The Collaborative Ocular Tuberculosis Study (COTS)-1: Polymerase Chain Reaction in the diagnosis and management of Tubercular Uveitis: Real world scenario: Report 3

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Background: Tuberculosis (TB) is a major cause of morbidity and mortality in many countries, and a significant public health problem worldwide. Various attempts have been made to aid the clinician in diagnosing TBU, including clinical, imaging, and histopathological characterization. Polymerase chain reaction (PCR), a type of nucleic acid amplification technique (NAAT), has been employed in the diagnosis of TBU in several reports published in the literature. The exact role of NAATs such as PCR in the diagnosis of TBU in the diagnosis and management of TBU has not been evaluated in a multicenter approach. Thus, in the index study, data from the COTS-1 was analysed to see how frequently and reliably experts were using PCR as a diagnostic criterion in deciding about treatment initiation based on PCR positivity.

Patients & Methods: COTS-1 is a retrospective cohort study of patients diagnosed with TBU from January 2004 to December 2014 from 25 centers worldwide. In this study, demographics, clinical features, laboratory investigations, imaging evaluation, systemic examination, management, and treatment outcomes were obtained for 962 patients.

In the present report, subset of patients from the COTS-1 undergoing PCR analysis of ocular fluids (from anterior chamber paracentesis/vitreous paracentesis or diagnostic vitrectomy) were analysed. PCR was performed by the treating uveitis specialist on discretionary basis, in cases of diagnostic dilemma, or along with diagnostic vitrectomy. PCRs were performed at all the study sites in a standardized and stringent manner in designated laboratories. Commonly identified sequences include *IS6110, MPB64*, and *protein b*. PCR was performed on aqueous, vitreous fluid, or both. Results of the PCR were noted for all the patients undergoing the test.

Table 1: Demographic characteristics of subjects undergoing polymerase chain reaction analysis from the COTS-1		TB PCR + (n = 33)	TB PCR – (n = 26)
Age	Mean ± SD (years)	38.84 ± 15.64	32.43 ± 12.68
Gender	Male (n, %)	23 (69.69)	18 (69.23)
	Female (n, %)	10 (30.30)	8 (30.77)
Race	Asian (n, %)	29 (87.87)	24 (92.31)
	Caucasian (n, %)	3 (9.09)	0
	Middle-Eastern (n, %)	1 (3.03)	2 (7.69)
Bilaterality	n (%)	16 (48.48)	14 (53.85)
TB: tuberculosis; PCR: polymerase chain reaction; SD: standard deviation			

Table 2: Clinical features of patients undergoing polymerase chain reaction analysis of ocular samples in the COTS-1		TB PCR + (n = 33)	TB PCR – (n = 26)
Anatomical Site of Uveitis	Anterior	1 (3.03)	2 (7.69)
	Intermediate	1 (3.03)	1 (3.84)
	Posterior	20 (60.06)	13 (50)
	Panuveitis	11 (33.33)	10 (38.46)
Anterior Chamber Inflammation		10 (30.30)	8 (30.77)
Vitreous Haze		7 (21.21)	3 (11.54)
Vitreous Cells		6 (18.18)	4 (15.38)
Snow Balls		3 (9.09)	2 (7.69)
Disc Edema		7 (21.21)	2 (7.69)
Macular Edema		4 (12.12)	2 (7.69)
Retinal Vasculitis		9 (27.27)	2 (7.69)
Choroiditis	Serpiginous-like	10 (30.30)	5 (19.23)
	Multifocal	5 (15.15)	3 (11.54)
	Tubercles	4 (12.12)	3 (11.54)
	Others	1 (3.03)	2 (7.69)

Results: Of the 962 patients, only 59 patients (6.13%) underwent analysis of PCR. The patients who underwent PCR had a mean age of 36.33 ± 14 years (range: 11 – 74 years). There were 41 males (69.49%) in the cohort. PCR analysis was performed at a few centers from amongst the participating study centers, with 45 study subjects (76.27%) from India.

Positive PCR was obtained in 33 patients (55.93%) (23 males; all Asian Indians). Among patients with positive PCR, tuberculin skin test was performed in 30 patients, and the results were positive in 22 patients (66.66%). QuantiFERON TB Gold was performed in 10/33 patients and was positive in 4 patients (40%). One patient was positive for TB-T spot test. Six patients (18.18%) were diagnosed with systemic (pulmonary/ extrapulmonary TB). Computed tomography (CT) scans showed "suggestive lesions" in 5 patients (15.15%).

26 patients had negative PCR (8 females; 21 were Asians including 1 Chinese and 1 Malay, and 2 patients were Caucasian).

Therapy and Outcomes: Treatment with ATT was given in 31/33 patients with PCR positive TBU (93.94%) compared to 18 patients with PCR negative results (78.26%). Second-line ATT with injection streptomycin was given in 2 patients with positive PCR and 2 patients with negative PCR (for extrapulmonary severe TB). Among patients with TB PCR positive results, at 1-year follow-up, 5 patients (15.15%) showed treatment failure.

Among patients with negative PCR, 3 patients (11.54%) showed treatment failure at the end of 12 months (2 patients with posterior and 1 with panuveitis).

Conclusions: A highlight of the index manuscript is that while 55.93% patients tested positive for TB using PCR, the treating uveitis specialists seemed to largely rely on the constellation of their clinical and imaging findings, and presence of other systemic immunological features and systemic TB to base their decision on whether to initiate ATT or not. This implies that PCR is still in its infancy and needs significant advancement to gain wider acceptability and reliability. Data from COTS-1 suggests that PCR is not commonly done for diagnosing intraocular TB and positive/negative results may not influence management or treatment outcomes in the real world scenario.