Lung Functions and Airway Inflammatory Markers during Different Phases of Menstrual Cycle in Asthmatic and Healthy Females of Sri Lanka

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Background & objectives: Sex hormones affect lung functions by different mechanisms. Thus the status of asthma is known to vary during menstrual cycle but conclusions drawn are divergent. We aimed to assess lung function and airway inflammatory markers; Fractional exhaled breath Nitric oxide (FeNO) and blood eosinophil count (EC) during different phases of menstrual cycle in healthy females and stable asthmatics. **Methods:** Healthy females (n=39) and asthmatics (n=26) with regular menstrual cycles were recruited after informed consent. Lung function variables FEV_1, FVC, PEF and FeNO, EC were measured during menstruation, follicular and luteal phases. **Results:** Mean age of asthmatics and healthy women were 22.38(±1.44) years and 22.36(± 1.33) years respectively. The mean PEF, FEV1, FEV1% were lower in asthmatics ($p< 0.05$). FEV1, FVC positively correlated with height in both asthmatics (r=.43, p=0.028), (r=0.519, p=0.007) and in healthy females (r=0.458, p=0.003), (r=0.501 p= 0.001). In asthmatics BMI correlated positively with FEV1 (in menstrual and follicular phases), FVC, PEF, EC (in all phases). BMI correlated negatively with FEV1%. In normal girls BMI correlated positively with FEV1, FVC, (r =0.317, p=0.049 at follicular phase), PEF of all phases. BMI correlated negatively with FEV1% (r= -0.411, p=0.009 at follicular phase). In healthy females highest mean FEV_1 (2.467±.41) L and FVC (2.73±.4390) L were during luteal phase while lowest FEV_1 (2.462±.38) L and FVC (2.71L±.438) were obtained during follicular phase. In asthmatics the highest mean FEV_1 was recorded in follicular phase (2.305L±.3018) while lowest was recorded in luteal phase (2.2904±0.308) L. Asthmatics had higher FeNO level compared to controls ($p<0.001$). In both groups, mean FeNO level was highest in luteal phase (42.19±36.8) ppb vs (21.15 ± 17.362) ppb; In asthmatics, highest mean EC was in luteal phase ($0.40x10^9$/Liter±.258) while lowest was seen in menstrual phase (0.33±.15). FeNO level correlated positively with EC on all phases in both groups. In asthmatics EC correlated positively with PEF at menstrual and follicular phases but negatively at luteal phase. FeNO correlated negatively with PEF at follicular and luteal phases and with FEV1 during all three phases. In normal females, FeNO correlated negatively with PEF in all three phases. FeNO correlated negatively with FEV1 at follicular phases and positively at other phases. However, no statistically significant variation in lung function variables, FeNO nor EC was observed in either group in the course of menstruation. **Conclusions:** FeNO and EC changes parallel through the phases of menstrual cycle in both asthmatics and in healthy individuals. Changes in PEF, FEV1, FEV1% appear to follow a distinct pattern innormal women and asthmatics. **Future prospects:** Role of reproductive hormones in mediating inflammatory changes in the lungs needs to be elucidated.

Keywords: Lung Function, FeNO, Eosinophil Count, Menstrual Cycle, Asthma

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