

Glaucoma Diagnostics

Early diagnosis and detection of the progression of the disease are crucial for the successful treatment of glaucoma. A clinical examination including gonioscopy, funduscopy with assessment of the optic disc and retinal nerve fibre layer (RNFL) and visual field testing are strongly recommended at the initial and follow-up examination. Standard automated perimetry (SAP) is the reference standard for the assessment of visual function in glaucoma. It is dependent on patient co-operation and in some patients there is a high variability in mean deviation over time, which reduces the ability to distinguish true change from noise. Electroretinography (ERG) is an objective method of assessing visual function, and both the pattern ERG and the photopic negative response of the ERG are sensitive markers of retinal ganglion cell dysfunction that may precede structural changes and visual field defects in SAP. Optical coherence tomography (OCT) of the optic disc, RNFL and macula allows objective quantification and contributes to early glaucoma diagnosis and monitoring. Non-invasive assessment of ocular microvasculature by OCT angiography (OCTA) complements OCT and can detect the reduction of superficial vessel density in the early stages of glaucoma. Deep learning (DL) can support the differentiation between healthy and pathological optic disc based on fundus photographs, while improving the quality and quantity of OCT data could be used for the diagnosis of glaucoma in the future.