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Proportionate Topographic Areas often Retinal Zones 1, 2, and 3 for Use in Describing Infectious Retinitis

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Holland and colleagues¹ introduced the technique of localizing infectious retinitis lesions to 1 or more of 3 contiguous retinal zones in 1989, an approach first applied to the study of cytomegalovirus retinitis in patients with AIDS. As defined in the original study, zone 1 corresponded to an area comprising both 2 disc diameters (3600 μm) from the foveal center and 1 disc diameter (1800 μm) from the margins of the optic disc, an area wherein most immediately sight-threatening lesions reside²; zone 2 was defined as the area extending from zone 1 to the clinical equator of the eye, identified by the anterior borders of the ampullae of the vortex veins; and zone 3 extended from zone 2 to the ora serrata, an area underlying the vitreous base and associated with an increased risk of retinal detachment (Figure 1). Studies of retinitis location, size, and progression are often done photographically in collaboration with a certified reading center using standardized protocols, photographs, and measuring techniques.³ In general, there is good agreement both between individual reading center graders and between separate reading centers,⁴ whereas clinicians tend to consistently overestimate retinitis lesion size by about a factor of 2.⁵ The zonal system, as originally developed for cytomegalovirus retinitis, was adopted for the National Institutes of Health-sponsored Studies of the Ocular Complications of AIDS⁴ and has since been applied to other forms of retinitis, most notably ocular toxoplasmosis,⁶ but is distinct from the zonal classification (I, II, III) used in the study of retinopathy of prematurity.⁷

One aspect of retinal topography that has yet to be addressed is the proportionate area represented by each zone. Such an analysis would, we believe, provide valuable information

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for both clinicians who care for patients with necrotizing infections of the retina and for investigators who study these conditions. It has been suggested, for example, that new retinitis lesions are not randomly distributed^{8,9} but rather might preferentially involve selected zones. To determine whether such a hypothesis is true, one must first have a reliable estimate of proportionate topographic area for the various retinal zones. To this end, we compared photographic estimates⁴ of the area of zones 1 and 2, the only zones readily photographable, with an estimate of zone 3 area derived by subtracting the sum of the areas of zones 1 and 2 from a known total human retinal area of approximately 1000 mm².¹⁰ Given that such estimates would be expected to vary somewhat from person to person, we then rounded the proportionate areas to the nearest fifth percentile. This approach provided an estimate of proportionate area for zone 1 of approximately 5% of the entire retina; for zone 2, of about 70%; and for zone 3, the remaining 25% (Figure 2). We propose that such evidence-based estimates be used both by clinicians to document and monitor necrotizing retinitis lesions and for future studies of retinitis location, size, and progression.

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Figure 1. Retinal zonal topography, modified after Holland and colleagues.¹ One disc diameter is approximately 1800 μm .

Figure 2.

Proportionate zonal representation as estimated from both photographic⁴ and human anatomical¹⁰ studies.*Zones 1 and 2 from NTS accession No. PB97-192082.⁴ †Zone 3 from Curcio and Allen.¹⁰ ‡Rounded to the nearest fifth percentile.