OPTICAL COHERENCE TOMOGRAPHY, AN INFLECTION POINT IN NEURO-OPTHALMOLOGY

LA TOMOGRAFÍA DE COHERENCIA ÓPTICA, UN PUNTO DE INFLEXIÓN EN NEURO-OFTALMOLOGÍA

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Santiago Ramón y Cajal would have never imagined that, hardly one hundred years after his «doctrine of the neuron» which formed the basis of his Nobel Medicine award, we would be able to quantify «in vivo» the retina nervous fiber layer (RNFL) with a procedure which is not invasive, simple, fast, objective, repeatable and highly resolvent.

Optical Coherence Tomography (OCT) has become a highly valuable tool in daily practice, both for diagnosis as well as for monitoring and understanding a variety of entities within the framework of neuro ophthalmology. Perhaps one of the pathologies in which this technology is very helpful is optical neuritis. OCT has confirmed that a demyelinating process frequently associates new run damage or axon death.

Several studies have demonstrated a significant reduction of the peripapillary RNFL thickness after an episode of optic neuritis, both in single symptomatic or isolated form such as in the context of multiple sclerosis (1-5). Basically, the RNFL is the sum of non-myelinized axons of the ganglion cells, and this explains why the visual deficit increases together with the RNFL thickness reduction, i.e., with neuronal death. This means that there is a significant correlation between the loss of thickness and the loss of sensitivity to contracts, as well as with the reduction of the scope of the visual evoked potentials. In what concerns automatic perimetry, discrepancies are not infrequent so that the RNFL thickness reduction does not always have its corresponding functional defect. In these cases, we may infer a greater diagnostic sensitivity in the case of OCT.

The loss of fibers entails an increase of excavation, which is deeper when the axonal loss is greater and the for more commonly with worse visual acuity. The finding of a clinically relevant pathological excavation can be made objective in up to 20% of cases. In these cases, clinical antecedents as well as the paleness of the neuroretinal ring leave little room for doubt in the differential diagnostic with other excavated neuropathies.

The quantification of the papillary edema has demonstrated that there are no differences in the degree of visual deficit between retrobulbar and anterior forms or papillitis and, within the latter, there is no difference either in the degree of recovery as a function of the intensity of the edema in acute phase. Accordingly, the degree of the edema has no predictive value for visual recovery (3).

Even so, the findings facilitated by OCT are not restricted to the ophthalmological field: axonal death also occurs curves in the context of multiple sclerosis, even in patients without optical neuritis history, even though the RNFL thickness reduction is not as intense. In addition, it has been seen that said singing is closely related with the duration of the disease, with the degree of neurological deterioration or disability, with the number of relapses and with the atrophy which is determined by magnetic resonance (1,5,6).

Taking all of the above data into account, it seems necessary for any study which aims to assess the role of existing or emerging therapeutic agents for neuroprotection, both in optic neuritis and multiple sclerosis, to include in its assessment of the results of OCT before and after treatment (7,8).

OCT does not only allow us to quantify or measure RNFL but also to analyze the morphological characteristics of the optic disc. In this sense, we have been able to observe that the «risk disc» typically associated to non-arthritic ischemic optic neu-

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Optic neuropathy (NAION) does not match with a small papilla as typically described. It seems that the appearance of bundled disc and absence of excavation are due to more anterior position of the lamina cribosa. In this clinical context, similarly as with optical neuritis, axonal loss translates into increased excava-
tion which, due to being less obvious, goes clinically unnoticed (9,10).

Another entity in which OCT is very useful is in the follow up of papilledema because it allows for a quantitative and serial analysis of the papillar edema, apart from the assessment of possible sequelae. Even so, it is not proved useful to differentiate true papillar edemas from «pseudoedema» (11).

It is beyond the purpose of this letter to list all the neuropathies in which OCT can be useful. However, we must take into account that it gives us a unique opportunity of performing an in vivo highly resolvent biopsy which is less independent than perimetry on the patient’s cooperation.

This has only started: the 10-micron resolution of regular tomographs is already being replaced by resolutions of 2-3 microns. Without realizing it, we will soon be exploring our patients with resolutions which we cannot even imagine at this time.

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