Stop, Start or Continue asthma medication:

Use of a biomarker-based approach for adjusting asthma medication dose during pregnancy

Vanessa E Murphy and Peter G Gibson

University of Newcastle, Hunter Medical Research Institute, John Hunter Hospital

Contact: vanessa.murphy@newcastle.edu.au

Abstract

Introduction – Asthma exacerbations in pregnancy are associated with increased risks of adverse perinatal outcomes including low birth weight and preterm delivery. We developed a biomarker-based approach for adjusting asthma medication dose in pregnancy, using fractional exhaled nitric oxide, (FeNO) to assesses eosinophilic lung inflammation, which is corticosteroid responsive. The objective of this study was to determine treatment decision differences between a symptom-based and FeNO-based algorithm, and how many applications of the algorithm were required in pregnancy to reduce exacerbations.

Methods – Women with asthma were randomised (<22 weeks gestation) to monthly treatment adjustment according to symptoms (control group) or FeNO plus symptoms (FeNO group). FeNO was used to adjust inhaled corticosteroid (ICS) dose, and long acting beta agonist (LABA) was added when symptoms remain uncontrolled. Exacerbations requiring medical intervention were recorded prospectively.

Results – Among 220 pregnant women with asthma (n=109 control, n=111 FeNO), 1006 treatment decisions were made, with significant group differences after the first and second algorithm applications. Treatment was better targeted to phenotype in the FeNO group: ICS use increased in eosinophilic asthma (EA, 48%-86%), while ICS/LABA increased in non-eosinophilic asthma (11%-30%). The FeNO algorithm was more effective in treating NEA, resulting in reduced exacerbations (18.9%), compared to a symptom control algorithm (44%, P=0.006). This was not the result of ICS overtreatment, since the benefits occurred at a lower median daily ICS dose.

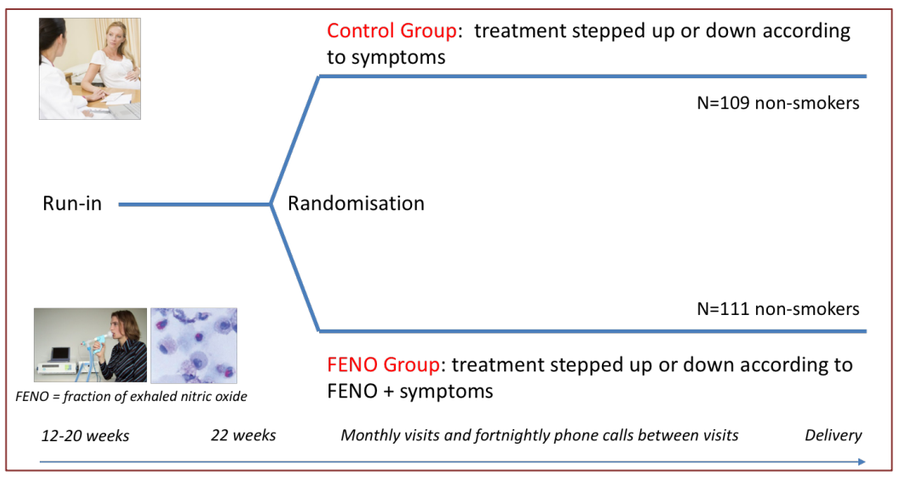
Discussion – Two applications of the FENO-guided algorithm, one month apart, were sufficient to achieve beneficial effects in terms of asthma exacerbations, among pregnant women with asthma.

Objectives

- Asthma affects 13% of pregnant women and is associated with adverse perinatal outcomes
- Fractional exhaled Nitric Oxide (FeNO) is a biomarker which measures corticosteroid responsive eosinophilic airway inflammation
- FeNO-based asthma management reduces asthma exacerbations by 50% in pregnancy.
- The objective of this secondary analysis of an RCT was to determine treatment decision differences between a symptom-based and FeNO-based algorithm and assess differences between asthma phenotypes

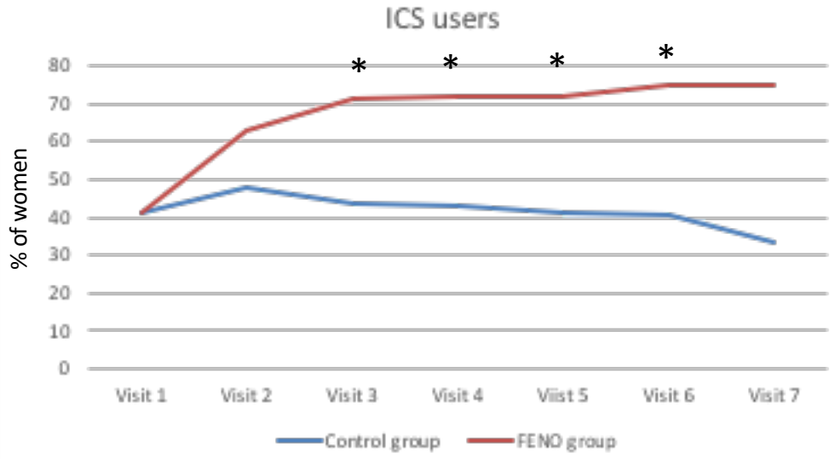
Methods

- 220 pregnant women with asthma recruited to an RCT of monthly treatment adjustment according to either: symptoms (control group), or FeNO plus symptoms (FeNO group).
- FeNO used to adjust inhaled corticosteroid (ICS) dose and long acting beta agonist (LABA) added when symptoms remained uncontrolled
- Treatment decisions included: no change, decrease ICS, increase ICS, decrease ICS/LABA, increase ICS/LABA, Increase LABA and Decrease ICS/Increase LABA (FeNO group only)
- There was a 4 week run-in period (from visit 1), with randomisation at visit 2

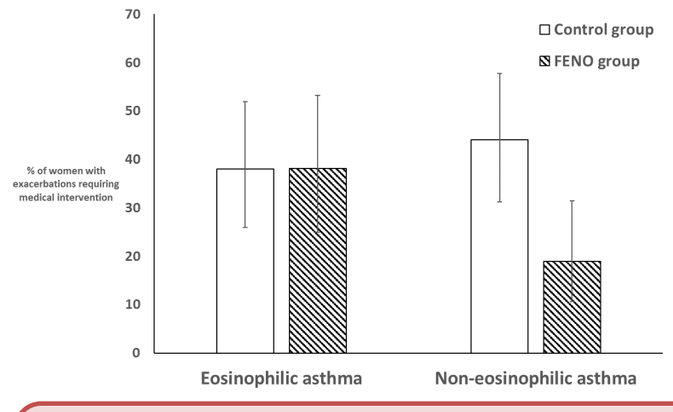


Results

- 1006 treatment decisions were made among 109 women in the control group and 111 in the FeNO group
- There were significant group differences after the first and second algorithm applications
- Significantly more women used ICS or ICS/LABA from visit 3 on
- Women in the control group were more likely to have a “no change” treatment decision at visit 2 and 3.



- FeNO-based management better targeted treatment to asthma phenotype
- ICS use increased in eosinophilic asthma (48%-86%) and ICS/LABA use increased in non-eosinophilic asthma (NEA) (11-30%)
- Exacerbations were significantly reduced in NEA only



Conclusion

- Two applications of the FeNO-guided algorithm, one month apart, achieved a reduction in asthma exacerbations in pregnancy