Virtues of polymerase chain reaction in ophthalmology

Dear Editor,

We read the article titled ‘DNA chip-assisted diagnosis of a previously unknown etiology of intermediate uveitis - Toxoplasma gondii’, by Basu et al., with great interest.[1] We appreciate their attempt to draw attention towards the superior efficacy of Polymerase Chain Reaction (PCR) as a diagnostic tool in the etiology of uveitis and take this opportunity to put forth our views.

The biggest thorn in the side in a case of uveitis (especially posterior) is the diagnosis of the specific causative agent or factor, thereafter ensuring appropriate treatment for complete resolution of the condition. Being an inflammatory condition, uveitis is most commonly seen as a sequel to a rigmarole of infectious or non-infectious pathologies. Picking out a specific etiological factor or agent is like finding needle in a haystack. The clinical evaluation here gives a direction and the ancillary laboratory investigations help in shaping the diagnosis. But sometimes, especially in cases of non-responders or relapsers we need a bull's eye diagnosis, which is provided by sophisticated modalities like PCR, presenting irrefutable evidence, therefore assisting in pinpoint diagnosis and specific treatment.

Multiplex PCR mentioned in the article by Basu et al., is one of the various modifications of PCR used to rapidly detect deletions or duplications in a large gene. By targeting multiple genes at once, it gains additional information from a single test run which otherwise would require several times the reagents and more time to perform.[1,2]

To elaborate our point, we analyze the role of PCR in the diagnosis of various conditions leading to uveitis by exemplification. Beginning with viral infections, the viral DNA or RNA can be identified by gene detection using quantitative real-time PCR in the intraocular fluid samples.[3] For parasitic protozoans like Toxoplasma, PCR testing for antibody titers in aqueous or vitreous has been proved to carry a high degree of specificity and sensitivity. PCR is also effective in identifying bacterial infections, e.g., detection of the Mycobacteium tuberculosis complex by IS6110 primer-based PCR. Not only does it identify the agents but also distinguishes amongst organisms belonging to the same genus.[4]

To cite an example of the diagnostic capability of PCR in non-infectious conditions we take the Vogt-Koyanagi-Harada disease, in which the Interleukin-21 messenger RNA expression by peripheral blood mononuclear cells is determined by reverse transcriptase-PCR.[5]

These few examples are just the tip of the iceberg of the numerous conditions in which PCR is useful.

Despite all these benefits, the major constraints in using this investigation regularly in a country like ours are cost, availability and the enormous patient load, especially in rural areas. Such an advanced investigation is available in precious few centers located in cities making it inaccessible to the masses. Adequate patient education and providing economical services to remote areas may serve as an answer to this problem.

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