Purpose: This pilot study is aimed to design a software with a new algorithm which analyzes the tortuosity and vascular dilatation in fundus images of plus ROP patients with a different method.

Methods: Analyzing the curvature algorithm for assessment of vascular tortuosity was based on the real and schematic images. Since the algorithm had an appropriate behavior toward the schematic images, it was applied to real ones. Curvature algorithm estimation in this study had a close result to previous studies with the privilege of being less time consuming and less sophisticated. To measure vascular diameter, we designed an algorithm based on distance transform. In this algorithm, firstly, based on the vasculature image transform the distance was implicated and secondly, with analyzing the results the distance was measured. To assess this automated algorithm, 48 images taken with Retcam were classified to two groups of plus and non-plus patients by 3 experts.

Results: In the first place, the accuracy of algorithm was divided into three groups as follows; being compatible with at least one of the experts, being compatible with at least two of them, and being compatible with all of the experts diagnosis. In this part, it was noted that in 87.5% of cases the algorithm was compatible with at least one of the expert diagnosis in plus or non-plus patients. Because in statistical analysis the expert (3) had highest discriminatory power in segregation of Plus and Non-Plus Patients, on second evaluation this automated algorithm results was compared with expert (3). The threshold values for the two parameters, tortuosity and dilatation were chosen in such a way that maximum accuracy in detecting a fundus image as plus disease be achieved. After analyzing the average values, second assessment had sensitivity, specificity and accuracy of 0.8412, 0.06325 and 0.7726, respectively in comparison of expert 3.

Conclusion: this New Automated Algorithm has acceptable Accuracy for Plus disease Detection.