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**Title:** Influence of obesity and nasal polyps on severe asthma

Dr. Federica 16454 Novelli f.c.78@libero.it MD <sup>1</sup>, Dr. Giulia 16462 Lenzini giulia\_lenzini@virgilio.it MD <sup>1</sup>, Dr. Manuela 16465 Latorre manuela.latorre@yahoo.it MD <sup>1</sup>, Dr. Veronica 16486 Seccia veronicaseccia@gmail.com MD <sup>2</sup>, Dr. Maria Laura 16496 Bartoli m.bartoli@ao-pisa.toscana.it MD <sup>1</sup>, Dr. Laura 16506 Malagrino lauramalagrino@yahoo.it MD <sup>1</sup>, Dr. Federico Lorenzo 16508 Dente f.dente@ao-pisa.toscana.it MD <sup>1</sup> and Prof. Pier Luigi 16512 Paggiaro lpaggiaro@dcap.med.unipi.it MD <sup>1</sup>. <sup>1</sup> Department of Surgery, Medicine, Molecular Biology and Critical Care, University of Pisa, Pisa, Italy and <sup>2</sup> ENT Unit, University of Pisa, Pisa, Italy .

**Body:** Background: Asthma is often associated with comorbidities that can influence its control, phenotype and response to treatment. Aim of this study is to evaluate the influence of two common comorbidities (obesity and nasal polyps, NP) on pulmonary function, inflammation, asthma control and quality of life in patients with severe asthma (SA). Method: We studied 64 patients with SA. All patients performed spirometry, collection of induced sputum for inflammatory cells, measurement of exhaled nitric oxide (eNO) and ENT visit. Asthma control was evaluated according to GINA guidelines and by ACT questionnaire, quality of life by AQLQ. Results: The percentage of patients with uncontrolled asthma was high (46.9%). Obese asthmatics had a similar functional data than non-obese, but worse asthma control (ACT score: 16 (7-25) vs 21 (10-25),  $p<0.05$ ; poorly controlled: 71,4% vs 34,9%,  $p<0.05$ ) and quality of life index (AQLQ score: 4.5 (3.0-6.2) vs 5.1 (2.7-6.7),  $p<0.05$ ), as well as a trend to have lower sputum eosinophilia (6.6 (0-71.2) vs 17.6 (0-95.6),  $p=0.07$ ), with no-difference in asthma treatment. Asthmatics with NP showed similar asthma control and quality of life index than asthmatics without NP, but worse spirometry (FEV1  $71.1\pm16.7$  vs  $81.0\pm17.3$ ,  $p<0.05$ ) and higher sputum eosinophilia (29.8 (0.4-95.6) vs 8.5 (0-84.1),  $p<0.05$ ). In a multivariate analysis taking into account age, sex, FEV1 (% of predicted), obesity, NP and sputum eosinophilia, only the obesity predicted the lack of asthma control (OR: 5.6, CI: 1.4-22.8  $p=0.01$ ). Conclusion: In patients with SA, NP is associated with increased eosinophilic airway inflammation and with worse lung function, but has less impact on asthma control and quality of life than obesity.