# Postpartum pyrexia

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## Abstract

Postpartum pyrexia occurs in 5–7% of births. There are many possible causes, with infection related to childbirth being the most common. In women presenting with non-specific symptoms, the diagnosis of puerperal sepsis should be considered until proven otherwise, as puerperal sepsis can result in severe maternal morbidity and occasional mortality. A comprehensive history and physical examination supported by appropriate investigations can help confirm the diagnosis. Use of an early warning chart for observations is important to detect early changes in a patient's condition. When pyrexia is due to sepsis, the clinical condition can deteriorate to a life-threatening situation rapidly; hence high dose broad-spectrum intravenous antibiotics should be commenced without waiting for microbiology results. Early involvement of senior members of the multidisciplinary team improves outcomes.

**Keywords** Group A streptococcus; postpartum infection; postpartum pyrexia; puerperal infection; puerperal sepsis; *Streptococcus pyogenes*

## Incidence

Postpartum febrile morbidity is relatively common, occurring in approximately 5–7% of births. The majority of cases occur more than 2 days after birth. Although there are various causes of fever during the postpartum period, infection is the most common cause of febrile morbidity. Global rates of sepsis-related maternal mortality have decreased as progress has been made towards Millennium Development Goal-5 (to reduce the Maternal Mortality Rate (MMR) by 75% between 1990 and 2015). However sepsis remains a leading contributor to maternal morbidity and mortality. Ninety-nine per cent of maternal deaths occur in developing countries. The World Health Organisation identifies sepsis as one of the major causes, accounting for approximately 10.7% of all maternal deaths. MBRRACE-UK (Mothers and Babies; Reducing Risk through Audits and Confidential Enquiries across the UK) reported that the overall rate of maternal mortality from all infectious causes in 2009–2012 was 2.04/100,000 maternities with less than 25% of these deaths due to genital tract sepsis. There was a significant decrease in the maternal mortality rate due to genital tract sepsis from 1.13 deaths per 100,000 maternities in 2006–2008 to 0.5 deaths per 100,000 maternities in 2009–2012.

Many studies have quoted that postpartum sepsis accounts for around 45% of pregnancy-related sepsis episodes; the majority of mothers who died due to genital tract sepsis in 2006–12 in the UK were postpartum.

The UK Obstetric Surveillance System (UKOSS) study into Severe Maternal Sepsis in the UK 2011–2012 found that for every woman who died from maternal sepsis, approximately 50 women had life-threatening morbidity from sepsis, including 14 who survived life-threatening septic shock. In the UKOSS study the estimated incidence of severe sepsis was 47/100,000 maternities and the incidence of septic shock was 9.1/100,000 maternities. Survivors of severe puerperal sepsis can develop long-term health problems such as chronic pelvic inflammatory disease and infertility.

## Definitions

Postpartum fever is defined as a temperature greater than 38.0 °C on any two of the first 10 days following delivery, exclusive of the first 24 hours, after childbirth, miscarriage and termination of pregnancy. Puerperal sepsis is any bacterial infection of the genital tract occurring after the birth of a baby. (International Classification of Diseases ICD-10 version 2015). The classification of sepsis used by UKOSS is presented in Box 1.

## Risk factors

The increased incidence of maternal sepsis has been attributed to changing demographics, including increasing age at first pregnancy, obesity, insulin-dependent diabetes and multiple births. The enhanced virulence of circulating organisms such as Group A Streptococcus has also been postulated. Anaemia during pregnancy can be exacerbated following childbirth, especially if there has been excessive bleeding, and this can compromise the ability to resist infection. Many risk factors predispose to increased susceptibility to sepsis and pyrexia in the postpartum period (Table 1).

## Causes

Pyrexia during the postnatal period can result from various causes (Table 2) such as infections, inflammations, iatrogenic,

### Sepsis definitions – UKOSS

- **SIRS** – Systemic inflammatory response syndrome – Two of the following:
  - Temperature >38 °C or <36 °C,
  - Heart rate >90 beats/minute,
  - Respiratory rate >20 breaths/minute, or $PaCO_2$ < 32 mmHg (4.3 kPa),
  - White cell count >12,000 cells/ml or <4000 cells/ml, or 10% immature/band forms.
- **Sepsis** – SIRS with infection.
- **Severe sepsis** – Sepsis associated with organ dysfunction, hypoperfusion, or hypotension.
- **Septic shock** – Sepsis associated with hypotension, despite adequate fluid resuscitation, along with the presence of perfusion abnormalities.

**Box 1**

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## Risk factors for puerperal pyrexia

**Pre-existing factors**

- Genital infections, e.g. bacterial vaginosis, sexually transmitted infections, pelvic inflammatory disease
- Medical disorders complicating pregnancy, e.g. diabetes, anaemia
- Compromised immunity, multiple comorbidities
- Body mass index >30
- Teenage mothers, primigravida
- Group B streptococcus infection
- Low socioeconomic status, poor hygiene, poor nutrition
- Minority ethnic group origin

**Factors relating to labour and delivery**

- Labour-related, e.g. preterm labour, prolonged rupture of membranes, prolonged labour, post-dates pregnancy, intrapartum fever, postpartum haemorrhage
- Procedure-related, e.g. use of fetal scalp electrode, Foleys catheter, Cook balloon use, multiple vaginal examinations, operative vaginal delivery
- Complications of procedures, e.g. uterine perforation, retained products of conception, manual removal of placenta, wound infection
- Invasive procedures, e.g. amniocentesis, cervical cerclage
- Delayed or omitted prophylactic antibiotics

**Table 1**

excessive trauma to the tissues or rare malignancies. The infectious causes can be due to bacteria, virus, parasites or protozoans. By far the most common reason for febrile morbidity is bacterial infection of the genital tract.

Endomyometritis remains the most common infectious postnatal complication. Other common infections include wound infections, perineal cellulitis, mastitis, respiratory infections, retained products of conception, urinary tract infections (UTIs), and septic pelvic phlebitis. There is a three-fold increased risk of sepsis developing during the puerperium, compared with the antenatal period, and a nearly five-fold increase in postpartum infection after caesarean section (CS) compared with vaginal birth.

## Organisms implicated

Most of the bacteria implicated in the causation of postpartum infection normally live in the vagina and rectum without causing harm, however some can be introduced into the vagina from outside.

### Bacterial

**Group A Streptococcus (GAS or β-haemolytic *Streptococcus pyogenes*):** About 2% of all GAS infections manifest as puerperal sepsis. GAS is usually community acquired and often presents as innocuous sore throat but can progress to life-threatening complications if left untreated. The incidence of GAS infections is now estimated to be about 3–4 cases per 100,000 population every year in developed countries. GAS was the most common pathogen responsible for direct maternal deaths from genital tract sepsis in the 2006–08 and 2009–2012 UK Confidential Enquiries. GAS infections were more common during the peripartum period, although a few cases occurred antenatally. The UKOSS study (2014) found that GAS infection was associated with rapid progression to septic shock, and emphasised that signs of severe sepsis in peripartum women should be regarded as an obstetric emergency.

**Coliforms:** The UKOSS study (2014) found that *Escherichia coli* was the commonest organism implicated in severe maternal sepsis, approximately 20% of which were during the postnatal

## Causes of pyrexia in the puerperium

| Conditions directly related to pregnancy | Conditions not related to pregnancy | |
|---|---|---|
| | **Infectious causes** | **Non infectious causes** |
| 1. Endometritis | 1. Respiratory infections | 1. Drug fever |
| 2. Episiotomy, vaginal laceration infection | 2. Meningitis | 2. Transfusion related |
| 3. Ischiorectal abscess | 3. Tuberculosis | 3. Thromboembolism |
| 4. Parametritis, Broad ligament abscess | 4. Endocarditis | 4. Neoplasms |
| 5. Caesarean section site infection | 5. Gastrointestinal, e.g. appendicitis, diverticulitis | 5. Connective tissue disorders |
| 6. Mastitis | | |
| 7. Urinary tract infection | | |

**Table 2**