Methods: A total of 67 APS patients (12 PAPS patients, 55 SAPS patients) and 40 healthy controls were enrolled in this study. Retrospectively collected clinical and laboratory data of these patients. The absolute numbers of peripheral blood lymphocyte subsets and CD4+ T cell subsets were detected by flow cytometry, and serum cytokine levels were detected by flow cytometry bead array.

Results: Compared with healthy control group, the absolute values of T [689.26 vs. 1239.00, \( p < 0.001 \)], B (104.69 vs. 177.50, \( p < 0.001 \)), NK (98.97 vs. 300.00, \( p < 0.001 \)) and CD4+T (330.16 vs. 628.50, \( p < 0.001 \)) cells in SAPS group were decreased. While only the NK cells (151.30 vs. 300.00, \( p = 0.002 \)) in the PAPS group were lower than that in healthy control group. However, the absolute values of T (1295.41 vs. 689.26, \( p = 0.001 \)), B (184.44 vs. 104.69, \( p = 0.012 \)), NK (151.30 vs. 98.97, \( p = 0.023 \)) and CD4+T cells (989.34 vs. 330.16, \( p < 0.001 \)) in PAPS group were significantly higher than those in SAPS group. For CD4+ T cell subsets, PAPS patients and SAPS patients showed the same trend compared with healthy controls, showing increased Th1 (111.50 vs. 23.47, \( p<0.001 \)) and Th2 (6.97 vs. 29.53, \( p<0.001 \)) cells, increased Th17/Treg ratio (0.39 vs. 0.17, \( p<0.001 \)) in PAPS group and SAPS group, respectively, and more importantly, decreased Treg (18.77 vs. 23.47, \( p=0.017 \)) and Th17 (111.50 vs. 23.47, \( p<0.001 \)) in SAPS group. In addition, for APS patients, IL-2 (6.97 vs. 2.46, \( p=0.001 \)), IL-17 (8.42 vs. 4.00, \( p=0.042 \)) and Treg (18.77 vs. 12.01, \( p=0.020 \)) cells in PAPS group were higher than those in SAPS group. As for the correlation study, we concluded that both aCL (\( r=0.6061, p=0.0405 \)) and \( \beta_2 \)GPI (\( r=0.6900, p=0.0158 \)) were positively correlated to Th17/Treg ratio in PAPS group. In addition, for APS patients, IL-2 (\( r=0.420, p=0.010 \)), IL-4 (\( r=0.392, p=0.016 \)), IL-10 (\( r=0.331, p=0.046 \)), IL-17 (\( r=0.479, p=0.006 \)) and IFN-\( \gamma \) (\( r=0.339, p=0.040 \)) were negatively correlated with titers of aCL. And IL-6 is also associated with ESR (\( r=0.469, p=0.004 \)) and CRP (\( r=0.670, p<0.001 \)).

Conclusion: Whether PAPS or SAPS patients, detection and balancing of lymphocyte and CD4+ T cell subsets, especially Th17 and Treg subsets, may help correct immune disorders. Of course, the immune function of primary and secondary APS patients is not completely consistent, at least in terms of immune cells. Also, the role of cytokines in the pathogenesis of APS should not be ignored.