

TITLE: The predictive potential of basophils in peripheral blood basophils in endometriosis

AUTHORS: Jun Guan^{†,1,2} Karin Hellner,^{1,2} Nilufer Rahmioglu,³ Carol Hubbard,^{1,2} Maryjane Dale,^{1,2} Kevin Paddon,⁴ Krina Zondervan,^{1,2,3} Christian Becker*.^{1,2} 1University of Oxford, Oxford, United Kingdom; 2University of Oxford, Oxford, United Kingdom; 3University of Oxford, Oxford, United Kingdom; 4Oxford University Hospitals NHS Foundation Trust, Oxford, United Kingdom.

INTRODUCTION: Endometriosis affects 5-10% of premenopausal women causing pelvic pain and impaired fertility. Diagnosis can only be established surgically, thus, less invasive means of diagnosis are urgently needed. Endometriosis has been suggested to induce local and systemic inflammation. Circulating leukocytes are used as markers of systemic inflammatory response in many conditions. However, their role in endometriosis is unclear. This study investigates the potential of leukocyte subpopulations in diagnosing endometriosis, using data from prospective ENDOX study.

METHODS: We analyzed preoperative full blood counts of 600 patients who underwent laparoscopy for symptoms suggestive of endometriosis. Medical and surgical data were collected according to WERF EPHeC standards. Differences in leukocyte subgroups were evaluated using linear regression models including variables as the history of other inflammatory conditions and menstrual cycle phase. The predictive value was assessed using receiver operating characteristic curves.

RESULTS: Endometriosis was confirmed intra-operatively in 383 cases and excluded in 217 cases. In the endometriosis group 239 women had mild disease (ASRM stage I/II) and 144 women had moderate/severe endometriosis (ASRM stage III/IV). We found no difference in total white cell counts between groups. However, basophil counts were significantly increased in endometriosis patients ($p=0.0012$), in both mild ($p=0.0455$) and severe disease ($p=0.0032$). This yielded a sensitivity of 46.0% and specificity of 65.7% (AUC=0.577, $p=0.0017$) in diagnosing endometriosis. The increase of basophils in endometriosis patients was independent of other inflammatory conditions known to affect basophil counts including asthma, eczema and irritable bowel syndrome.

CONCLUSIONS: Investigating circulating leukocyte subpopulations revealed a significant increase of basophils in endometriosis patients. This was strongly correlated with disease severity and independent of prevalence of other inflammatory conditions. Implementation of basophil counts into clinical algorithms has the potential to transform non-invasive diagnosis of endometriosis.