Management recommendations for postpartum hemorrhage

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DEFINITION OF POSTPARTUM HEMORRHAGE (PPH)

According to the definition, PPH can be identified if the blood loss is:
• > 500 ml (spontaneous delivery),
• > 1000 ml (caesarean section).
If the blood loss occurs before 24 hours it is deemed early postpartum hemorrhage; after that (24 h-6 week) it is late or delayed postpartum hemorrhage.

Definition of severe hemorrhage:
• blood loss > 150 ml/min (within 20 min causing loss of more than 50% of blood volume),
• sudden blood loss > 1500-2000 ml (uterine atony; loss of 25-35% of blood volume).
For greater clarity two separate protocols have been distinguished:

Basic protocol (A)
• for blood loss about 500-1000 ml, without symptoms of shock.

Full protocol (B)
• for blood loss > 1000-1500 ml or
• with symptoms of hemorrhagic shock (tachycardia/bradycardia, hypotension, tachypnoe, oligo/anuria).

PROGNOSING POSTPARTUM HEMORRHAGE

Prenatal risk factors:
• bleeding before delivery,
• risk of placental abruption,
• placenta previa,
• multiple pregnancy,
• hypertension in pregnancy (preeclamptic state, eclampsia, HELLP),
• chorioamnionitis,
• hydramnion,
• fetal death,
• anemia (Hb < 5.8 mmol/l),
• multiparity (> 5 pregnancies),
• uterine myoma,
• past history of hemorrhage, obesity (minor importance).

Postpartum risk factors:
• cesarean section (in particular emergency),
• retained placental tissue,
• uterine atony,
• operative termination of delivery (forceps, traction appliance),
• no progression of labor (for more than 12 hours, especially II stage > 1 hour in a multipara, > 2 hours in a primigravida),
• delivery induction,
• large infant (infant weighing > 4000 g),
• injury to the genital tract during delivery (rupture hematoma, uterine eversion),
• pyrexia in labour,
• type of anesthesia,
• DIC.

Delivering women with risk factors should be under specialist care.

TREATMENT OF EARLY POSTPARTUM HEMORRHAGE

General rules
At diagnosis of PPH immediate action should be taken ("the golden hour"):  
• causal treatment of hemorrhage,
• replacement of lost blood volume,
• start of blood transfusion,
• diagnose coagulopathies, correct hemostasis,
• keep constant control of source of bleeding,
• begin constant basic monitoring.

In case of severe bleeding of symptoms of developing shock the following should be informed:
• physician in charge and head of department,
• anesthesiologist,
• hospital blood transfusion service,
• consultant hematologist (if there is positive past history or serious hemostasis disorders are expected).

Way of controlling bleeding
The leading cause of early postpartum hemorrhage is uterine atony. In the first stage external massage of the uterine fundus should be applied. At all times clinical examination must be done to exclude other causes such as: retention of placenta remnants, postpartum injury to the cervix and/or vaginal wall (hematoma), rupture of the uterus etc.

Urinary bladder should be emptied in all cases.
Pharmacological treatment

Before the application of drugs presence of contraindications to its administration should be checked. If uterine atony is confirmed as the reason of bleeding, the following treatment should be applied:

- **oxitocin** 10 j.m. (IV, bolus) and 20-40 IU in 500 ml 5% glucose (125 ml/h),
- **methylergometrin** 0.2 mg IM; 0.05-0.2 mg IV,
- **dinoprost** (PGF$_{2\alpha}$ Enzaprost),
- **sulproston**, 
- **mizoprostol** (PGE$_1$, Cytotec).

Prostaglandins can be into the uterine administered as infusion and as injections into the cervix or uterine muscle.

Prohemostatic drugs

**Recombinant factor VIIa (rFVIIa)**

Recommended in case of continuous or recurrent PPH when standard treatment is ineffective. rFVIIa can be administered if bleeding continues despite application of the following transfusions:

- FFP – 5-10 ml/kg (4-5 units),
- CP – 1-1.5 units/10 kg (8-10 units),
- PLT – 1 units/10 kg (5-8 units),
- PC – 4-6 units.

or when bleeding recurs after replacement transfusion at abnormal laboratory tests results:

- PT and APTT > 1.8 × mean control value,
- thrombocytopenia < 50 × 10$^9$/l,
- fibrinogen < 0.6-0.8 g/l.

**Recommended doses:**

- 40-60 μg/kg – at lack of clinical improvement within 15-30 min from administration of the drug the dose may be repeated (provided that the source of bleeding is not a major blood vessel or increta placenta).
- Higher doses of the drug 90-120 μg/kg may also be applied if the decision of its application has been made too late. The number of doses depends upon the clinical situation – maximum of 4-5 initial doses.
- In sudden blood loss with hemostatic disorders, which can accompany uterine atony, rFVIIa may be applied together with drugs contracting the uterus.
- We recommend that administration of drug should always be used before the decision of obstetric hysterectomy. If there are still indications for this procedure, the course of operation will be better with significantly smaller blood loss. The recommended dose is 60-90 μg/kg.

Additionally we recommend administration of rFVIIa in case of increasing bleeding when:

- there is no blood available,
- in women refusing transfusions (e.g. Jehovah Witnesses),
- in acquired hemophilia,
- in thrombocytopenias.

We suggest that rFVIIa should be administered as early as possible:

- before metabolic complications develop,
- before signs of severe diathesis develop, to prevent severe hypoxia and organ damage (MOF, ARDS).

Antifibrinolitic drugs

**Epsilon aminocapronic acid (EACA), tranexamic acid (TXA) and aprotinin** significantly decrease bleeding, but are not effective at major hemorrhage.

**Desmopressin (DDAVP)**

- Synthetic analog of vasopressin.
- Its activity is based on increasing the level of coagulation factors VIII and von Willebrand, and direct activation of platelets.

Surgical management

If the standard methods do not give expected results in terms of bleeding control, surgical treatment should be implemented:

- uterine tamponing,
- laparotomy and injection into of prostaglandin preparation the uterine muscle,
- selective embolisation,
- bilateral ligation of uterine arteries,
- bilateral ligation of internal iliac (hypogastric arteries),
- hysterectomy.

Cardiovascular resuscitation

**(intravenous fluids administration, transfusions)**

**Protocol A**

- IV access (1 × 14 G cannula or 16 G cannula).
- Administration of crystalloids (0.9% normal saline, Ringer solution, compound electrolyte solution).

**Protocol B**

- IV access (2 × 14 G cannula or 16 G cannula).
- Oxygen administration 6-8 litres/min (via nasal catheter or by mask).
- Before the blood is transfused give as rapidly as required the following:
  - crystalloids max 2000 ml,
  - colloids (hydroxyethyl starch, gelatine, human albumin 4.5%) max 1500 ml.
- Transfuse blood (ASAP). If cross-matched is blood still unavailable once crystalloids/colloids are infused give “O” Rh Neg. blood or uncross-matched blood.
- If the bleeding does not stop and (or) no coagulologic control has been achieved, we recommend:
  - transfusion of 4-5 units of FFP,
  - 10 units of CP.

**Note**

Dextran solutions are not recommended. Fluids, should be warmed up if possible. To avoid slowing down of transfusion, filters for blood transfusion may be omitted.

The level of Hb 6.2 mmol/l (10 g/dl) is optimum. It does not mean, however, that lower Hb level is the factor deciding for the transfusion. It is not necessary to attempt reaching the "optimal" Hb value in all pregnant women because it is associated with an increased risk of transfusion complications.

Basing the decision of transfusion only on Hb level is wrong.
Management recommendations for postpartum hemorrhage

Recommended laboratory tests and monitoring

Protocol A
Blood should be sampled for:
- full blood count,
- clotting screen (PT, APTT, fibrinogen),
- cross-match 2 units of PC.

Monitoring of BP and HR.

Protocol B
Blood should be sampled for:
- full blood count,
- blood gas analysis (recommended ABG),
- electrolytes,
- clotting screen (PT, APTT, fibrinogen),
- cross-match 5-6 units of PC.

Continuous monitoring of BP and HR of the patient (automatic BP, ECG, pulsoximeter).

Catheterisation of the urinary bladder – recommended control of diuresis every hour.

Central vein access should be considered to monitor venous blood pressure.

Intensive Care Unit should be informed and transfer of the patient to this unit discussed.

Repeating of all tests is recommended:
- within one hour or
- after replacement of 1/3 of blood volume to check for effectiveness of treatment,
- after the patient’s condition has been stabilised.

TREATMENT OF PREGNANT WOMEN WHO REFUSE BLOOD TRANSFUSION

Management before delivery
- Refusal of transfusion must be documented and the team taking care of the pregnant/delivering woman should be informed about that fact.
- Blood group should be checked.
- Blood storage with a view of autotransfusion should not be suggested.

Delivery
- Standard procedures apply.

Hemorrhage
- Fluids resuscitation according to standard procedures.
- If bleeding increases, after haematological consultation administration of vitamin K, desmopressin and fibrinolysis inhibitors is justified.
- Rapid haemostatic effect can be achieved with rFVIIa (the authors recommend it as the treatment of choice).
- In case of severe hemorrhage laparotomy should be performed ASAP to ligate the arteries and perform obstetric hysterectomy.

Management after delivery
Administration of:
- erythropoietin,
- parenterally iron,
- hyperbaric oxygen.

The role of blood „substitutes“ (perfluorocarbons, solutions of Hb) in acute post hemorrhagic anaemia is not clear, and thus they are not recommended.

At each stage of management the patient should be informed about possible risks. The patient may change her decision concerning the applied treatment, and this possibility should be kept in mind.

SPECIAL SITUATIONS

Treatment of pregnant women with anticoagulant drugs
- Pregnant women may receive (prophylaxis or therapeutic): unfractionated heparin (UH), low molecular weight heparins (LMWH; enoxaparin, deltaparin, nadroparin), acenocoumarol (warfarin), aspirin.

Prophylactic doses of heparin (e.g. risk of deep vein thrombosis, pregnant women with artificial heart valves) can be applied in perinatal period (small risk of severe bleeding).

- In pregnant women receiving full treatment with oral anticoagulants (acenocoumarol), management depends on the value of INR. To normalise PT the following are used: FFA, vitamin K and recombinant factor VIIa (if correction of PT is urgently needed). Newborns should be closely monitored (clotting screen).

- The activity of heparins administered intravenously decreases within several hours after their administration. Protamine sulphate will reverse activity more rapid, if required.

- Hematological consultation is recommended.

Coexisting inherited bleeding disorders
In obstetrics the following are important:
- von Willebrand’s disease,
- factor VIII deficiency (hemophilia A, carrier) and factor IX deficiency (hemophilia B, carrier).

The delivering woman should obtain:
- hematological consultation,
- close monitoring, in particular during stage III of delivery.

It should be kept in mind that in carriers of haemophilia type A the level of factor VIII increases during pregnancy, which usually protects them from bleeding during delivery (no need of transfusions of factor VIII preparations). Bleeding may occur at a later stage.

The decision upon management should be made after hematological consultation.

Abbreviations
ABG – arterial blood gas
APTT – activated partial thromboplastin time
ARDS – acute respiratory distress syndrome
BP – blood pressure
The above presented guidelines have been based on literature search in MEDLINE and Cochrane Library databases between 1999-2004.

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