The Auckland City Hospital's experience with novel H1N1 influenza in pregnant women

We have read Prof Powrie's excellent summary and wish to share our clinical experience with pregnant women with novel H1N1 influenza.¹

In the 2009 Antipodean winter, the novel H1N1 influenza pandemic was associated with a marked increase in pregnant women presenting with influenza-like illnesses (ILI). In Auckland, 46 pregnant women were diagnosed with novel H1N1 influenza. Thirty-eight women presented to one of the four public hospitals in Auckland. Four women needed intensive care (ICU) management, and two women died (Figure 1).

Half the women ($n = 13/26$) presenting to our hospital were of Maori and Pacific Island ethnicity, and were in their third trimester. Almost 70% of the women were overweight and 5/26 were morbidly obese. Diabetes was the most common medical co-morbidity ($n = 4$). Asthma ($n = 2$) and previous

lung pathology ($n = 3$) did not feature prominently in our cohort. Nicotine use was common (current smokers $n = 5$, recent ex-smokers $n = 3$).

A temperature $\geq 38^\circ\text{C}$ at presentation was not a sensitive screen and present in only 23%. Lymphopenia was present in 74% and 93% had raised C-reactive protein (CRP) $\geq 20\text{ mg/L}$. Chest X-ray (CXR) demonstrating patchy, often bilateral, consolidation was present in 59% of our women at presentation and correlated with severity of illness.

The standard of care included oseltamivir 75 mg twice daily and oral antibiotic of clinician's choice (usually amoxycillin-clavulanic acid) for five days, pending confirmation of novel H1N1 infection on nasopharyngeal swabs. If the women were unwell enough to require an inpatient admission, an intravenous antibiotic (usually cefuroxime) was used.

All pregnant women with ILI were isolated at presentation. Medical staff were expected to undertake full isolation precautions to avoid transmission among other pregnant women. If required the women were admitted to a medical ward with daily obstetric review. Number of visitors were limited. At maternity outpatient's clinics, women were screened and

* Definite novel H1N1 influenza, $n = 42$; Influenza A not-further-subtyped, $n = 4$

Figure 1 Distribution of pregnant women with novel H1N1 influenza across Auckland

Table 1 Characteristics of pregnant women requiring intensive care admission compared with the other pregnant women

	Patient 1	Patient 2	Patient 3	Patient 4	Median values of the women with poor outcomes	Other women (n = 24)
Age (years)	23	40	34	29	31.5	29
Ethnicity	PI	PI	European	Indian		
Gestation (weeks)	39 ⁺²	31 ⁺²	28 ⁺⁴	29 ⁺⁵	30 ⁺⁴	29 ⁺⁵
BMI (kg/m ²)	59.2	50.7	33.3	25.5	40.2	28.0
Duration of symptoms prior to oseltamivir use (days)	7	7	11	26	9	3
Oxygen saturations on air at presentation (%)	86	95	88	85	87	97
CRP (mg/dL)	NA	139	28	90	90	35
Lymphocyte count (×10 ⁹ /L)	0.53	0.50	0.50	0.51	0.50	0.91
CXR findings	Widespread multilobar consolidation	Bibasal consolidation and midzone atelectasis	Bibasal and lingular consolidation	Bibasal and right upper lobe consolidation		
Obstetric outcomes	ELSCS*	ELSCS*	NVD at term	ELSCS*		
Maternal outcomes	Alive. Recovery complicated by pancreatitis, wound dehiscence, etc.	Died from severe bilateral viral pneumonia	Alive	Died from intracranial haemorrhage (the woman was anticoagulated while on ECMO)		
Duration of hospitalization (days)	52	16	4	32	24	3

PI = Pacific Islander; ELSCS = emergency lower segment caesarean section; NVD = normal vaginal delivery; ECMO = extra-corporeal membrane oxygenation; BMI = body mass index; CRP = C-reactive protein; CXR = chest X-ray; NA = not available

*The three women who had ELSCS were for severe maternal hypoxia necessitating delivery

given respiratory masks if symptomatic of an ILI. These strict isolation procedures were put in place because the threat of novel H1N1 influenza to pregnant women at that time was undefined. Historically, pregnant women are more vulnerable, and maternal morbidity and mortality in pandemics is usually higher than the average population.²⁻⁴

The characteristics of the four women who required ICU support were compared against the other pregnant women (Table 1). The most striking feature was that these women were much heavier with a median body mass index of 40.2 kg/m². The higher CRP, lower oxygen saturations and more florid CXR changes on presentation could reflect a more prolonged untreated disease course (median of nine days before receiving oseltamivir). Of this group, two women died. The autopsy of one woman revealed that death was due to severe bilateral viral pneumonia.

Three women were delivered at the time of presentation because of severe maternal hypoxia from severe infection. None of the neonates were infected and all survived. There were two early miscarriages.

Based on our experience, we would recommend that any pregnant woman presenting with an ILI should be assessed promptly with full isolation precautions. A CXR and full blood count should be part of the routine assessment. Obese women in their third trimester, who have patchy consolidation present on CXR, should be admitted for observation. We agree that oseltamivir should be started, even prior to laboratory confirmation of infection.^{1,5} Special consideration for pregnant women in influenza pandemic planning should include provisions for isolation of the unwell woman and their family members from other pregnant women. Influenza vaccination should be offered to all women who are pregnant or planning pregnancy.⁶

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