Maternal mortality

Maternal mortality (mortality) refers to the total number of deaths of women during pregnancy, childbirth and up to day 42 of childbirth per 100 000 live births.

Classification in the Czech Republic

Total maternal mortality (pregnancy related mortality ratio)

- the sum of the following three:

1. **direct maternal mortality** - death from a disease directly related to gestation (obstetric hemorrhage, embolism by amniotic fluid);
2. **indirect maternal mortality** - death from a non-obstetric disease that is significantly aggravated by gestation (CV diseases);
3. **accidental maternal mortality** - causes unrelated to gestation (e.g. car accidents).

The so-called **adjusted maternal mortality ratio** (MMR) is often used, which excludes accidental maternal deaths unrelated to gestation.
In the Czech Republic, the maternal mortality ratio was 10.7 between 2002 and 2007 (78 deaths for 729 472 births).[1].

The most common causes:

- 22.4% obstetric hemorrhage;
- 19.8% embolic causes;
- 15% CV complications;
- 15% accidental deaths.

In recent years, the proportion of embolic causes has been increasing; hemorrhages are now more amenable to medical management. The prevention of maternal mortality is knowledge of the antenatal care system and its wide availability and ability to deal with acute conditions arising at birth. The recommended prevention of TEN is mini-heparinization, as well as regular ultrasound examinations and in utero transport to specialized facilities.

The most common causes of maternal mortality

Pulmonary embolism

Treatment

- in the hands of an experienced anesthesiologist, internist and hematologist;
- oxygen, sedation, analgesics, anticoagulation (10,000 j of heparin bolus, then 1,000 j/h);
- anti-shock, cardiotonic therapy;
- immediate Trendelenburg operation.

TEN prophylaxis

1. **Primary prevention**:
   - principles and measures to limit the development of thromboembolism in direct relation to caesarean section;
   - preoperative environmental modification (rehydration, ionic balance), considering indications, sparing surgery, minimizing blood loss, bandaging of DK, early mobilization.
2. **Secondary prevention**:
   - active search, dispensing of patients at risk;
   - heparin prophylaxis - low molecular weight heparins before surgery (administered until mobilisation).

TEN prophylaxis in pregnancy and six months of life

- Patients with a history of thrombosis are dispensed throughout pregnancy, from day 1 they receive LMWH, from day 5 warfarin (at INR 2 we discontinue LMWH), warfarin is not administered in the first trimester during organogenesis, it is teratogenic. We discontinue it before delivery to avoid bleeding complications.
- Similarly, in patients with antithrombin III deficiency, antiphospholipid Ig.

Embolism by amniotic fluid

More detailed information can be found on the Amniotic fluid embolism page.

Treatment initially similar to pulmonary embolism, complete therapy of DIC as soon as possible, which is induced by the presence of amniotic fluid in the circulation.

Air embolism

- diagnosis is very difficult, often even post mortem;
- a condition with a high mortality rate;
- treatment is usually unsuccessful if there is a bubble in the heart - Trendelenburg position, in which the air bubble moves to the tip of the heart with subsequent puncture of the right ventricle and aspiration of the bubble.
- **Prophylaxis**: during the operation in the third stage of labour (manual or digital revision), we pour disinfectant or saline solution over the hand introduced into the uterus to prevent air entry.

Disseminated intravascular coagulation

For more detailed information, see Disseminated intravascular coagulation.

Prevention of DIC

1. **Primary prevention:**
   - outpatient detection and dispensation of all conditions with coagulation disorders - especially AT III, protein C and S deficiency, Leiden factor V mutation, homozygous MTHFR defect, antiphospholipid syndrome.
2. **Secondary prevention:**
   - antenatal LMWH administration in higher-risk pregnancies (especially miscarriages and surgeries)
   - LMWH is routinely given before s.c. in the following risk conditions - obesity, age over 30, hereditary thrombophilia, history of venous thrombosis, pre-eclampsia, DM, previous abdominal surgery, placenta praevia, placental abruption, spontaneous stillbirth, parturient fever.

Treatment

- intensive, preferably in a team (hematologist, anesthesiologist, internist...)
- principle - to eliminate the provoking cause, to regulate thrombin activity, to maintain haemostasis.

1. **Acute DIC:**
   - order frozen plasma and erythrocytes immediately, draw blood for hemoconvection;
   - first precaution - administer AT III - a bolus of 1000 I.V. and then another continuous 1000 I.V. infusion;
   - administration of heparin;
   - circulating plasma replacement (dextrans and plasmaexpanders are KI - they interfere with platelets);
   - fibrinogen - if its concentration falls below 1 g/l;
2. **Chronic DIC:**
   - combination of AT III with heparin;
   - newly used activated human protein C.

Placental abruption

Treatment

- The management of labour depends on when the abruption occurs, the condition of the fetus and the extent of placental abruption;
- small haemorrhage, open breech - we can attempt vaginal delivery;
- diruption of the bladder sac will reduce uterine tone and reduce the penetration of thromboplastin into the circulation;
- we keep a close eye on both the fetus and the mother.
- if signs are more severe, terminate s.c. immediately;
- prophylactic heparinisation and AT III are indicated before s.c;
- in both abruptio and placenta praevia, ultrasound monitoring is important.

Links

Literature used

1. VELEBIL, Petr. *Mateřská mortalita v ČR /2008* [online]. [cit. 2014-02-10]. <http://lekari.porodnice.cz/ici_files/kriticke-stavy/prednasky_final_2010/03_Materska_mortalita_v_CR_2008_Velebil.pdf>.

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