

Carbon monoxide poisoning in asymptomatic patient identified at first antenatal appointment

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INTRODUCTION

Carbon monoxide (CO) poisoning is a leading cause of accidental death by poisoning in the UK. ¹ It is a colourless and odorless gas which may go undetected until it causes death in those exposed and symptoms vary widely.

Table 2: The frequency of the most commonly reported symptoms in carbon monoxide poisoning	
Symptoms	Frequency of reporting (%)
Headache	90%
Nausea and vomiting	50%
Vertigo	50%
Alteration in consciousness	30%
Subjective weakness	20%
Reference	
National Poisons Information Service (NPIS), TOXBASE. Carbon Monoxide. 2013.	

In the UK as part of Saving Babies lives, to reduce perinatal mortality; CO testing is offered to all pregnant women at the antenatal booking and 36 week antenatal appointments. ² Antenatal CO monitoring is used primarily to assess exposure to tobacco smoke, but very high levels require additional considerations.

NICE guidelines state that if the patient is a smoker with a CO level 4ppm or above requires referral to stop-smoking support. ³

If the patient has a reading >10 ppm but do not smoke, inform them they may have CO poisoning and contact the Gas Emergency line on 0800 111 999. ³

CASE DESCRIPTION

- 30-year-old Indian woman (G1P1) attended her 12 week pregnancy booking appointment with her husband.
- No significant medical/obstetric history; both denied smoking or exposure.
- Routine CO screening showed very high readings: 144ppm, then 100ppm; a different machine gave 69ppm. The high readings were initially attributed to a faulty machine.
- Her observations were normal and she denied any symptoms but reported mild lethargy, attributing it to early pregnancy.
- The CO monitoring results were escalated to the obstetric team; blood gas showed carboxyhaemoglobin of 15.4% (normal <2% in non-smokers).
- She was transferred to A&E with her husband also had elevated carboxyhaemoglobin (10.3%).
- Both were treated with high-flow oxygen until carboxyhaemaglobin levels normalized.
- The couple were co-habiting with their extended family and they remaining household members were asked to attend A&E; CO leak found in home boiler.
- Early detection and treatment likely prevented serious harm or death to the patient and extended family.

DISCUSSION

- CO monitoring as part of routine antenatal appointments can not only alert us to those who are smoking in pregnancy or exposed to high levels through passive smoking, but can identify those who may be exposed to high levels of CO at home.
- Early identification and treatment is important in this cohort as prolonged CO exposure, even at low levels, leads to increased foetal morbidity and mortality. Elimination half-life of carbon monoxide in the fetus is up to 4 to 5 times longer than in the mother. ⁴
- CO exposure in pregnancy is associated with pre-term delivery, low birthweight, congenital malformations (including heart defects), sudden infant death and neurodevelopmental problems. ⁴
- Clinicians should not dismiss readings >10ppm on CO machines, even in asymptomatic patients.
- A blood gas can easily be used to help confirm the suspicion of CO poisoning. This should be included in all guidelines to help aid practice and could be lifesaving for not only the patient and foetus, but their entire household.

1 National Institute for Health and Care Excellence. (2023). Carbon monoxide poisoning: Prevalence. Clinical Knowledge Summaries.

<https://cks.nice.org.uk/topics/carbon-monoxide-poisoning/background-information/prevalence/>

2 NHS England. (2023). Saving babies' lives: Version 3. A care bundle for reducing perinatal mortality (Version 3.1).

<https://www.england.nhs.uk/long-read/saving-babies-lives-version-3/>

3 National Institute for Health and Care Excellence. (2023). Treating tobacco dependence during pregnancy and in the first year after childbirth. NICE guideline [NG209]. <https://www.nice.org.uk/guidance/ng209/chapter/Treating-tobacco-dependence-during-pregnancy-and-in-the-first-year-after-childbirth>

4 UK Teratology Information Service. (2023). Exposure to carbon monoxide in pregnancy. <https://uktis.org/monographs/exposure-to-carbon-monoxide-in-pregnancy/>