Lab  
   f. Prepare for possible surgical procedure  
      i. Uterine hemostatic suture (i.e. B-Lynch suture)  
      ii. D&C  
      iii. Hysterectomy  
   g. Prepare to transfer to higher level of care/ICU  

VI. REPORTABLE CONDITIONS  

A. Notify MD/CNM immediately if patient exhibits one or more of the following symptoms or risk factors of postpartum hemorrhage:  
   1. Estimated blood loss > 500 mL for vaginal birth OR blood loss > 1000 mL for cesarean delivery.  
   2. Signs of increased bleeding, active bleeding (e.g. continuous free-flowing bright red blood in the presence of contracted uterus, saturation of 2-3 peri-pads within one hour, passage of large clots or tissue)  
   3. Fundus that does not contract and/or remains atonic with fundal massage.  
   4. Increasing fundal height, or uterine cramping  
   5. Tachycardia (HR >120 bpm)  
   6. Tachypnea (Respirations > 30 per minute)  
   7. Hypotension (SBP < 80 or 15% drop from baseline)  
   8. Hypoxemia (SpO2 < 96% on room air)  
   9. Oliguria (<30 mL/hr for 2 hrs or < 120 mL in 4 hours)
10. Change in mental status (anxiety, confusion, lethargy)
11. Delayed capillary refill (> 2 seconds, cold and clammy)
12. Pallor, cool clammy skin

VII. DOCUMENTATION
A. Date and time provider or emergency team notified (e.g. MD/CNM, OB STAT Team, RRT)
B. Activation of Obstetric Hemorrhage protocol, or Massive Transfusion policy
C. Vital Signs, oxygen saturation, intake and output
D. Estimated blood loss (visual and objective)
E. Assessments, interventions, reportable conditions, and outcome on flowsheet in the electronic medical record.

VIII. SUPPORTIVE INFORMATION
1. See Also:
   • JHH Policy "Massive Transfusion for Adult Patients"
   • OB Blood Satellite Emergency Release (Appendix A)

2. References:
   • ACOG Obstetric Hemorrhage Resources - http://www.acog.org/About-ACOG/ACOG-Districts/District-II/SMI-OB-Hemorrhage
   • ACOG District II SafeMotherhood Initiative (SMI) - http://www.acog.org/About-ACOG/ACOG-Districts/District-II/Safe-Motherhood-Initiative
   • AWHONN Postpartum Hemorrhage Project Resources - http://pphproject.org/resources.asp

3. Reviewed by:
   • Gyn/Ob Advanced Practice Nurses

4. Sponsor:
   • Department of Gynecology and Obstetrics

5. Developer:
6. Review Cycle:
   • Every three (3) years

IX. APPROVAL

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<tr>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Andrew Satin, MD</td>
<td>Professor and Director</td>
<td>Department of Gynecology and Obstetrics</td>
</tr>
<tr>
<td>Diann L. Snyder, MS, RN</td>
<td>Administrator and Director of Nursing</td>
<td>Department of Gynecology and Obstetrics</td>
</tr>
<tr>
<td>Linda Szymanski, MD, PhD</td>
<td>Medical Director, Labor and Delivery Division of Maternal-Fetal Medicine</td>
<td>Department of Gynecology and Obstetrics</td>
</tr>
<tr>
<td>Jamie Murphy, MD</td>
<td>Chief, Division of Obstetric, Gynecologic and Fetal Anesthesiology</td>
<td>Department of Anesthesia and Critical Care Medicine</td>
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<td>Department of Gynecology and Obstetrics</td>
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ORIGINAL: 12/90   REVIEWED: 10/00
REVISED: 6/94; 8/97; 10/01; 9/04; 9/05; 9/07; 9/10; 11/11; 11/15
1. **Cord Gas Collection**
   - At JHH, we plan to CHANGE the process for umbilical cord gas collection
     - **New Process:**
       - Doubly clamp and cut a segment of umbilical cord (10-20 cm) after delivery and place on delivery table.
       - MD, RN or tech may collect the arterial/venous blood samples from the segment of cord.
       - Ideally, blood is collected and sent to lab as soon as possible; however, blood is stable for up to 60 minutes.
       - Cord gases can be collected after delayed cord clamping.

2. **Tranexamic Acid (TXA)**
   - TXA is now available for us to use for PPH. It will be in the OB OR Pyxis machines (both in-room and med room).
     Please see attachments for details on TXA use.
   - Briefly:
     - May be used for prophylaxis in women at high-risk of PPH.
     - Shown to reduce death due to bleeding in women with PPH.
     - Has minimal adverse effects.
     - To be effective, administer as soon as possible after PPH is identified.

   **Indications (PPH):**
   - EBL > 1,000 ml after vaginal delivery or > 1,500 ml during cesarean delivery.
   - OR EBL considered sufficient to compromise hemodynamic stability.

   **Dosage:**
   - TXA 1 g to be added to 100 ml NS mini-bag (Anesthesiologist will prepare).
   - Administer 100 mL mini-bag over 10 minutes as soon as PPH is identified.
   - One additional dose may be given 30 minutes to 24 hours after initial dose if PPH persists.

3. **REMARKS:**

   - **OR Leveling:**
     - Remember the “leveling” system. It is posted on L&D.
     - Please assign *all* OR cases a “level”. The OB resident will inform the charge nurse, who will inform the PSC.
     - For ORANGE, please communicate how soon you need the patient to go to the OR. DO NOT PUT THIS IN THE CHART.

   - **Operating Room:**
     - *Methylene Blue*: Is stocked in the OR Pyxis. ONLY use AFTER delivery of the baby!
     - *Laps*: Remember to do a cavity sweep prior to fascial closure.

   - **Team Debriefs:** Please try to organize after “difficult” cases (SD, PPHs, etc.)
     to discuss ways to improve care, etc.

   - **Med Teams:** Please schedule these team meetings when busy to review workload management with the team.

   - **Vaginal Deliveries:** Please remember to place the leg covers over the stirrups in the labor beds at time of delivery.
     This is to help our EVC colleagues -- much easier to clean the beds after delivery!

   - **HCAHPS (Patient satisfaction):**
     - Please remember to talk to patients about their pain management regimens!
       Explain goals (they will not be “pain free”), different medications, etc.
     - Describe medication side effects.
     - Provide clear discharge instructions.
I. PURPOSE
A. To provide guidelines for administration of analgesia during labor and delivery via neuraxial analgesia to include analgesics, regional analgesia/ anesthesia, spinal or intrathecal, and combined spinal-epidural (CSE).

II. INDICATIONS FOR USE
A. All intrapartum patients who desire and are appropriate for regional analgesia (i.e., epidural or intrathecal).

III. DEFINITIONS

<table>
<thead>
<tr>
<th>Term</th>
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<tr>
<td>Analgesia</td>
<td>Pain relief with or without partial sensory changes. Motor block does not usually occur.</td>
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<tr>
<td>Analgesics</td>
<td>Drugs that relieve pain</td>
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<td>Breakthrough Pain</td>
<td>Pain that breaks through an existing analgesia regimen.</td>
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<tr>
<td>Neuraxial</td>
<td>Intrathecal and epidural route</td>
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<tr>
<td>Regional Analgesia/Anesthesia</td>
<td>Blocks pain or lessen pain on a specific region of the body (e.g., below the waist). They include but not limited to epidural, spinal, and combined spinal-epidural (CSE) analgesia/anesthesia and peripheral nerve blocks.</td>
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<tr>
<td>Epidural</td>
<td>Analgesic/anesthetic injected into epidural space. Epidural analgesia includes intermittent dosing, continuous infusion, and patient-controlled analgesia and involves the administration of local anesthetics, opioids, and/or adjuvant drugs.</td>
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<tr>
<td>Spinal or intrathecal</td>
<td>Analgesic injected into the subarachnoid (dura) space.</td>
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Combined spinal-epidural (CSE) Analgesic injected into the subarachnoid space followed by analgesic/anesthetic injected into epidural space via intermittent dosing followed by continuous infusion.

IV. RESPONSIBILITIES
A. Anesthesiologist
   1. The anesthesiologist shall determine patient suitability for regional analgesia and the administration of patient controlled epidural analgesia (PCEA) during labor.
   2. Only the anesthesiologist may order medication to be infused via epidural or intrathecal catheter.
   3. Upon initiation of regional analgesia the anesthesiologist shall:
      a. Be present or immediately available for 10 minutes once analgesic agent is administered.
      b. Assess patient within 15 minutes after analgesic agents are administered and then as necessary.
      c. Assess analgesic level and monitor patient for signs/symptoms of local anesthetic toxicity such as confusion, metallic taste, numbness about the mouth, or irregular heartbeat.
      d. Evaluate and treat breakthrough pain not addressed with regional analgesia.
   4. Only the anesthesiologist may:
      a. Program the PCA pump for pregnant patients receiving epidural analgesia in labor. The anesthesiologist shall validate drug, dose, and pump settings with the RN.
      b. Give a bolus dose via epidural or intrathecal catheter.
      c. Place or remove epidural catheter.
      d. Attach epidural catheter to PCA pump.
   5. The anesthesiologist shall be made aware of any subsequent orders for opioids, and/or benzodiazepines to be given to patients receiving epidural or intrathecal analgesia.
B. OB Physician/Certified Nurse Midwife (CNM)
   1. The OB physician/anesthesiologist/CNM may write an order for “Ephedrine 10 mg IV push for post-anesthetic hypotension per protocol not to exceed three doses.” See JHH ICPM PAT030 “IV Push Medications” policy for rate of administration.
   2. Consult with anesthesiologist before beginning anticoagulant therapy on patient receiving epidural or intrathecal analgesia.
C. Registered Nurse:
   1. RN shall have demonstrated competency in fetal monitoring, management of epidural catheter care, and administration of epidural pump medication.
   2. RN may NOT:
      a. Administer a clinician bolus or adjust the rate of an epidural infusion.
      b. Manipulate, initiate, or program pump settings for pregnant patients receiving continuous or PCA epidural infusion in labor.
      c. Re-initiate an infusion once it has been stopped.
      d. Remove epidural or intrathecal catheter.
   3. RN may:
      a. Obtain PCA medication bag and supplies (e.g. CADD pump key, PCA tubing, and lock box or shell) and take them to the patient’s bedside for PCA pump set-up. The anesthesiologist is responsible for programming the PCA pump.
b. Pause the infusion to replace empty epidural infusion with pre-mixed solution of the same concentration per authorized prescriber order. If there is a change in the concentration, notify OB Anesthesia provider to replace the new bag.

c. Stop the infusion if there is a safety concern or after the infant is delivered. Only the anesthesiologist may discontinue epidural catheter.

d. Initiate emergency therapeutic measures if complications arise (i.e. administer ephedrine per physician order).

V. PROCEDURES

A. Orders:
   1. Anesthesia provider orders epidural medications using the epidural PCA order set and manages the patient receiving epidural analgesia, including concurrent administration of epidural analgesia and continuous infusion of IV anticoagulation therapy.

B. Analgesia Solutions/Tubing Changes:
   1. The epidural analgesia solution shall hang no longer than 96 hours.
   2. The RN will change the infusion pump tubing every 96 hours.
   3. Assure epidural catheter is labeled with yellow epidural PCA label (done on initiation by authorized prescriber).
   4. Label infusion tubing end near the connection site with approved yellow epidural PCA tape.

C. Validation of Therapy and Safety Checks:
   1. Two licensed health care providers must independently validate drug name, concentration, pump program settings, and safety checks (per Pain Flowsheet) on initiation of regional analgesia, when making changes in pump settings or replacing medication bag.
   2. Preservative-Free Normal Saline may be infused via epidural catheter to prevent clogging – See Appendix A for procedure.

D. Prior to Initiation of Regional Analgesia:
   1. Assessment:
      a. Vital signs to include temperature, pulse, respirations, blood pressure, oxygen saturation, and pain rating.
      b. Bladder by palpation.
      c. Fetal heart rate (FHR), variability, and contraction pattern via electronic fetal monitor per physician/CNM order.
   2. Infuse 500-1000 mL bolus of Lactated Ringers per prescriber order. Dextrose containing IV fluids should not be used for the bolus. After completion of the bolus, regulate the IV according to the rate ordered by physician/CNM.
   3. Ensure a pulse oximeter, blood pressure cuff, and electrocardiograph (EKG) machine or cardiac monitor are available.
   4. Assist patient into a sitting or side lying position to facilitate placement of catheter or medications.
   5. If using continuous electronic fetal monitoring, position patient to obtain an optimal fetal heart and uterine activity tracing throughout the procedure. Support patient as necessary to maintain position.
   6. Advise the patient’s support person to wait outside patient's room during the procedure.
      a. Provide explanation to support person as necessary.
      b. Obtain approval of attending anesthesiologist if consideration is given to support person’s attendance during epidural placement or administration of neuraxial medication.

E. During Epidural Placement:
   1. Infuse Lactated Ringers per anesthesiologist’s order.
   2. Assess fetal heart either intermittently or continuously and as much as possible during the procedure.
   3. Maintain continuous electronic fetal monitoring throughout the procedure for:
Regional Analgesia, Management of the Laboring Patient

F. Upon Initiation of Epidural Analgesia:
1. The nurse must be continuously present at patient’s bedside for 15 minutes after administration of analgesic agents (epidural and intrathecal).
2. Initial Assessment:
   a. Assess pulse and respiratory rate every 30 minutes x 2 and BP every 5 minutes x 30 minutes on initiation, with any bolus given, or with any increases in epidural analgesia dose or volume.
      i. Ensure that monitoring alarms are audible to staff and that systolic blood pressure alarm parameters are set to levels below.
      ii. If the patient’s baseline systolic BP is < 100 mmHg, or greater than 20% decrease in blood pressure from pre-anesthesia level after receiving analgesic medication then:
          • Increase fluids (Lactated Ringers only)
          • Notify anesthesia resident
          • Maintain patient in left lateral position with head of bed flat.
          • Administer ephedrine 10 mg IV over 1 minute or per physician’s order. May repeat ephedrine 10 mg IV every 2 minutes up to three (3) doses for systolic BP < 100 mmHg.
      iii. If ephedrine is given:
          • Repeat blood pressure every 2 minutes until it is above the threshold for which Ephedrine therapy had been initiated, then every 5 minutes for 30 minutes to assure that the BP does not drop rapidly following the end of ephedrine therapy.
          • Ensure anesthesiology personnel are present in the patient’s room for persistent hypotension (despite three doses of ephedrine).
          • Repeat BP every 15 minutes x one hour for persistent hypotension (despite three doses of ephedrine), then follow the standard BP frequency measurement for patients in labor. Ensure anesthesiology personnel are present in the patient’s room.
   b. Assess oxygen saturation levels continuously x 30 minutes on initiation of epidural analgesia.
      i. If oxygen saturation falls below 96% while on room air, initiate oxygen at 10 liters/minute via facemask.
         • Continue to assess oxygen saturation every 30 minutes on room air until > 96%.
         • After the first 15 minutes, it is acceptable for the nurse to be within audible range of the monitor alarms.
3. Ongoing Assessment
   a. Vital signs (heart rate, respirations, BP, pulse oximetry) every hour.
   b. Fetal heart rate, contraction pattern, and potential bladder distention every hour per protocol “Management of Patients during Labor and Birth.”
   c. Sedation level (per Pain Flow Sheet) every 4 hours.
   d. Motor and sensory levels (per Pain Flow Sheet) every 4 hours.
   e. Pain level and pain relief every hour.
   f. Side effects and adverse effects of therapy (See Reportable Conditions below).
      i. Patients receiving concomitant anticoagulants shall be assessed for onset of signs/symptoms of epidural/spinal hematoma such as worsening sensory deficits, worsening motor deficits, pain at catheter insertion site, or severe low back pain.
ii. Signs and symptoms of local anesthetic toxicity such as confusion, metallic taste, numbness about the mouth, or irregular heart beat.

g. Epidural catheter dressing site once a shift for signs of infection, dislodgement, bleeding, fecal or urinary contamination, and that the transparent dressing and tape securing the catheter are present and intact.
i. The anesthesiologist will assess the dressing site on a daily basis and will change the dressing at least every 5 days.

ii. If suspected catheter break/dislodgement, contact anesthesiologist to assess catheter. If catheter is broken, wrap the broken end of catheter in sterile gauze.

h. Skin integrity (Braden Risk assessment) at least once per day.

i. Keep skin clean and dry.

ii. Do not use heat packs or warming pads on areas where sensation is affected by the epidural analgesia.

4. Interventions

a. Provide comfort measures as needed.

b. Maintain either left lateral position or full right lateral position to facilitate uterine displacement and maximize utero-placental perfusion.

c. Maintain intravenous access and regulate the IV according to the rate ordered by the obstetrician.

d. Assure epidural catheter is labeled with yellow epidural PCA label (done on initiation by authorized prescriber).

e. Label infusion tubing end after the connection site with approved yellow epidural PCA tape.

f. For itching, nausea or vomiting, administer medication per authorized prescriber order.

g. For respiratory rate <= 8 per minute or sedation level < -1 on RASS scale:

i. Stop the infusion

ii. Immediately call for assistance and immediately notify the anesthesiologist. Do NOT leave patient unattended.

iii. Have ambu bag with mask and emergency equipment at bedside.

iv. Check oxygen saturation.

v. Administer oxygen 10 liters/minute via facemask and recheck oxygen saturation.

vi. Assess respirations, blood pressure and pulse every 15 minutes or more frequently as necessary until level of consciousness and respiratory rate return to patient’s baseline.

vii. If oxygen saturation < 96% and respirations <= 8 per minute, administer naloxone per authorized prescriber order.

• Dilute 1 mL of naloxone (0.4 mg/mL) in 9 mL NS for a total volume of 10 ml (0.04 mg/mL).

• Administer naloxone 2 mL (0.08 mg) IV push every 2 minutes until respirations > 8 per minute.

viii. If naloxone is administered, monitor for signs of re-sedation.

ix. Patient shall be reassessed by anesthesiologist and disposition determined for additional monitoring and care.

h. Discontinue epidural infusion at time of delivery.

i. Discard medication in accordance to the controlled substance policy.

ii. Record time infusion was discontinued on Pain Flowsheet.

G. Upon initiation of Intrathecal Analgesia:

1. The nurse must be continuously present at the patient’s bedside for 15 minutes after administration of analgesic agents.

2. Assessment:

a. Pulse, BP, and respiratory rate every 5 minutes x 30 minutes.
b. Continuous electronic fetal monitor x 30 minutes after medication is administered.
c. Pain level, pain relief, FHR, and contraction pattern according to “Management of the Patient during Labor, Birth, and Immediate Recovery” protocol.

3. Assure intrathecal catheter is labeled with grey intrathecal PCA label (done on initiation by authorized prescriber).
4. Label infusion tubing end after the connection site with approved grey intrathecal PCA tape.
5. Provide comfort measures as needed.

H. Pre-ambulation assessment following delivery/birth:
1. Assess orthostatic blood pressure prior to first time out of bed.
2. Immediately notify physician/CNM if systolic blood pressure drops > 20 mmHg from lying/sitting BP baseline.
3. Assess sedation level, sensation and motor strength in lower extremities, and respiratory rate.
4. The following parameters should be achieved before ambulating:
   a. Sedation level =0 on RASS scale
   b. Sensory level > 4
   c. Motor strength of lower extremities = 0 on Bromage scale
5. Provide assistance with ambulation
6. Assess fall risk score and implement fall precautions as indicated

I. Post catheter discontinuation:
1. Assessment
   a. Changes in vital signs
   b. Motor and sensory level for signs and symptoms of hematoma
      i. Severe low back pain
      ii. Pain at the catheter site
      iii. Worsening motor deficits (leg weakness and/or paralysis)
      iv. Worsening sensory deficits (numbness and/or paresthesia)
   c. Immediately notify anesthesiologist for any signs or symptoms present
2. Frequency
   a. If patient not receiving anticoagulation therapy, monitor vital signs and for sign/symptoms of hematoma every 4 hours.
   b. If patient is receiving concomitant anticoagulation therapy, monitor vital signs and for s/s of hematoma every 4 hours x 24 hours after the PCA catheter is removed, then every 8 hours for an additional 24 hours.

J. Pump Events
1. Disconnect pump from patient, turn it off, and contact Clinical Engineering department.
2. Submit report in the electronic patient safety reporting system.
3. Remove any remaining medication from the bag by withdrawing it with a syringe, wasting it in the presence of a RN and documenting the wasted on the eMAR.
4. Collect and keep intact all equipment and disposables and place them in a clear zip lock bag and label with the appropriate tag.

VI. REPORTABLE CONDITIONS
A. Immediately notify anesthesiologist/physician/CNM for:
   1. Respiratory rate < 12 per minute.
   2. Oxygen saturation level falls below 96%
   3. Change in mental status
   4. Hypotension
Regional Analgesia, Management of the Laboring Patient with...

a. Systolic BP < 90 mmHg or systolic BP < 100 if baseline >100 mmHg
b. Systolic BP decrease by more than 20% from pre-anesthesia level
5. Sedation level < -1 on RASS scale
6. Motor strength > 1 on Bromage scale or changes from baseline at the start of neuraxial analgesia.
7. Sensory level < 4 (per Pain Flowsheet) or changes from baseline at the start of epidural analgesia.
8. Administration of ephedrine or naloxone.
9. Non-reassuring fetal heart rate patterns including all Category III fetal heart tracings
10. Pain score > 7 or unrelieved pain.
11. Presence of nausea/vomiting or itching unrelieved by medication.
12. Signs/symptoms of local anesthetic toxicity (e.g. confusion, metallic taste, numbness about the mouth, irregular heart beat).
13. Signs/symptoms of epidural/spinal hematoma (e.g motor deficits, pain at insertion site, severe low back pain, numbness or paresthesia, bowel/bladder dysfunction). Note: Patient may present with a single sign/symptom or a combination of signs/symptoms.
14. PCA catheter issues (e.g. wet dressing, catheter break or dislodgement, signs and symptoms of catheter site infection, meningitis, or sepsis)
15. Failure of the epidural block to recede after 6 hours of discontinuation of epidural catheter or resolution within 24 hours post epidural cessation.

VII. DOCUMENTATION

A. On PCA Flowsheet:
   1. Adverse effects of therapy.
   2. Check of tubing connection on initial hook-up, every shift, and with any tubing changes or disruptions.
   3. Calculated amount of medication received by patient every 4 hours; clear pump amount every 4 hours.
   4. Vital signs, oxygen saturation, sedation level, pain rating, and appearance of dressing site.

B. On MAR:
   1. Dual signatures of anesthesiologist and RN as part of pump validation procedure on initial pump set-up/hook up, pump programming changes, bag or and tubing changes.
   2. Amount of controlled substance wastage.

C. On Nursing Flowsheet:
   1. Epidural test dose and administration time in the electronic medical record.
   2. Reportable conditions and actions taken.

VIII. EDUCATION AND COMMUNICATION

A. This policy will be communicated to the appropriate JHH and JHBMC personnel via the following channels:
   1. Medical staff and Nursing department education and communication.
   2. Departmental leadership shall be responsible for training new employees and communicating updates regarding the policy.

B. This policy will be placed in the JHM Gyn/Ob Interdisciplinary Clinical Practice Manual in the Hopkins Policy and Document Library website.
IX. SUPPORTIVE INFORMATION

A. See Also:
   • JHH Interdisciplinary Clinical Practice Manual (ICPM) PAT018 "Patient Controlled Analgesia (PCA) Using the CADD-SOLIS PUMP"
   • JHH Interdisciplinary Clinical Practice Manual (ICPM) PAT030 "IV Push Medications"

B. References:

C. Policy Cross-Reference:
   • Johns Hopkins Bayview Medical Center, L&D035, Epidural Catheter Analgesia (02/01/2013), JHBMG GYN/OB Clinical Practice Manual
   • Johns Hopkins Hospital, L&D132, Regional Analgesia, Management of the Laboring Patient (12/07/2015), JHH GYN/OB Clinical Practice Manual

D. Developer
   • Department of Gynecology and Obstetrics

E. Sponsor
   • Department of Gynecology and Obstetrics

F. Review Cycle
   • Every 3 years
X. SIGNATURES

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<thead>
<tr>
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<tr>
<td>Cynthia Walters</td>
<td>01/18/2018</td>
</tr>
<tr>
<td>Senior Director of Nursing, Maternal Child Health, Johns Hopkins Bayview Medical Center</td>
<td></td>
</tr>
<tr>
<td>Diann Snyder</td>
<td>01/22/2018</td>
</tr>
<tr>
<td>Administrator and Director of Nursing, Department of Gynecology and Obstetrics, Johns Hopkins Hospital</td>
<td></td>
</tr>
<tr>
<td>Andrew Satin</td>
<td>01/23/2018</td>
</tr>
<tr>
<td>Medical Director, Department of Gynecology and Obstetrics, Johns Hopkins Hospital</td>
<td></td>
</tr>
<tr>
<td>Victoria Handa</td>
<td>01/24/2018</td>
</tr>
<tr>
<td>Medical Director, Department of Gynecology and Obstetrics, Johns Hopkins Bayview Medical Center</td>
<td></td>
</tr>
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</table>
MASSIVE TRANSFUSION PROTOCOL (MTP), PAT064

Workflow

ACTIVATE MASSIVE TRANSFUSION PROTOCOL by:
ATTENDING Physician
(SURGEON, ANESTHESIOLOGIST, OBSTETRICIAN, EMERGENCY MEDICINE, INTENSIVIST OR TRAUMA/CRITICAL CARE FELLOW)

Calls Blood Bank (5-6580)
The Blood Bank will notify the Pathology Resident on-call

CONTAINER RETURN
Containers stay with the patient until protocol is discontinued

All blood products in one container should be exhausted prior to beginning another new container. This is to ensure a 6:6:1 transfusion ratio is achieved (6 units of PRBCs to 6 units of FP to 1 unit of apheresis platelets)

BLOOD BANK IMMEDIATELY PREPARES CONTAINERS
6U PRBC
6U FP
2U PLT6
THIRD CONTAINER TO INCLUDE DOSE OF CRYOPRECIPITATE

UNIT TRANSFUSED

PROTOCOL ONGOING

CONSIDER rFVIIa (Factor 7)
Contact the Pathology Resident on-call, for dosing approval
Pager # 3-3312
After 5PM #3-9958

PROTOCOL DISCONTINUED
ATTENDING SURGEON, ANESTHESIOLOGIST, OBSTETRICIAN, EMERGENCY MEDICINE, INTENSIVIST OR Trauma/CRITICAL CARE FELLOW

LABS
Semi at initiation of the protocol:
Type & screen  CBC
PT/aPTT/INR  iCa
ABG  CMP
Lactate  Fibrinogen

CONTAINER OBTAINED FROM BLOOD BANK
Blood bank begins preparing another Container upon release of a container

LABS
Send the following q. 1 hr after initiation of the protocol:
CBC  ABG
PT/aPTT/INR  iCa
Fibrinogen  Lactate

NOTE: Labs drawn in the ORs (GOR or L&D) or in L&D during hemorrhage situations should be hand carried to the Critical Care Lab

DEFINITION: Massive Hemorrhage

- Anticipated blood loss of 150ml/min, which represents one liter in seven (7) minutes, for 30 minutes
- Rapid and continuing blood loss leading to decompensation and circulatory failures despite aggressive volume replacement. An acute hemorrhagic condition associated with anticipated rapid and continuing blood loss requiring greater than or equal to 20 units of RBCs

- Communication and collaboration are essential prior to activation and implementation of the protocol.

- Consider calling a “time out” to ensure all personnel are aware the MTP is being activated
Keywords: cardiac arrest, CPR

Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INDICATION</td>
<td>1</td>
</tr>
<tr>
<td>II. RESPONSIBILITY</td>
<td>1</td>
</tr>
<tr>
<td>III. PERIMORTEM CESAREAN DELIVERY</td>
<td>2</td>
</tr>
<tr>
<td>IV. DOCUMENTATION</td>
<td>2</td>
</tr>
<tr>
<td>V. SUPPORTIVE INFORMATION</td>
<td>2</td>
</tr>
<tr>
<td>VI. APPROVAL</td>
<td>2</td>
</tr>
<tr>
<td>Appendix A: Cardiac Arrest Associated with Pregnancy</td>
<td>Click Here</td>
</tr>
</tbody>
</table>

I. INDICATION

Any cardiac arrest on Labor and Delivery.

II. RESPONSIBILITY

A. The JHH Arrest Team (x5-4444) will be paged for all cardiac arrests in Labor and Delivery.
   1. Personnel on Labor and Delivery will follow the Adult Cardiopulmonary Resuscitation policy (PAT 004 ICPM).
B. The PSC/designee will notify anesthesia and obstetrician personnel STAT and include the labor room # in the message.
C. The patient’s obstetrician and OB anesthesia personnel will be responsible for the initial evaluation and care of the patient until the Hospital arrest team arrives.
D. The physician leader of the arrest team will assume care of the patient upon arrival.
   1. The arrest team leader will consult with the patient’s obstetrician and OB anesthesia as the situation warrants.
   2. The OB anesthesiologist or designee shall maintain responsibility for airway management.
E. The obstetrician will make the decision to perform a perimortem cesarean section for pregnant patients ≥24 weeks, which do not immediately respond to ACLS measures (see Section III).
F. The Registered Nurse/designee (includes, but is not limited to):
   1. Manually displaces the uterus to the left to relieve aortocaval compression during chest compressions and optimize the quality of CPR.
      a. Position the pregnant patient on a backboard in the supine position first and manually displace the uterus with the 1-handed or 2-handed technique. If this technique is unsuccessful, place the patient in a left-lateral tilt of 27 to 30 degrees, using a firm wedge to support the pelvis and thorax. Fold and place towels, linens, or pillows beneath the patient’s right hip to maintain left lateral tilt position).
   2. Initiates or assists in CPR.
   3. Applies AED defibrillator and follows shock advisory. NOTE: Remove any fetal or uterine monitoring devices before AED shock delivery.
   4. Prepares emergency equipment and medications.
   5. Applies cricoid pressure during intubation, if requested by anesthesia.
   6. Establishes IV access and infuse fluids per MD order.
   7. Prepares for perimortem cesarean section /hysterotomy for the pregnant patient ≥ 24 weeks gestation within 4 minutes after the arrest (See Section III).
   8. Requests PSC notify pediatricians of perimortem Cesarean Section
      NOTE: Refer to JHH Cardiac Arrest policy, Appendix titled “Arrest Team Roles” for specific role responsibilities.”
III. PERIMORTEM CESAREAN DELIVERY

In cases of cardiac arrest which do not immediately respond to ACLS, a "perimortem" cesarean section/hysterotomy should be performed. Because of the potential benefit* (See Appendix A) to the pregnant woman and her fetus, the following guidelines are recommended during a cardiopulmonary arrest:

1. If the pregnant woman is \( \geq \) to 24 weeks gestation, a perimortem cesarean section/hysterotomy should occur, if possible, at 4 to 5 minutes after the arrest if no perfusing rhythm is restored. The infant should be delivered by 5 - 6 minutes following maternal arrest.
   • **Note**: Because of the isolated reports of infant survival beyond the 4 to 6 minute limit and the potential for better maternal resuscitation with an empty uterus, attempts at delivery should usually be undertaken even when this time limit has passed.

2. Sterile conditions are unnecessary and surgery should not be delayed to prepare a sterile field.

3. Cardiopulmonary resuscitation should continue during and after the surgical procedure.

IV. DOCUMENTATION

A. Adult Arrest Flow Sheet:
   1. Resuscitation efforts.
   2. Patient’s response.
   3. Medications and time of administration.
   4. Procedures performed.
   5. Disposition of adult patient, and infant.

V. SUPPORTIVE INFORMATION

1. See Also:
   • Interdisciplinary Clinical Practice Manual, CARDIOPULMONARY RESUSCITATION (Arrest/Code) and Rapid Response Teams

2. Sponsor:
   • Department of Gynecology and Obstetrics

3. Developer:
   • Department of Gynecology and Obstetrics

4. Review Cycle:
   • Every three (3) years

VI. APPROVAL

Approval Date: 12/03/2015  Effective Date: 12/07/2015

Andrew Satin, MD  Professor and Director  Department of Gynecology and Obstetrics
Dianne Snyder, MS, RN  Administrator and Director of Nursing  Department of Gynecology and Obstetrics
Linda Szymanski, MD, PhD  Medical Director, Labor and Delivery Division of Maternal-Fetal Medicine  Department of Gynecology and Obstetrics
Jamie Murphy, MD  Chief, Division of Obstetric, Gynecologic and Fetal Anesthesiology Assistant Professor  Department of Anesthesia and Critical Care Medicine  Department of Gynecology and Obstetrics

ORIGINAL: 2/87  REVIEWED: 6/94; 10/00
REVISED: 1/89; 4/90; 5/95; 8/97; 6/01; 5/04; 12/06; 5/08; 11/11; 11/15
I. PURPOSE

To provide guidelines for care of obstetrical patients receiving neuraxial preservative-free morphine sulfate (Duramorph) analgesia for postoperative pain.

II. GENERAL OVERVIEW

Morphine sulfate injection, preservative-free (Duramorph), a product specifically formulated for neuraxial administration, is effective in providing pain relief postoperatively because the duration of analgesia is longer by this route compared to systemic administration. Plasma levels of neuraxial preservative-free morphine administered into the epidural space closely resembles those obtained after intravenous or intramuscular administration. The drug is absorbed rapidly into the circulation after neuraxial injection and provides pain relief for extended periods without loss of motor, sensory, or sympathetic function. The major side effects of neuraxial morphine include respiratory depression, pruritis, nausea/vomiting, and urinary retention.

Although uncommon, respiratory depression is associated with the use of neuraxial preservative-free morphine. It usually occurs from 6 to 12 hours after epidural or intrathecal morphine administration, and may occur for up to 24 hours. Patients who develop respiratory depression typically exhibit somnolence before a significant decrease in respiratory rate is observed. The occurrence of pruritis varies widely from 0% to 100% and is easily treated with medication. The incidence of nausea and vomiting following neuraxial preservative-free morphine is up to 30%, which is equivalent to parenteral narcotics.

Patients receiving neuraxial preservative-free morphine for postoperative pain require frequent assessment of respiratory rate and sedation level by the registered nurse for the first 24 hours. In the majority of patients, the anesthesiologist will remove the epidural catheter postoperatively following the administration of neuraxial preservative-free morphine and transfer to the PACU.
Preservative-free morphine is most effective when used in combination with a multimodal analgesic regimen. The anesthesiologist will order additional pain medications postoperatively (e.g. acetaminophen, NSAIDs, and opioids). NO ADDITIONAL OPIOIDS SHOULD BE ORDERED BY THE OBSTETRICS TEAM IN THE FIRST 24 HOURS.

III. INDICATIONS FOR USE
A. Patients on the obstetrical service receiving neuraxial preservative-free morphine for postoperative pain management.
B. Contraindications of preservative-free morphine administration include, but are not limited to, the following:
   1. Hypersensitivity to morphine, morphine salts or any product component
   2. Respiratory depression
   3. Acute or severe asthma
   4. Upper airway obstruction
   5. Head injury or increased intracranial pressure
   6. Circulatory shock
   7. Paralytic ileus
   8. Any contraindication for neuraxial injection such as injection site infection, concomitant anticoagulants, bleeding diathesis, parenteral steroids within 2 weeks of administration.
C. Precautions or relative contraindications
   1. Known or suspected obstructive sleep apnea
   2. BMI > 40
D. This protocol does NOT apply to patients receiving neuraxial preservative-free morphine for intraoperative analgesia in non-obstetrical settings.

IV. DEFINITIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>Analgesia</td>
<td>Pain relief with or without partial sensory changes. Motor block does not usually occur.</td>
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<tr>
<td>Analgesics</td>
<td>Drugs that relieve pain.</td>
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<tr>
<td>Breakthrough Pain</td>
<td>Pain that breaks through an existing analgesia regimen</td>
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<tr>
<td>Neuraxial</td>
<td>Intrathecal and epidural route</td>
</tr>
<tr>
<td>Regional Analgesia/Anesthesia</td>
<td>Blocks pain or lessen pain on a specific region of the body (e.g. below the waist). They include but not limited to epidural, spinal, and combined spinal-epidural (CSE) analgesia/anesthesia and peripheral nerve blocks.</td>
</tr>
<tr>
<td>Epidural</td>
<td>Analgesic/anesthetic injected into epidural space. Epidural analgesia includes intermittent dosing, continuous infusion, and patient-controlled analgesia and involves the administration of local anesthetics, opioids, and/or adjuvant drugs.</td>
</tr>
<tr>
<td>Spinal or intrathecal</td>
<td>Analgesic injected into the subarachnoid (dura) space.</td>
</tr>
<tr>
<td>Combined spinal-epidural (CSE)</td>
<td>Analgesic injected into the subarachnoid space followed by analgesic/anesthetic injected into epidural space via intermittent dosing followed by continuous infusion.</td>
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</tbody>
</table>
V. RESPONSIBILITIES

A. OB Anesthesia
   1. Determine the patient’s suitability for neuraxial preservative-free morphine administration for postoperative pain.
   2. Removal of the epidural catheter in the operating room or PACU.
   3. Enter initial orders using standing orderset (see "Adult Anesthesia Preservative Free Morphine Sulfate Post-op" Order Set).
   4. Approve and enter additional orders for opioid analgesia for breakthrough pain within 24 hours postop.
   5. Evaluate the patient’s response to neuraxial preservative-free morphine for 24 hours post administration or as indicated by patient status.

B. Physicians (Other than specified above)
   1. May not order concurrent antiemetics, opioids or benzodiazepines for 24 hours post administration of neuraxial preservative-free morphine for postoperative pain management.
   2. Consult with OB anesthesiologist prior to procedures requiring the administration of additional benzodiazepines, opioids, or antiemetics beyond those specified in the standing morphine sulfate preservative-free analgesia order set.

C. Registered Nurse
   1. May NOT administer additional benzodiazepines, opioids, or antiemetics beyond those specified in the standing morphine sulfate preservative-free analgesia order set unless ordered by OB anesthesiologist.
   2. May NOT delegate respiratory rate assessment to unlicensed assisted personnel.
   3. Assess patients for response and/or complications related to pain management therapy.
   4. Notify OB anesthesiologist prior to transferring patient from PACU to inpatient unit or ICU.
   5. Inform receiving unit/procedure area of patient receiving neuraxial preservative-free morphine for postoperative pain management at handoff.

VI. PROCEDURES

A. Assessments
   1. Implement safety measures:
      a. Place safety label or electronic flag - “Patient Received Neuraxial Preservative-free Morphine (Duramorph): Date:______ Time: _______. NO additional benzodiazepines or opioids may be administered within 24 hours unless ordered by the anesthesiologist” in the following locations:
         i. Medication administration record (MAR)
         ii. Morphine sulfate preservative-free analgesia orderset
         iii. Paper medical record (front cover)
         iv. Above patient’s bed
   2. PACU assessments
      a. Initial assessments per PACU standards.
      b. Implement the following companion protocols:
         i. Post Anesthesia, Phase I & Phase II, Management of the Obstetrical Patient
         ii. Management of Postpartum Patients
         iii. Pain Assessment and Management
      c. Transfer/PACU Discharge Criteria:
         i. Patient may transfer to the inpatient unit after meeting standard PACU discharge criteria.
            • Note: oxygen saturation level, respiratory rate, and sedation level should be within expected range prior to transfer to the inpatient unit.
Morphine Sulfate Preservative-Free (Duramorph) Analgesia Postoperative Pain - Adult

- Note: In some cases, the OB anesthesiologist will determine that some patients should remain on L&D with continuous pulse oximetry monitoring for 24 hours (e.g. patients with severe pain with IV PCA after receiving neuraxial preservative-free morphine).

3. Ongoing assessments:
   a. Hourly x 12 hours, then every 2 hours x 12 hours and PRN:
      i. Respiratory rate
      ii. Sedation level
   b. Every 4 hours and PRN:
      i. Blood pressure, pulse rate, and temperature per Management of Postpartum protocol
      ii. Oxygen saturation x 24 hours
      iii. Pain rating and pain relief per Pain Assessment and Management protocol
      iv. Side effects and adverse effects of therapy
   c. Strict intake and output x 24 hours post-op, regardless of Foley or IV fluid status
      i. Foley catheter usually remains in place until first ambulation or around 6-8 hours postop per physician’s order.
      ii. Maintain patent IV or saline lock in place for 24 hours per physician’s order.

4. Pre-Ambulation Assessment per Authorized Prescriber Order:
   a. Before getting the patient out of bed for the first time:
      i. Assess motor and sensory level
      ii. Respiratory rate and sedation level should be achieved before ambulating:
         • Respiratory rate > 8 per minute
         • Sedation level = 0 (RASS) - see Appendix A

B. Management of Side Effects
1. For respiratory rate ≤ 8 per minute or sedation level < -1 on RASS.
   a. Immediately call for assistance and notify OB Anesthesia Resident.
   b. Do NOT leave patient unattended.
   c. Have ambu bag with mask and emergency equipment at beside.
   d. Check oxygen saturation.
   e. Administer oxygen via facemask @ 10 liters/minute per authorized prescriber order.
   f. Recheck oxygen saturation.
      i. If oxygen saturation < 95 and respirations ≤ 8 per minute: Dilute 1 mL of naloxone (0.4 mg/mL) in 9 mL NS for a total volume of 10 ml (0.04 mg/mL). Administer 2 mL dose (dose of 0.08 mg) IV push q 2 minutes until respirations > 8 per minute per authorized prescriber order.
      ii. If naloxone is administered, monitor for signs of re-sedation. Patient shall be reassessed by anesthesiologist and disposition determined for additional monitoring and care.
   g. Assess respiratory rate, sedation level, blood pressure, and pulse every 15 minutes for 90 minutes or more frequently as necessary, until level of consciousness and respiratory rate return to patient’s baseline.

2. For nausea and vomiting, administer medication per authorized prescriber order.
3. For itching, administer medication per authorized prescriber order.
4. For urinary retention after Foley catheter is removed: if the patient has not voided after 4 hours of Foley removal, call OB physician to request follow-up orders - either a bladder scan or a straight-cath.

C. Transfer/Transport
1. The patient must meet pre-ambulation assessment criteria prior to transfer/transport.
2. Clinical Purposes (transfer to procedure/diagnostic/operative /consultative areas):
a. The patient shall be accompanied by a MD, RN, or clinical technician if transported off the clinical unit for clinical purposes.
b. Inform receiving unit/procedure area of patient receiving neuraxial preservative-free morphine for postoperative pain management.

3. Non-clinical Purposes (NICU visit)
a. Prior to leaving the postpartum unit the RN will reassess and document the patient’s respiratory rate and sedation level regardless of the time of the last assessment.
b. The patient will be transported to the NICU in a wheelchair by an RN or clinical technician.
c. The NICU nurse will call the postpartum unit for transport when the patient is ready to return or if signs of increasing somnolence are observed.
d. If signs of increasing somnolence are observed, the RN assigned to the patient will go to the NICU to transport the patient back to the postpartum unit.
e. If the patient has not returned from the NICU for the next assessment (1 hour) the RN will go to the NICU, perform the required assessments and determine if the patient can remain in the NICU or send the clinical technician to return the patient to the OB unit for the assessment.

D. Patient/Family Education:
   1. Assessment procedures
   2. Medication name (neuraxial preservative-free morphine sulfate), action, side effects and planned interventions for side-effects.

VII. REPORTABLE CONDITIONS
Notify the anesthesiologist (PACU) for the following conditions:

1. Respiratory rate ≤ 8, shallow paradoxical or obstructed breathing
2. Sedation level < -1 on RASS
3. Pain score > 6 or unrelieved pain
4. Hypotension: SBP ≤ 90
5. Itching, nausea, vomiting unrelieved by medication on pre-printed orders

VIII. DOCUMENTATION
A. On Pain Flowsheet
   1. Respiratory rate, sedation level, and pain rating, and motor and sensory strength as required by assessment parameters
   2. Adverse effects of therapy
B. On Nursing Flowsheet
   1. Reportable conditions and actions taken
C. On Multidisciplinary Patient Education Documentation Tool
   1. Patient education
IX. EDUCATION AND COMMUNICATION
A. This policy will be communicated to the appropriate JHH and JHBMC personnel via the following channels:
1. Medical staff and Nursing department education and communication.
2. Departmental leadership shall be responsible for training new employees and communicating updates regarding the policy.
B. This policy will be placed in the JHM Gyn/Ob Interdisciplinary Clinical Practice Manual in the Hopkins Policy and Document Library website.

X. SUPPORTIVE INFORMATION
A. References:

B. Policy Cross-Reference:
• Johns Hopkins Hospital, A/P130 Morphine Sulfate Preservative Free (Duramorph) Analgesia Postoperative Pain (12/07/2015), JHH GYN/OB Clinical Practice Manual

C. Developer:
• Department of Gynecology and Obstetrics, Johns Hopkins Hospital
• Department of Gynecology and Obstetrics, Johns Hopkins Bayview Medical Center

D. Review Cycle:
• Every three (3) years

E. Reviewed by:
• JHH Anesthesia and Analgesia Subcommittee, December 2017.
• JHH Pharmacy and Therapeutics (P&T) Committee, December 2017
• JHBMC Pharmacy and Therapeutics (P&T) Committee, February 2018
Subject
Morphine Sulfate Preservative-Free (Duramorph) Analgesia
Postoperative Pain - Adult

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<td>Jeanne Sheffield, MD</td>
<td>Division Director, Maternal-Fetal Medicine</td>
<td>01/03/2018</td>
</tr>
<tr>
<td></td>
<td>Johns Hopkins Hospital, Department of Gynecology and Obstetrics</td>
<td></td>
</tr>
<tr>
<td>Jamie Murphy, MD</td>
<td>Chief, Division of Obstetric, Gynecologic and Fetal Anesthesiology</td>
<td>01/04/2018</td>
</tr>
<tr>
<td></td>
<td>Johns Hopkins Hospital, Department of Anesthesia and Critical Care Medicine</td>
<td></td>
</tr>
<tr>
<td>Steven Beaudry, MD</td>
<td>Medical Director, Division of Obstetric Anesthesiology</td>
<td>01/03/2018</td>
</tr>
<tr>
<td></td>
<td>Johns Hopkins Bayview Medical Center, Department of Anesthesia and Critical Care Medicine</td>
<td></td>
</tr>
<tr>
<td>Linda Szymanski, MD</td>
<td>Medical Director, Labor and Delivery</td>
<td>01/16/2018</td>
</tr>
<tr>
<td></td>
<td>Johns Hopkins Hospital, Division of Maternal-Fetal Medicine, Department of Gynecology and Obstetrics</td>
<td></td>
</tr>
<tr>
<td>Cynthia Argani, MD</td>
<td>Medical Director, Labor and Delivery</td>
<td>12/11/2017</td>
</tr>
<tr>
<td></td>
<td>Johns Hopkins Bayview Medical Center, Department of Gynecology and Obstetrics</td>
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XI. SIGNATURES

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<td>Diann Snyder Administrator and Director of Nursing. Department of Gynecology and Obstetrics, Johns Hopkins Hospital</td>
<td>01/22/2018</td>
</tr>
<tr>
<td>Cynthia Walters Senior Director of Nursing. Maternal Child Health, Johns Hopkins Bayview Medical Center</td>
<td>01/18/2018</td>
</tr>
<tr>
<td>Andrew Satin Medical Director. Department of Gynecology and Obstetrics, Johns Hopkins Hospital</td>
<td>01/23/2018</td>
</tr>
<tr>
<td>Victoria Handa Medical Director. Department of Gynecology and Obstetrics, Johns Hopkins Bayview Medical Center</td>
<td>01/24/2018</td>
</tr>
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# Appendix A: OB STAT Team Member Responsibilities

## MFM OB / JHCP Attending
- Assign the lead OB resident
- Coordinate care with anesthesia providers
- Complete orders (e.g., labs, IV fluids, medications, blood products)

## OB Resident
- Assume team leadership upon arrival
- Manage obstetric and surgical care
- Complete orders (e.g., labs, IV fluids, medications, blood products)

## Anesthesia Attending
- Document RRT summary/review
- Ensure completion of OB record
- Coordinate NICU presence

## Anesthesia Resident
- Conduct NICU presence
- Unnecessary personnel cleaned from area

## L&D Charge Nurse
- Assist with IV and blood draw supplies, labs, and equipment on request
- Assist with all OB STAT equipment

## Clinical Technician
- Document RRT summary/review
- Ensure completion of OB record
- Coordinate NICU presence

## Unit Assistant
- Provide assistance as needed
- Request additional personnel as indicated
- Request additional equipment as indicated

## OB STAT TEAM MEMBER RESPONSIBILITIES

### 1. Designate team leader
- Who will direct the team in emergency management/orders.

### 2. Designate roles and responsibilities
- Medications
- Documentation
- Anesthesia support
- Compressions
- Family communication

### 3. Coordinate care with anesthesia providers

### 4. Determine need for additional resources (e.g., Trauma, General Surgery, Adult Surgical Intensivist, hospital RRT or code team)

### 5. Determine disposition of the patient after the emergency

### 6. Facilitate team debriefing

---

Appendix A: OB STAT Team Member Responsibilities

Effective Date: [Date]

6YN/0B Clinical Practice Manual, Obstetrics: Antepartum/Postpartum, Obstetric Emergencies: OB STAT Team...
The Johns Hopkins Hospital

GYN/OB Clinical Practice Manual

Obstetrics: Antepartum/Postpartum

Obstetric Emergencies: OB STAT Team

Keywords:

Table of Contents

<table>
<thead>
<tr>
<th></th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. OBJECTIVES AND POLICY HIGHLIGHTS</td>
<td>1</td>
</tr>
<tr>
<td>II. INDICATIONS FOR USE</td>
<td>1</td>
</tr>
<tr>
<td>III. RESPONSIBILITY</td>
<td>1</td>
</tr>
<tr>
<td>IV. PROCEDURE</td>
<td>2</td>
</tr>
<tr>
<td>V. REPORTABLE CONDITIONS</td>
<td>2</td>
</tr>
<tr>
<td>VI. DOCUMENTATION</td>
<td>2</td>
</tr>
<tr>
<td>VII. SUPPORTIVE INFORMATION</td>
<td>3</td>
</tr>
<tr>
<td>VIII. APPROVAL</td>
<td>3</td>
</tr>
<tr>
<td>Appendix A: OB STAT TEAM MEMBER RESPONSIBILITIES</td>
<td>Click Here</td>
</tr>
</tbody>
</table>

I. OBJECTIVES AND POLICY HIGHLIGHTS

1. To provide effective management of obstetric emergencies and rapid mobilization of all interdisciplinary team members.
2. The OB STAT Team process ensures reliable, efficient, and simultaneous notification of pre-identified team members to respond to obstetric emergencies within inpatient obstetric areas.

II. INDICATIONS FOR USE

A. The OB STAT Team shall be notified to provide rapid assessment and treatment in emergent situations, including but not limited to:
   1. Emergent (STAT) OB OR cases
   2. Obstetric hemorrhage – Stage 2 (See GynOb A/P148 Obstetric Hemorrhage policy)
   3. Fetal bradycardia
   4. Umbilical cord prolapsed
   5. Undiagnosed breech vaginal birth
   6. Eclamptic seizure
   7. Any medical condition assessed by the bedside obstetric provider as urgent and requiring additional resources.

B. If a medical emergency is identified (e.g. medical condition unstable or deteriorating), the Patient Service Coordinator (PSC)/designee shall notify the OB STAT Team.

C. The JHH Arrest Team (Code Team) shall be called for cardiopulmonary arrests concurrently with activation of the OB STAT Team. See GynOb L&D 106 “Cardiac Arrest on Labor and Delivery” policy.

III. RESPONSIBILITY

A. All OB STAT Team members shall:
   1. Carry the assigned ASCOM phone at all times.
   2. Respond to obstetrical emergencies upon notification via the ASCOM phone system. If the ASCOM phone is out of range to receive the message, the OB STAT Team member shall receive notification via a secondary notification (e.g. pager or direct call to back-up phone).

B. The OB STAT Team membership includes:
   1. Obstetric Attending Physician (e.g. Maternal-Fetal Medicine (MFM), Generalist or JHCP)
   2. OB Resident
   3. Anesthesiology Attending
   4. Anesthesia Resident

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Subject
Obstetric Emergencies: OB STAT Team

5. L&D Charge Nurse
6. Clinical Technician
7. Unit Assistant (UA)

C. Refer to Appendix A for role delineation of team members for specific responsibilities.

IV. PROCEDURE
A. The OB STAT Team can be activated by any nurse or physician team member.
   1. The first responder shall call for help and/or press the “Staff Emergency” button in the patient’s room.
   2. State the nature of the obstetric emergency.
   3. Initiate appropriate interventions, as needed.
   4. Prepare patient for transfer to Labor and Delivery for emergencies occurring on the maternity unit.

B. The PSC / designee shall notify the OB STAT Team of an obstetric emergency via the Ascom phone Globestar Connexall Middleware (See NPOM GEN011 policy “GE Telligence Nurse Call System, Real Time Locating System, and Ascom Phone Standards”).
   1. Select the OB STAT callpoint on the Connexall messaging system.
   2. Enter the emergency location provided and room number (e.g. OB Room 10).
   3. Enter the nature of the OB emergency (e.g. Postpartum Hemorrhage, STAT C-Section).
   4. Confirm on the Connexall system that the text message was acknowledged by the clinician. If no response within one minute, the PSC shall notify the OB provider and charge nurse on L&D.

C. Notification System/Monitoring
   1. Pre-programmed ASCOM phones will be provided to OB STAT team members by the PSC.
   2. The OB STAT Team notification process will be tested every 24 hours.
      a. A test message will be sent simultaneously to each member’s Ascom phone.
      b. A back-up message will be sent to the individual physician pager (if signed into the Connexall system).
      c. Individual team member will acknowledge the test message.
   3. If the Connexall system is not functioning, use Avaya landline telephone system to contact clinicians directly.
   4. OB STAT Team usage data will be tracked and audited periodically.

V. REPORTABLE CONDITIONS
1. Patient safety events, delayed response time of the OB Stat Team to the urgent or emergent event, failure of any team member to respond to an emergency, equipment malfunctions/unavailability, and airway or vascular complications.
2. Notify the Legal Department for unexpected deaths or unexpected significant harm.

VI. DOCUMENTATION
Complete appropriate documentation forms in the electronic medical record.
VII. SUPPORTIVE INFORMATION

1. See Also:

2. References:

3. Sponsor:
   - Department of Gynecology and Obstetrics

4. Developer:
   - Department of Gynecology and Obstetrics

5. Review Cycle:
   - Every three (3) years

VIII. APPROVAL

Approval Date: 03/06/2016  Effective Date: 10/18/2016

Andrew Satin, MD  Professor and Director  Department of Gynecology and Obstetrics

Diann L. Snyder, MS, RN  Administrator and Director of Nursing  Department of Gynecology and Obstetrics

Linda Szymanski, MD, PhD  Medical Director, Labor and Delivery Division of Maternal-Fetal Medicine  Department of Gynecology and Obstetrics

Jamie Murphy, MD  Chief, Division of Obstetric, Gynecologic and Fetal Anesthesiology  Assistant Professor  Department of Anesthesia and Critical Care Medicine

Original: 02/2016

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**Post OB Quality Care Evaluation**

**DATE OF EVALUATION:** 

**DATE OF PROCEDURE:** 

**ANESTHESIA PROVIDERS:** 

**TO BE FILLED OUT BY PATIENT**

1. I had:
   - [ ] Epidural
   - [ ] Spinal Anesthesia
   - [ ] Epidural/Spinal (CESA)
   - [ ] General Anesthesia

   I have had a previous C-section
   - [ ] Yes
   - [ ] No

   I have had a previous vaginal delivery
   - [ ] Yes
   - [ ] No

2. For all patients given an anesthetic:
   - I understood the risks and benefits of the anesthetic.
     - [ ] Yes
     - [ ] No

   I was comfortable during the placement of my epidural/spinal.
     - [ ] Yes
     - [ ] No

   I had adequate pain relief for my delivery.
     - [ ] Yes
     - [ ] No

   The anesthetic prevented “pushing.”
     - [ ] Yes
     - [ ] No

   I have a headache.
     - [ ] Yes
     - [ ] No

   I have a backache.
     - [ ] Yes
     - [ ] No

3. For C-section patients ONLY:
   - During C-section, there was significant pain.
     - [ ] Yes
     - [ ] No

   Post C-section itching has been
     - [ ] Intolerable

   Post C-section nausea/vomiting has been
     - [ ] Intolerable

4. Experience with Anesthesiology Team (all patients)
   - My anesthesia team spoke to me in a respectful and courteous manner.
     - [ ] Yes
     - [ ] No

   My anesthesia team was
     - [ ] Excellent
     - [ ] Acceptable
     - [ ] Unacceptable

**Patient Comments:**

I would like to be contacted to discuss my care:
   - [ ] Yes
   - [ ] No
Postpartum Patients, Management of...

This document applies to the following Participating Organizations:
Johns Hopkins Bayview Medical Center  The Johns Hopkins Hospital

Keywords: cesarean section, post-delivery, postpartum, vaginal delivery

<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. PURPOSE</td>
<td>1</td>
</tr>
<tr>
<td>II. INDICATIONS FOR USE</td>
<td>1</td>
</tr>
<tr>
<td>III. RESPONSIBILITIES</td>
<td>1</td>
</tr>
<tr>
<td>IV. PROCEDURES</td>
<td>1</td>
</tr>
<tr>
<td>V. REPORTABLE CONDITIONS</td>
<td>2</td>
</tr>
<tr>
<td>VI. DOCUMENTATION</td>
<td>3</td>
</tr>
<tr>
<td>VII. EDUCATION AND COMMUNICATION</td>
<td>3</td>
</tr>
<tr>
<td>VIII. SUPPORTIVE INFORMATION</td>
<td>3</td>
</tr>
<tr>
<td>IX. SIGNATURES</td>
<td>4</td>
</tr>
</tbody>
</table>

I. PURPOSE
A. To provide guidance in postpartum care after transfer to the inpatient unit.

II. INDICATIONS FOR USE
A. All patients who experience a vaginal or cesarean section birth.

III. RESPONSIBILITIES
A. Physician/certified nurse midwife (CNM) enter orders in the electronic medical record for postpartum care.
B. Registered nurse (RN):
   1. Review medical record for hemorrhage risk screen and include risk factors during hand-off/change of shift report.
   2. Report clinical indicators for hemorrhage (e.g. blood loss and/or abnormal vital signs) to physician/CNM.

IV. PROCEDURES
A. Vital Signs:
   1. Vaginal Delivery - assess temperature, pulse, respiration, blood pressure, and oxygen saturation every 8 hours or more frequently per physician/CNM order.
   2. Cesarean Section - assess temperature, pulse, respiration, blood pressure, and oxygen saturation every 4 hours x 48 hours then every 8 hours or per physician/CNM order.
B. Physical assessment at least every 12 hours and PRN including:
   1. Fundal tone and level, lochia amount and color, bladder for fullness.
   2. Episiotomy/perineal repair for redness, edema, tenderness, drainage, or ecchymosis.
      a. Vaginal Delivery – complete assessment on admission, then PRN
      b. Cesarean Section patients – complete assessment on admission, then at least every 12 hours and PRN.
      c. Instruct patient to turn, cough and deep breathe every 2-4 hours following a cesarean section or per physician order.
5. For postoperative patients: Abdominal dressing for the presence of bleeding and/or drainage, amount and characteristics. Following removal of the abdominal dressing by the physician/CNM, assess incision for for intact suture line and note any redness, edema, ecchymosis, drainage, or tenderness.
6. Cardiovascular: Skin temperature and color.
7. Neurological: Level of consciousness; motor and sensory function.
8. Pain level every 4 hours and PRN. Assess effective use of nonpharmacological and pharmacological agents.
   a. Refer to PCA policy for patient receiving patient controlled analgesia.
   b. Refer to Morphine Sulfate Preservative Free (Duramorph) Analgesia Postoperative Pain policy for patients who received Duramorph.
   c. Refer to Pain protocol for pain management guidelines.

C. Intake and output.
   1. Measure intake and output per physician/CNM order.
   2. Assess patency of IV lines.
   3. Assess drains and tubes for patency, amount, and characteristic of drainage.

D. Apply sequential compression device (SCD) per physician’s order.

E. Assist with progressive activity per physician's order.
   1. Assess motor and sensory level prior to first time out of bed.
   2. Assess orthostatic blood pressure prior to first time out of bed.
   3. Secure bed in low-locked position. Assist patient to sitting position and allow her to dangle her legs 2-3 minutes before getting out of bed for the first time.
   4. Instruct patient in the use of emergency call bell if patient is in bathroom. Remain outside door until patient needs assistance.
   5. Implement Fall Risk protocol as indicated.

F. If patient has received a regional anesthetic for a vaginal birth and does not ambulate prior to transfer to the inpatient unit, assist patient first time out of bed and as needed.

G. Assist patient with hygiene and peri-care daily and as needed. Apply ice pack to perineum of patient with episiotomy, lacerations, or perineal swelling as desired.

H. Facilitate breastfeeding. See "Management of Breast-feeding Couple" policy. If formula feeding, assess mother’s ability to feed infant.

I. Instruct patient on postpartum and infant care skills.

J. Administer vaccines per physician/CNM order and if patient meets screening criteria.

K. Assess discharge needs (housing, transportation, infant supplies, or clothing) on admission and daily. Refer patient to social worker, substance abuse counselor, home care, or lactation specialist per risk screening criteria.

L. Foster a family-centered atmosphere that promotes parent and family interactions with the infant.

V. REPORTABLE CONDITIONS

A. Abnormal vital signs:
   1. Temperature ≥ 38°C
   2. Pulse ≥ 120 or < 60
   3. BP systolic ≥ 140 or < 80 mmHg
   4. BP diastolic ≥ 90 or < 50 mmHg
5. Oxygen saturation < 96%
6. Respiratory rate > 26 or < 12
B. Urinary output: < 30 mL/hr or < 120 mL/4hr
C. Changes in LOC, sensory or motor function.
D. Breakdown of episiotomy/incision/wound.
E. Persistent uterine bogginess, saturates ≥ 2 peri pads in less than one hour or a continuous flow of lochia (Refer to Obstetric Hemorrhage Protocol.)
F. Calf pain, asymmetrical swelling, warmth, or redness.
G. Unrelieved pain or score ≥ 7 (0-10 scale).
H. Inability to sit up unassisted.

VI. DOCUMENTATION
A. Assessments, interventions, response to interventions and evaluation of outcome on nursing flowsheet in the electronic medical record.
B. Risk screening referrals/discharge planning and patient education in the electronic medical record.

VII. EDUCATION AND COMMUNICATION
A. This policy will be communicated to the appropriate JHH and JHBMC personnel via the following channels:
   1. Medical staff and Nursing department education and communication.
   2. Departmental leadership shall be responsible for training new employees and communicating updates regarding the policy.
B. This policy will be placed in the JHM Gyn/Ob Interdisciplinary Clinical Practice Manual in the Hopkins Policy and Document Library website.

VIII. SUPPORTIVE INFORMATION
1. See Also:
   • GynOb Clinical Practice Manual - A/P 144 "Obstetric Hemorrhage" policy
2. Policy Cross-Reference:
   • Johns Hopkins Bayview Medical Center, L&D005 Admission of Mother-Baby Couplet (02/01/2015), JHBMC GYN/OB Clinical Practice Manual
   • Johns Hopkins Hospital, A/P144 Management of Postpartum Patients (12/08/2015), JHH GYN/OB Clinical Practice Manual
3. Sponsor:
   • Department of Gynecology and Obstetrics
4. Developer:
   • Department of Gynecology and Obstetrics
5. Review Cycle:
   • Every three (3) years
IX. SIGNATURES

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</table>
| Cynthia Walters  
Senior Director of Nursing, Maternal Child Health, Johns Hopkins Bayview Medical Center | 11/07/2017|
| Diann Snyder  
Administrator and Director of Nursing, Department of Gynecology and Obstetrics, Johns Hopkins Hospital | 10/23/2017|
| Victoria Handa  
Medical Director, Department of Gynecology and Obstetrics, Johns Hopkins Bayview Medical Center | 11/08/2017|
| Andrew Satin  
Medical Director, Department of Gynecology and Obstetrics, Johns Hopkins Hospital | 11/08/2017|
Tranexamic Acid (TXA) for Postpartum Hemorrhage (PPH)

- May be used for prophylaxis in women at high-risk of PPH
- Has been shown to reduce death due to bleeding in women with PPH
- Has minimal adverse effects
- To be effective, it should be given as soon as possible after PPH is identified.

**Indications (PPH):**
- EBL > 1,000 ml after vaginal delivery or > 1,500 ml during cesarean delivery
- OR EBL considered sufficient to compromise hemodynamic stability

**Dosage:**
- TXA 1 g to be added to 100 ml NS mini-bag
- Administer 100 mL mini-bag over 10 minutes as soon as PPH is identified
- An additional dose may be given 30 minutes to 24 hours after initial dose if PPH persists

**Contraindications with IV administration (per Micromedix):**
- Acquired defective color vision
- Hypersensitivity to TXA
- Active intravascular clotting
- Subarachnoid hemorrhage – may cause cerebral edema and cerebral infarction
- *Caution* in patients at risk of thrombotic complications
- *However, in case of life-threatening PPH, risk/benefit must be considered.*

**Adverse Effects with IV administration:**
- Hypotension if administered too rapidly
- Seizures (seen in 2.5% of pts undergoing cardiac surgery who received TXA, mean dose 24 mg/kg, vs 1.2% in pts who did not receive TXA)
- Allergic dermatitis

**Pharmacokinetics (IV):**

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</thead>
<tbody>
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<td>Excretion</td>
<td>Urine (&gt;95% as unchanged drug)</td>
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<tr>
<td>Elimination half life</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

**Breastfeeding:**
- Micromedex Lactation Rating: *Infant risk cannot be ruled out.*
- Available evidence and/or expert consensus is inconclusive or is inadequate for determining infant risk when used during breastfeeding. Weigh the potential benefits of drug treatment against potential risks before prescribing this drug during breastfeeding.
- There are limited data on nursing an infant while on TXA. Data have shown that only minimal amounts of the drug are excreted in breast milk. Breast milk concentrations were reported to be approximately 1% of peak serum levels 1 hour following the last dose of a 2-day treatment regimen.
- TXA should only be used in a nursing mother only if clearly needed and use caution when TXA is administered to a nursing mother.
- Levels of TXA found in breast milk are about one hundredth of those in the maternal serum.
Tranexamic Acid (TXA) for PPH

Based on the CRASH-2 trial, (Clinical Randomization of an Antifibrinolytic in Significant Hemorrhage) study, TXA is becoming more widely used for patients with ongoing bleeding, especially those with documented evidence of fibrinolysis. The CRASH-2 trial tested an infusion of 1 g tranexamic acid (TXA), demonstrated an overall reduction in mortality of 1.5% in patients who received TXA compared to placebo. The number needed to treat (NNT) to save a single patient from death was 67.


TXA:
- Antifibrinolytic
- Synthetic lysine derivative
- Competitively (and reversibly) inhibits the activation of plasminogen. At higher concentrations, also inhibits plasmin
- Inhibits plasmin activity also
- Prevents fibrin binding and degradation

- Same mechanism as aminocaproic acid (EACA), but aminocaproic acid has lower binding affinity to plasminogen. TXA is 6-10x more potent
- Excreted primarily by kidneys

Thromboelastography (TEG) - test of whole blood coagulation mainly used in surgery & anesthesiology. Designed to assist in identifying if a patient has normal hemostasis or is bleeding due to a coagulopathy or anticoagulant therapy. Allows for more focused treatment.

**DOSING:**
- 1 gram as soon as hemorrhage is identified
  - 1 gram/1 ml: Dilute in 100 ml NS; administer over 10 mins (600 ml/hr)
- Additional dose may be given 30 minutes – 24 hours after initial dose if hemorrhage persists
WOMAN Trial (World Maternal Antifibrinolytic) -- Lancet May 27, 2017

- Randomized, placebo controlled trial; > 20,000 women; 21 diverse geographical settings (193 hospitals, 21 countries)
- Deaths from bleeding were reduced by 19% with TXA (RR .81; 1.5% vs 1.9%)
- Maternal mortality was reduced by 31% if given within 3 h of birth
- Adverse events did not differ between groups

Figure 3. Death from bleeding by subgroup

Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial

WOMAN Trial Collaborators*

Summary

Background Post-partum haemorrhage is the leading cause of maternal death worldwide. Early administration of tranexamic acid reduces deaths due to bleeding in trauma patients. We aimed to assess the effects of early administration of tranexamic acid on death, hysterectomy, and other relevant outcomes in women with post-partum haemorrhage.

Methods In this randomised, double-blind, placebo-controlled trial, we recruited women aged 16 years and older with a clinical diagnosis of post-partum haemorrhage after a vaginal birth or caesarean section from 193 hospitals in 21 countries. We randomly assigned women to receive either 1 g intravenous tranexamic acid or matching placebo in addition to usual care. If bleeding continued after 30 min, or stopped and restarted within 24 h of the first dose, a second dose of 1 g of tranexamic acid or placebo could be given. Patients were assigned by selection of a numbered treatment pack from a box containing eight numbered packs that were identical apart from the pack number. Participants, care givers, and those assessing outcomes were masked to allocation. We originally planned to enrol 15,000 women with a composite primary endpoint of death from all-causes or hysterectomy within 42 days of giving birth. However, during the trial it became apparent that the decision to conduct a hysterectomy was often made at the same time as randomisation. Although tranexamic acid could influence the risk of death in these cases, it could not affect the risk of hysterectomy. Therefore we increased the sample size from 15,000 to 20,000 women in order to estimate the effect of tranexamic acid on the risk of death from post-partum haemorrhage. All analyses were done on an intention-to-treat basis. This trial is registered with ISRCTN70012196 (Dec 8, 2008). ClinicalTrials.gov, number NCT00672469; and PACTR201007000192283.

Findings Between March, 2010, and April, 2016, 20060 women were enrolled and randomly assigned to receive tranexamic acid (n=10031) or placebo (n=10009), of whom 10036 and 9985, respectively, were included in the analysis. Death due to bleeding was significantly reduced in women given tranexamic acid (155 [1.5%] of 10036 patients vs 191 [1.9%] of 9985 in the placebo group, risk ratio [RR] 0.81, 95% CI 0.65–1.00; p=0.045), especially in women given treatment within 3 h of giving birth (89 [1.2%] in the tranexamic acid group vs 127 [1.7%] in the placebo group, RR 0.69, 95% CI 0.52–0.91; p=0.008). All other causes of death did not differ significantly by group. Hysterectomy was not reduced with tranexamic acid (158 [1.5%] patients in the tranexamic acid group vs 151 [1.5%] in the placebo group, RR 1.02, 95% CI 0.85–1.21; p=0.94). The composite primary endpoint of death from all causes or hysterectomy was not reduced with tranexamic acid (534 [5.3%] deaths or hysterectomies in the tranexamic acid group vs 546 [5.5%] in the placebo group, RR 0.97, 95% CI 0.87–1.09; p=0.65). Adverse events (including thromboembolic events) did not differ significantly in the tranexamic acid versus placebo group.

Interpretation Tranexamic acid reduces death due to bleeding in women with post-partum haemorrhage with no adverse effects. When used as a treatment for postpartum haemorrhage, tranexamic acid should be given as soon as possible after bleeding onset.
I. OBJECTIVES AND POLICY HIGHLIGHTS

This policy outlines safe administration and ordering of continuous vasoactive IV infusions for patients on designated adult care areas.

II. INDICATIONS FOR USE

A. Implement this policy for all patients requiring IV vasoactive drugs on designated adult care areas (see definitions):
   1. In adult patients, the vasoactive continuous IV infusions listed in Appendix A and Appendix B may only be utilized in the designated areas described in the appendices.
   2. During medical emergencies (activation of code team or rapid response team), patients in non-designated areas may be initiated on vasoactive infusions if planning to transfer to a designated area in the immediate future.
   3. This policy does not apply to the use of vasoactive continuous IV infusions in the adult operating rooms

B. Follow appropriate medication-specific policies for detailed patient management (e.g., nesiritide).

III. DEFINITIONS

| Vasoactive Infusion | An intravenous medication that increases or decreases heart rate and/or blood pressure and is typically titrated to effect. |

Keywords: diltiazem, dobutamine, dopamine, drips, epinephrine, esmolol, Infusion, inotrope, isoproterenol, labetalol, Levophed, milrinone, Neosynephrine, nicardipine, Nipride, nitroglycerin, nitroprusside, norepinephrine, phenylephrine, pressor, Vasoactive, vasodilator, vasopressin, vasopressor
Designated Adult Care Areas

1. Intensive care units (ICU)
2. Post-anesthesia care units (PACU)
3. Labor & Delivery
4. Emergency department (ED)
5. The following procedural areas: cardiovascular interventional lab (CVIL) and interventional radiology (IRC)
6. Intermediate care units (IMC)
7. Telemetry beds on Department of Medicine (DOM) units
8. Department of Oncology Nursing Units
9. Palliative care beds

Consulting Attending Intensivist
Supervising intensivist managing care in an intensive care unit.

IV. RESPONSIBILITY

A. Authorized prescribers
   1. Initiation and ongoing management of orders for intravenous (IV) vasoactive drugs, using the vasoactive infusion order set, to include:
      a. Starting dose,
      b. Titration instructions
      c. Therapeutic target.
      NOTE: Maximum dose is unit specific and is defined in Appendix A or B.
   2. Notifying either the attending physician or consulting attending intensivist and entering a note when the established maximum dose of the IV vasoactive medication exceeds the unit specific established maximum dose. When applicable, a new maximum dose will be ordered by the authorized prescriber, as directed by the attending physician or consulting attending intensivist.
   3. Evaluating patient on telemetry/IMC areas when it surpasses maximum number of titrations.

B. Registered Nurses
   1. Initiating and maintaining vasoactive infusions per orders (e.g., starting dose, titration instructions, therapeutic target) and appropriate Appendix.
   2. Notify the authorized prescriber when a vasoactive drug is approaching maximum dose.
   3. Notifying medical team to evaluate the patient for a higher level of care when a patient:
      a. On DOM telemetry units, has two consecutive increases in dose in a 24-hour period. (Exclusion: nitroglycerin).
      b. On IMC level units, has three increases in dose in a 24-hour period (Exclusion: nitroglycerin, nicardipine).
      c. Is in a palliative care bed and goals of care changed, leading to an increase in vasoactive medication dose (see Appendix D).

C. Pharmacy is responsible for:
   1. Verifying entered orders and dispensing as appropriate.
   2. Consultation as needed.

V. PROCEDURE

A. General Information
   1. Do not bolus fluids or IV push medications through the same IV line where vasoactive drugs are infusing due to the potential of bolusing the vasoactive drug.
2. Do not interrupt a continuous infusion of a vasoactive medication for blood sampling or to routinely monitor for blood return.
   a. When blood sampling is necessary, peripheral venipuncture or another alternative site/method must be used.
3. Connect IV vasoactive infusions as close to the patient as possible to optimize responses of drug delivery to changes in drug dosing.
4. Carrier infusions are suggested to maximize the efficiency of continuous vasoactive IV infusions.
   a. The total rate of both vasoactive medications and the carrier fluids must meet, at a minimum, 10 mL per hour through each lumen of a peripheral or central venous access device or 20 mL per hour through a peripherally inserted central catheter (PICC). These rates represent standardized "keep vein open" (KVO) rates based on the cumulative rates of vasoactive and carrier fluids.
5. Ensure use of appropriate vasoactive infusion concentration for the available vascular access device (i.e., central venous access device (CVAD), peripheral IV) using the standard concentration list or appended unit specific vasoactive infusion reference.
6. Use the Guardrail Drugs feature of the infusion pump to program the vasoactive medication infusion (See PAT047 Alaris System, IV Infusion Pump, Adult)
   a. For weight-based infusions, use the dosing weight.
7. Refer to appropriate appendix for maximum IV vasoactive medications doses permissible on individual units.
   a. Before a unit specific maximum dose of an IV vasoactive medication is exceeded, notify the authorized prescriber. Ensure a new ordered maximum dose is placed, as directed by either the attending or consulting attending intensivist, when applicable.
   b. Titrate the IV vasoactive drug according to instructions in the appropriate appendix.
   c. Maintain parameters set forth in IV vasoactive medication order.
B. Assessment and Interventions (does not apply to palliative care beds):
   1. Assess and document heart rate and blood pressure, at least every 15 minutes X 2 (1 hour x 1 for IMC/telemetry) upon initiation of the IV vasoactive infusion; every 15 minutes X 2 after each dose titration; and then per unit standard.
   2. Assess and document the following at least every 4 hours (ICUs) and PRN or per unit standard.
      a. neurologic status
      b. peripheral circulation
   3. Record I&O.
      a. Assess urine output per unit standard.
   4. Monitor and assess the peripheral IV site hourly and central VAD at least every 4 hours per MDU003 Infiltration and Extravasation: Monitoring and Management of Vesicant and Non-Vesicant Agents.

VI. REPORTABLE CONDITIONS
   Notify the authorized prescriber of any of the following conditions (does not apply to palliative care beds):
   1. Deterioration in hemodynamic status from baseline.
   2. Reaching maximum allowed dose or number of titrations on a given unit without achieving ordered physiologic goal.
   3. Change in neurologic status.
   4. Decreased or absent urine output.
   5. Signs of impaired tissue or organ perfusion.
   6. IV vasoactive infiltration per MDU003 Infiltration and Extravasation: Monitoring and Management of Vesicant and Non-Vesicant Agents.
VII. DOCUMENTATION
Document vital signs, hemodynamic response to IV vasoactive medication (e.g., MAP, CO, CI), peripheral circulation assessment, I&O, drug titration, and reportable conditions in electronic medical record.

VIII. EDUCATION AND COMMUNICATION
This policy will be communicated to the appropriate JHH personnel via the following channels:

1. Department of Nursing will be responsible for initial/ongoing training of nursing staff to policy requirements.
2. The policy will be distributed to the Medical and Nursing Staff via newsletter.
3. Updates and revisions will be communicated via Medical and Nursing Staff newsletter.
4. The policy will be placed in the Interdisciplinary Clinical Practice Manual on the JHH Policy website. In the event of web access difficulty, the policy can be obtained from the downtime computer on any clinical nursing unit.
IX. SUPPORTIVE INFORMATION

See Also:

The Johns Hopkins Hospital, Interdisciplinary Clinical Practice Manual

- MDU003 Infiltration and Extravasation: Monitoring and Management of Vesicant and Non-Vesicant Agents
- PAT047 Alaris System, IV Infusion Pump, Adult
- PAT073 Heart Attack Team (HAT) Activation Policy and Cardiac Pain Protocol, Adult

The Johns Hopkins Hospital, Medical Nursing Operations Manual

- ADM202 Medical Unit Admission Guidelines

The Johns Hopkins Hospital, GYN/OB Clinical Practice Manual

- OBMED211 Intravenous Anti-hypertensive Drugs in the Obstetrical Patient

Sponsor:

- Medical Care Evaluation Committee

Developers:

- Critical Care Committee
- Pharmacy and Therapeutics Committee

Review Cycle - Three (3) years Medical Board - Approval Date: 11/29/2016 Effective Date: 12/14/2016

X. SIGNATURES

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<tr>
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<tr>
<td>Redonda Miller</td>
<td>12/05/2016</td>
</tr>
<tr>
<td>Vice President, Medical Affairs, The Johns Hopkins Hospital</td>
<td></td>
</tr>
<tr>
<td>Deborah Baker</td>
<td>12/06/2016</td>
</tr>
<tr>
<td>Vice President, Nursing and Patient Care Services, The</td>
<td></td>
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<tr>
<td>Johns Hopkins Hospital</td>
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