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Title: Increased sputum inflammatory cell count of PMA subjects during luteal phase of the cycle

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Body: Background: Although up to 40% of asthmatic women report significant perimenstrual exacerbations of asthma (PMA), the actual triggers of this phenomenon and the influence of changes in hormone concentrations remain unclear. Objective: The aim of the study was to assess the impact of changes in blood hormone concentrations on the markers of inflammation in lower airways of PMA subjects. Methods: Premenopausal women with regular menstrual cycles diagnosed as: PMA (n= 10), non-PMA asthmatics (n=8), and healthy controls (n=5) were prospectively followed for 10 weeks over 2 consecutive menstrual cycles. Asthma symptoms, medicine use and peak expiratory flow twice daily were recorded. Sputum induction and blood progesterone, estradiol, prolactin, TSH and cortisol levels were determined in the 10th and 26th day of each of the two cycles. Differential cell counts in sputum were determined and concentration of eotaxin, IL-5 and IL-10 were measured by ELISA. Results: Increased prolactin serum concentrations in luteal (compared to follicular) phase were detected only in PMA patients (p=0,01), but not in non-PMA asthmatics and healthy controls. Compared to follicular phase, induced sputum of PMA patients obtained in luteal phase contained increased eosinophil (p=0,03) and neutrophil (p=0,04) counts. No follicular-to-luteal phase changes of induced sputum cytokine concentrations were observed in all patients. Conclusions: The obtained results indicate for the first time the important role of prolactin in the development of PMA symptoms. The study also shows that mechanisms underlying PMA include increased eosinophil and neutrophil count in lower airways during late luteal phase of menstrual cycle.