



CMACE Emergent Theme Briefing

#2 Maternal Mortality due to A/H1N1 2009 Influenza Virus

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Pregnant women are known to be at increased risk of severe illness, and increased mortality, from influenza A epidemics and pandemics.

In the recent A/H1N1 2009 pandemic, there was a five times higher rate of hospital admission in pregnant women compared to the general population¹, and a seven times higher risk of admission to an intensive care unit.² From Health Protection Agency (HPA) surveillance data³ the risk of mortality for pregnant women, compared to non pregnant women of the same age group, was sevenfold.

Between 1 April 2009 and 13 January 2010, 12 maternal deaths in the UK and one maternal death in the Republic of Ireland in women with a diagnosis of A/H1N1 2009 influenza, were reported to the Centre for Maternal and Child Enquiries (CMACE). Eight of these maternal deaths were investigated in greater detail by CMACE through confidential enquiry. All cases were confirmed positive for A/H1N1 2009 influenza by PCR testing.

In October 2009 DH and RCOG jointly produced clinical management guidelines for pregnancy in relation to pandemic A/H1N1 2009 influenza⁴. The recommendations contained in these guidance documents were used as standards against which to assess clinical care provided to women in this enquiry. All eight cases in this report were reviewed by a multidisciplinary group of 10 health professionals and a lay representative.

The full report is now available⁵ (www.cmace.org.uk) but this briefing summarises the main findings and implications for future management, identifies factors associated with avoidable mortality and key lessons for pregnant women and their healthcare services.

Characteristics of women

Black and minority (BME) groups were over-represented (4/8) in this case series. Clinical co-morbidity, likely to have contributed to severe respiratory illness, was present in 5/8: these included asthma, paraplegia, previous stroke and scoliosis. Maternal smoking (2/8) did not appear to have been a risk factor for mortality, but may have been under-documented. In this case series, obesity did not seem to be a risk factor, with only one woman being reported as obese. In the general UK population, obesity was found to be a risk factor for severe morbidity and mortality during this pandemic period³. Two of the women who died were, in fact, significantly underweight, which may have been related to their other health problems.

Immunisation

None had documented evidence of having received seasonal flu immunisation, and none had received A/H1N1 2009 monovalent immunisation as these cases preceded its availability.

Clinical findings

Signs of severe illness in this series were tachycardia, high respiratory rate and episodic hypoxia. CRP was raised in 6/8 women, an unusual finding in viral infection

Clinical management

In half (4/8) of these women there was a delay in being tested for H1N1, due either to a failure to consider this in the differential diagnosis on admission, or the use of incorrect swabs at investigation.

Following confirmation of H1N1, 3 women did not have a clear multidisciplinary management plan documented in the case notes, and in only 2 cases was there documented evidence of Infection Control team involvement. Adequate multidisciplinary management was, however, judged to have been followed in 6 cases, with only 1 case demonstrating lack of clear leadership and clinical collaboration.

All women received oseltamivir (Tamiflu) at some stage in the course of their illness; but in 7/8 cases the panel concluded there was an avoidable delay in its administration. All women received antibiotic treatment, in most cases (7/8) there was evidence of discussion with a microbiologist.

Primary viral pneumonia and Adult Respiratory Distress Syndrome (ARDS) were the commonest clinical complications. Two women died from intracerebral haemorrhage following Extracorporeal Membrane Oxygenation (ECMO) treatment. All women were admitted to intensive care units and required mechanical ventilation; 5/8 required either ECMO (3) or high frequency oscillation (2).

Pregnancy Outcome

3/8 went into spontaneous preterm labour and delivered vaginally between 26 and 33 weeks. 2/8 had induction of labour at term but were delivered by Emergency Caesarean Section. 3/8 had a planned preterm Caesarean Section between 34 and 36 weeks due to deteriorating maternal respiratory function. 6/8 babies were liveborn; there was 1 stillbirth and 1 neonatal death in this case series.

Avoidable factors

Factors identified by the multidisciplinary panel in this case series included:

- Delayed admission to hospital and /or consideration of the likelihood of H1N1 infection in differential diagnosis;
- Delayed confirmation of H1N1: wrong swabs used or inappropriate storage / carriage to laboratory;
- Lack of clear clinical leadership in overall case management (1 case);
- Delay in administering antiviral medication.

Clinical learning points:

- All those who care for pregnant women should maintain a high index of suspicion for H1N1 influenza in pregnant and postnatal women presenting with respiratory symptoms / fever even outside the usual seasonal flu period;

- If H1N1 / other influenza is suspected, there should be a clear management plan documented in the case notes;
- Collaborative clinical leadership at an early stage is essential for optimal management: other key disciplines include respiratory medicine, microbiology and virology, intensive care, anaesthesiology, neonatology;
- An obstetrician should always be informed when a pregnant woman with respiratory illness is admitted to hospital;
- All pregnant women presenting with respiratory symptoms should have oxygen saturation performed at admission;
- Viral swabs should be taken from all pregnant women with respiratory symptoms presenting to hospital;
- Antiviral agents should be started BEFORE the results of viral swabs available and ideally within 48hrs of onset of clinical illness
- Do NOT delay imaging such as Chest X-ray or tests to exclude pulmonary embolus;
- All women admitted with respiratory symptoms should be nursed in isolation with handwashing/masks/gloves and in collaboration with the hospital Infection Control team.

Updated advice on the management of H1N1 winter flu in pregnancy has recently been issued by the Department of Health and the Health Protection Agency. This is accessible from the CMACE website (www.cmace.org.uk).

References:

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2. The ANZIC Influenza Investigators. Critical care services and 2009 H1N1 influenza in Australia and New Zealand. *NEJM* 2009;361:1-10
3. McLean E & Pebody R (2010). Epidemiological report of pandemic (H1N1) 2009 in the UK; April 2009-May 2010
4. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicy&Guidance/DH_107770
5. Modder J (2010). Review of Maternal Deaths in the UK related to A/H1N1 2009 Influenza (CMACE)

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