

Neuro Ophthalmology 2018: Pediatric ophthalmology and Ultrasound Biomicroscopy (UBM): A world to discover - Vicuna C Jessie Lin - National Institute of Ophthalmology

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Ophthalmological evaluation in children is very difficult when they present an ocular pathology such as: Corneal opacity, dysgenesis of the anterior segment, among others. Ultrasound imaging is valuable in eyes with opaque media to detect pathological changes of the posterior segment, but ultrasound bio microscopy has been used widely to analyse corneal disease, cysts and Tumors of the eye, lens implants and cataracts. Inspection was made for all participants for measurement of central corneal thickness, anterior chamber depth, lens thickness, iris thickness (measured 2mm from the iris root and again at the thickest point near the pupil), posterior chamber depth, zonular length and angle of anterior chamber. Qualitative assessment was done for abnormal angle membranes, iris insertion level, and ciliary processes position and configuration. Cross-sectional study which included 25 eyes of 15 patients suffering from PCG and a control group of 15 eyes of ten age- and sex-matched participants.

This study allows the ophthalmologist and the surgeon to make the best decision and obtain an accurate diagnosis, obtaining direct visualization of the anterior segment. Ultrasound Bio microscopy (UBM) is high frequency, 20 and 50Mhz, ultrasound that penetrates 5-6 mm and has a resolution of 25 microns. This was a cross-sectional non-randomized study that included 25 eyes of 15 patients (ten bilateral and five unilateral) diagnosed as PCG in the Pediatric Ophthalmology Unit. This study also involved an age- and sex-matched control group that consisted of 15 eyes of ten participants (five participants suffering from strabismus with normal clinical findings who were observed under overall anaesthesia for performing refraction, and the fellow normal eyes of the five patients with unilateral PCG from the study group). All participants were examined under general anaesthesia. Diagnosis of PCG was based on such clinical data as IOP, corneal diameter, disc changes, gonioscopy if possible, and amplitude-modulation scan measurement of axial length. UBM requires contact with the eye via a water bath or a clear shield interface, UBM can be used in infants under sedation with oral Chloral hydrate and what clinically, useful information it can provide UBM can be especially useful when corneal pacification limits direct visualization of anterior segment structures. The pathogenesis of glaucoma in childhood and the responses of the child's eye to this disorder are often very unlike from those in older individuals. Exposure to high IOP while the ocular coats are not fully mature in children leads to secondary changes like increased axial length (AL) and associated myopia, iris thinning, and increased corneal diameter.

Pediatric glaucoma includes a wide variety of conditions which result in elevated intraocular pressure (IOP) and optic nerve damage. UBM evaluation of both groups revealed that CCT in the study group was significantly larger than in the control group ($P=0.012$). CCT in the study group ranged between 500–1,390 μm with a mean of $700\pm 190\mu\text{m}$, while in the control group it ranged between 490–620 μm with a mean of $540\pm 30\mu\text{m}$. Similarly, ACD and zonular length in the study group were significantly larger than in the control group ($P=0.001$). Angle of anterior chamber was significantly wider in the study group ($P=0.002$). It is a erratic but serious cause of blindness around the world and represents a global problem that poses a diagnostic and therapeutic challenge to the ophthalmologist. Primary congenital glaucoma (PCG), the most common primary childhood glaucoma, is believed to be caused by dysplasia of the anterior chamber angle, and it is generally bilateral.

Ultrasound bio microscopy (UBM) is a technique which is high-resolution ultrasound that allows non-invasive in vivo imaging of structural details of the anterior ocular segment at near light microscopic resolution and provides detailed assessment of anterior part structures, including those obscured by regular anatomic and pathologic relations (such as corneal edema or iridocorneal abnormalities that may preclude the clinical assessment of underlying structures). Accordingly, UBM is useful for assessing the morphology and understanding the pathology of the anterior segment in congenital glaucoma. This technique can be used to assess the need for additional procedures prior to corneal transplantation, including cataract extraction, intraocular lens implantation, iris reconstruction, a glaucoma procedure. The potential and usefulness of the UBM was established as an accurate diagnostic procedure in ocular pathology with transparent and non-transparent media in children, diagnosing: Corneal diseases, dysgenesis of the anterior segment, cyst, Tumors, plateau iris configuration, plateau iris syndrome, vitreous bands and/or traction affecting the anterior segment including the ciliary body, pars plane and peripheral retina.