Puerperal Pyrexia

Puerperal pyrexia is defined as the presence of a fever, which is greater than or equal to 38°C, in a woman within six weeks of her having given birth.\[1\]

Even in the 21st century, at least 75,000 women die annually, worldwide of puerperal sepsis, mostly in low-income countries.\[2\] In the UK, sepsis in the puerperium remains an important cause of maternal death. The mortality rate related to genital tract sepsis decreased in the UK from 0.63 per 100,000 maternities in 2009-2011 to 0.29 deaths per 100,000 maternities in 2011-2013, although this reduction did not reach statistical significance.\[3\] There was also a reduction in the same period in indirect maternal deaths from sepsis, although this was largely due to reduction in deaths from influenza, due to a low level of influenza circulating in 2012 and 2013. See separate Maternal Mortality article for more information.

Aetiology

Specific causes of puerperal pyrexia may include:

- **Urinary tract infection:**
  - Frequency, dysuria, haematuria.
  - Rigors from pyelonephritis.
  - 95% caused by *Escherichia coli*, *Proteus* spp. and *Klebsiella* spp.

- **Genital tract infection:**
  - Tender bulky uterus.
  - Prolonged bleeding/pink or discoloured lochia.
  - Painful inflamed perineum.
  - May be caused by *E. coli*, other anaerobes, Group A streptococcus (GAS) (also known as *Streptococcus pyogenes*), *Staphylococcus* spp. and *Clostridium welchii* (rare, but serious).

- **Mastitis:**
  - Flu-like symptoms.
  - Painful, hard, red breast with possible abscess.
  - Nipple trauma and cellulitis.
  - Usually caused by *Staphylococcus* spp.

- **Postoperative infection following caesarean section:** *lower segment caesarean section* (LSCS) is the most important risk factor for puerperal pyrexia; there is a significantly increased risk of postpartum sepsis, wound problems, urinary tract infections and fever following LSCS. In the UK there is an 8% risk of infection following LSCS - appropriate antibiotic prophylaxis (not co-amoxiclav) before skin incision should be offered routinely.\[4\] Prophylaxis reduces endometritis by 66-75% and also reduces rate of wound infection.\[5\] Presenting features may include:
  - Painful, red suture line.
  - Deep tenderness on palpation.
  - Lochia pink/coloured.

- **Deep venous thrombosis:**\[6\]
  - A low-grade pyrexia can be caused by venous thromboembolism.
  - Caused by venous stasis and hypercoagulability.
  - Painful, swollen calf.
  - Ovarian vein thrombophlebitis is a rare cause of persistent puerperal pyrexia.\[7\]
Other infections:
- Pyrexia in a recently delivered mother may also be due to causes common to all, such as viral infection or chest infection.
- Glandular fever is probably a common cause of fever in the postpartum period.\(^8\)

Presentation
The symptoms with which the mother presents may well provide some idea of the source of the infection or there may be many symptoms referring to more than one system, which will require a systematic method of determining the problem.

History
A full history should be taken, to include a full history of the delivery - establish:
- When the membranes ruptured.
- The length of labour.
- The instrumentation used.
- Sutures required.
- Whether the placenta was complete.
- Whether there was any bleeding during or after delivery.

Examination
- Take the patient's temperature and blood pressure.
- Palpate the uterus to assess size and tenderness.
- Assess any perineal wounds and lochia.
- Examine the breasts.
- Examine the chest for signs of infection.
- Examine the abdomen.
- Examine the legs for possible thromboses.

Investigations
- High vaginal swab.
- Urine culture and microscopy.
- Other swabs as felt necessary - eg, wound swabs, throat swabs.
- FBC.
- Blood culture x 2.
- Ultrasound scan may be required to assist diagnosis of retained products of conception.
- Sputum culture if indicated.

Management

General measures
Ice packs may be helpful for pain from perineal wounds or mastitis.

Rest and adequate fluid intake are required, particularly for mothers who are breast-feeding.

The following signs and symptoms should prompt urgent referral for hospital assessment and, if the woman appears seriously unwell, by emergency ambulance:\(^1\)
- Pyrexia (greater than or equal to 38°C).
- Sustained tachycardia (≥90 beats/minute).
- Breathlessness (respiratory rate ≥20 breaths/minute).
- Abdominal or chest pain.
- Diarrhoea and/or vomiting - may be due to endotoxins.
- Uterine or renal angle pain and tenderness.
- The woman is generally unwell or seems unduly anxious or distressed.

Prophylaxis should be considered for close family members if either Group A streptococcal (GAS) or meningococcus (*Neisseria meningitidis*) infection is suspected.

**Pharmacological**

Administration of intravenous broad-spectrum antibiotics within one hour of suspicion of severe sepsis, with or without septic shock, is recommended:[1]

- Analgesia may be required. **NB**: non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided for pain relief in cases of sepsis, as they impede the ability of polymorphs to fight GAS infection.
- Antibiotics should be commenced after taking specimens and should not be delayed until the results are available.
- A combination of either piperacillin/tazobactam or a carbapenem plus clindamycin provides one of the broadest ranges of treatment for severe sepsis.
- Meticillin-resistant *Staphylococcus aureus* (MRSA) may be resistant to clindamycin; hence, if the woman is, or is highly likely to be, MRSA-positive, vancomycin or teicoplanin may be added until sensitivity is known.
- Breast-feeding limits the use of some antimicrobials; hence, the advice of a consultant microbiologist should be sought at an early stage.
- Intravenous immunoglobulin (IVIg) is recommended for severe invasive streptococcal or staphylococcal infection if other therapies have failed. It has an immunomodulatory effect and, in staphylococcal and streptococcal sepsis, it also neutralises the super-antigen effect of exotoxins. It also inhibits production of tumour necrosis factor and interleukins.
- If the fever is prolonged then treatment with heparin should also be considered.

**Surgical**

Surgical intervention may be required if it is thought that an abscess has formed, as in this case the fever will not settle until the abscess has been incised and drained.

**Complications**

The possible complications of the infection will depend on the site, although several complications such as septicaemia, pulmonary embolus, disseminated intravascular coagulation and pneumonia are common to all. Severe sepsis with acute organ dysfunction has a mortality rate of 20-40%, rising to around 60% if septicaemic shock develops.[9]

- Genital tract infection may lead to abscess formation, adhesions, peritonitis, haemorrhage and subsequent infertility if not treated early and aggressively.
- Urinary tract infection may progress to pyelonephritis and renal scarring if left untreated.
- Mastitis may lead to the formation of breast abscesses if treatment is not started early.

**Prognosis**

The majority of patients will make a full recovery with no lasting effects if treated speedily with appropriate antibiotic therapy and fluids.

However, the possibility of septicaemia and lasting sequelae or even death mean it is important to treat all cases of puerperal pyrexia early and aggressively.

**Prevention**

- Scrupulous attention to hygiene should be used during all examinations and use of instrumentation during and after labour.
- Any GAS identified during pregnancy should be treated aggressively.
- Some centres advocate the use of prophylactic antibiotics during prolonged labour.
- Catheterisation should be avoided where possible.
Perineal wounds should be cleaned and sutured as soon as possible after delivery. All blood losses and the completeness of the placenta should be recorded at all deliveries. Early mobilisation of delivered mothers will help to protect against venous thrombosis. New mothers should be helped to acquire the skills required for successful breast-feeding in order to reduce the risk of mastitis.\(^{[10]}\)

Further reading & references

- Dunn PM; Oliver Wendell Holmes (1809-1894) and his essay on puerperal fever. Arch Dis Child Fetal Neonatal Ed. 2007 Jul;92(4):F325-7.

1. Bacterial Sepsis following Pregnancy; Royal College of Obstetricians and Gynaecologists (April 2012)
3. Saving Lives Improving Mothers’ Care - Surveillance of maternal deaths in the UK 2011-13 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-13; MBRRACE-UK, Dec 2015
4. Caesarean section; NICE Clinical Guideline (November 2011)
6. Thromboembolic Disease in Pregnancy and the Puerperium: Acute Management; Royal College of Obstetricians and Gynaecologists (2015)
9. Bacterial Sepsis in Pregnancy; Royal College of Obstetricians and Gynaecologists (April 2012)
10. Postnatal care up to 8 weeks after birth; NICE Clinical Guideline (December 2014, updated February 2015)

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