Commentary: Low incidence of pachydrusen in central serous chorioretinopathy in an Indian cohort

The constantly evolving definition and expanding array of diseases is proof of our limited grasp on the pathogenesis of pachychoroid disease spectrum. From being first described as a group of disorders having a common clinical feature of "pachy" or thick choroid, the definition now encompasses a range of clinically distinct entities. Much of the contribution towards filling the lacunae in the understanding of these diseases comes from the advancement in multimodal imaging technology, namely confocal scanning laser-based angiography, spectral domain and swept source OCT, en-face OCT, enhanced depth imaging for visualizing the choroid on OCT and the OCT angiography.

Pachydrusen has recently been described as a unique form of drusen associated with increased choroidal thickness.[1] They are yellowish white sub-RPE deposits having a wider distribution at the posterior pole and in peri-papillary location, usually sparing the macula centre. They have well-defined margins with more complex irregular outer contour and occur in isolation or in groups of few. Spaide *et al*. have described it in patients with non-exudative AMD, while Lee *et al*. have described it in patient with polypoidal choroidal vasculopathy (PCV).[2] In their study, Lee have shown them to be associated with choroidal vascular hyperpermeability and pachyvessel morphology in PCV eyes. This is suggestive that the underlying choroidal morphology directly affects the overlying RPE, which may, in due course of time, lead to depositions, thus triggering formation of pachydrusen.

Current literature indicates that pachychoroid disease spectrum consists of Pachychoroid pigment epitheliopathy (PPE), Central serous chorioretinopathy (CSCR), Pachychoroid Neovasculopathy (PNV), Polypoidal choroidal vasculopathy (PCV), Focal Choroidal excavation (FCE), and Peripapillary pachychoroid syndrome (PPS).[3] In this issue of Indian Journal of Ophthalmology, the authors describe their study with an aim to report the prevalence of pachydrusen in 264 eyes of 132 patients with CSCR and their fellow eyes.[4] It was very interesting to note a low prevalence rate of 6.82% (9 eyes of 9 patients out of 132 patients) for pachydrusen in CSCR eyes in an Indian Population. One reason for this low prevalence could be the shorter duration of the disease. The following observations support this hypothesis:

1. CSCR falls in the early part of the pachychoroid spectrum, thereby implying shorter duration of the disease. Additionally, in the current study, pachydrusen was noted only in eyes with persistent, chronic or resolved CSCR and not in acute CSCR. Baek *et al*. have also demonstrated sequential increase in the number of pachydrusen per eye as pachychoroid spectrum progressed from PPE to CSCR to PNV and finally to PCV[5]
2. Duration of disease in eyes with Pachydrusen (30.6 ± 40.2 months) was more as compared to eyes without pachydrusen (15.7 ± 25.5 months). Although the difference was not significant (P = 0.1), it points a trend towards higher prevalence with increasing duration of disease. Additionally, it may be very difficult to correctly define the duration of the disease in pachychoroidopathy, as the patient may harbour underlying choroidal pathology for a long duration without any symptoms
3. Patient with pachydrusen had higher mean age compared to eyes without pachydrusen. The younger population could be harbouring underlying choroidal pathology for a shorter period i.e., shorter duration of disease, which can probably explain lower prevalence of pachydrusen in them as compared to their older counterpart.

Genetics also play a major role in varying prevalence rates among different ethnic populations. This could explain lower prevalence of pachydrusen in the current study with Indian population as compared to other studies in different ethnicities.[6] Fukuda *et al*. have shown that patients with pachydrusen have genetic and clinical characteristics distinct from those of soft drusen and pseudodrusen in eyes with typical AMD, PCV and retinal angiomatosis proliferation (RAP).[7] Larger cohort studies amongst various ethnic populations may help us to better elucidate the genetic variations within various populations.

The authors have beautifully illustrated presence of large choroidal vessels beneath the pachydrusen on swept-source optical coherence tomography (SS-OCT). It would have been interesting if the authors had additionally investigated the angiographic features of pachydrusen and the underlying choroid including ischemia and/or leakage.

Additionally, performing an eye-tracked OCT with ICGA and DFA for definitive co-localization of pachydrusen and to ascertain its corresponding features on angiography would give us a better insight into its multimodal imaging features. In AMD, multicolour imaging allowed for improved detection of features such a reticular drusen and geographic atrophy as compared to traditional colour fundus photography.[8] This is an exciting area of retinal imaging and it would be interesting to conduct such comparative studies in eyes with pachydrusen too. If similar findings of increased sensitivity for pachydrusen detection are noted with multicolour imaging, then it may potentially alter their epidemiological data.

In the future, larger cohort studies to evaluate the epidemiological, genetic and multimodal imaging features of pachydrusen will provide us with more insight into its pathogenesis and significance in clinical practice. Long-term follow-up of such patients can be planned to assess the evolution and progression of pachydrusen and its probable association with disease activity and CNV formation.

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