Glaucoma

Chairperson: D Dwarika

An Analysis of Glaucoma Services in Trinidad and Tobago

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The London School of Hygiene and Tropical Medicine (LSHTM) is recognised globally as a world-leader in research and postgraduate education in public health. Through the Master of Science (MSc) in Public Health for Eye Care, the LSHTM provides education and development of eye care professionals in the principles of public health. These enhanced skills include the ability to analyse and disseminate epidemiological data to promote an evidence-based approach to policy development. As public health practitioners, graduates are then able to suggest, propose, recommend, drive and implement national, regional and global eye health policies designed to reduce avoidable and unnecessary blindness. The MSc degree in Public Health for Eye Care from the LSHTM gives added weight to any recommendations, opinions and suggestions offered by eye care professionals to key stakeholders. One of the requirements for the MSc is to produce a research project in the student's area of interest. This particular project aims to explore options for "universal and equitable eye care" with respect to glaucoma services in Trinidad and Tobago. An overview of the research project will be presented, including methods used to identify barriers to access of eye care services, from both the provider and the user perspectives. The other objectives are:

- To document evidence of a need for enhanced glaucoma services
- To document existing glaucoma services and services activity
- To identify gaps in provision of glaucoma services (unmet need) in Trinidad and Tobago relative to the World Health Organization Health Systems Building Blocks
- To make recommendations for improvement in glaucoma services in Trinidad and Tobago.

Combined Phacoemulsification and Trabectome in a Caribbean Population

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The purpose of this study is to evaluate the effects of combined phacoemulsification and trabectome on intraocular pressure, postoperative drop therapy and ocular surface disease. There is a high incidence of glaucoma in the Caribbean population and this study aims to provide further insight into the possible benefits of a minimally invasive approach.

Trabectome is a procedure for the treatment of open angle glaucoma *via* ablation of a segment of the trabecular meshwork to allow drainage of aqueous humor. Phacoemulsification is a type of cataract surgery in which ultrasound energy is used to liquefy the lens to allow for extraction.

Encounter of Microspherosphakia Glaucoma in Guyana

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Microspherosphakia is a rare congenital disease of the lens that can lead to secondary glaucoma if not treated early. Two cases of microphero sphakia were discovered in the indigenous population of Guyana due to acute presentations of secondary angle closure glaucoma. Both of these cases were young female children at age nine and 13 years who were unrelated. Definite familial inheritance was noted in one of these cases who had a brother with microspherosphakia which had not progressed to glaucoma. Cases presented with extremely high intraocular pressures in acute presentations > 35 mmHg and glaucomatous cupping. One child had bilateral glaucoma and the other monocular glaucoma. Management by clear lens extraction with implantation of intraocular lens was done in an attempt to control intraocular pressure.

SLT: A Smart Alternative for Glaucoma Patients

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Glaucoma is a progressive neuropathy of the optic nerve and is one of the leading causes of blindness in North America and Europe, and the second leading cause worldwide after cataract. Reduction of intraocular pressure (IOP) seems to be the only treatment proven to slow progression in glaucoma. There are several methods to reduce IOP: pharmaceutical treatment, laser treatment and surgery.

In laser treatment, selective laser trabeculoplasty (SLT) is a proven alternative. Approved by the US Food and Drug Administration (FDA) in 2001, thousands of patients around the world have benefited from the procedure. Long-term studies have followed patients over as much as 10 years without any negative findings.

Selective laser trabeculoplasty uses a 532-nm frequency-doubled, Q-switched Nd:YAG laser that delivers a low-energy, large spot, very brief pulse to selectively target cells of the trabecular meshwork. This "milder" laser application is thought to stimulate the pigmented trabecular meshwork cells and thus facilitate improved aqueous outflow. Selective laser trabeculoplasty can be used as a primary stand-alone therapy or in conjunction with drug therapy.

Selective laser trabeculoplasty treatment can be repeated, if necessary, depending on the individual patient's response, as well as performed at regular intervals to keep IOP low and stable. There are no major risks or complications associated with SLT. The worst that can happen is that the patient's eye does not respond. The average response rate is over 70%. Selective laser trabeculoplasty is completely non-invasive and does not cause any harmful damage or scarring to the eye tissue surrounding the treatment area.

Selective laser trabeculoplasty is quick. The laser procedure itself takes approximately five minutes. The total average treatment time is 30 minutes.

In the majority of patients, there is often an immediate decrease in IOP following SLT treatment. However, in some patients, the photoregenerative process may take from weeks to a few months before impacting eye pressure. Selective laser trabeculoplasty is an effective treatment method for patients with primary open angle glaucoma, normal tension glaucoma, pseudoexfoliation glaucoma or pigmentary glaucoma. Studies have also shown that SLT can prove effective in the treatment of primary angle closure glaucoma.

We present our one-year experience with SLT in decreasing IOP in Peruvian patients.

UBM: Exploring Pathology in the Anterior and Intermediate Segment

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We present our experience of clinical application of ultrasound biomicroscopy (UBM) in ophthalmology, in which ultrasound frequencies of 25 and 50 MHz provide over a three-fold improvement in resolution compared with other systems.

Ultrasound biomicroscopy allows imaging of virtually all anterior and intermediate segment anatomy and pathology, including cornea, iridocorneal angle, anterior chamber, iris, ciliary body, lens, zonula, pars plana and peripheral retina, some of them regions obscured by overlying optically opaque anatomic or pathologic structures. Ultrasound biomicroscopy is thus applicable for diagnostic imaging of corneal diseases, glaucoma, tumours and cysts, uveitis, foreign bodies as well as lens implants. Although examinations are most commonly performed with a fluid-filled scleral shell, they may also utilize a water bath, a membrane enclosed-tip applied to the eye, after topical anaesthetic or even through closed lids, especially in cases of trauma, albeit at the cost of reduced sensitivity due to attenuation by the lids.

In glaucoma, UBM has demonstrated usefulness for evaluating the anterior segment of eyes with narrowing of the iridocorneal angles and primary angle closure glaucoma. It also offers mechanistic insights regarding malignant and pigmentary glaucoma. Ultrasound biomicroscopy is the ideal imaging modality for evaluating abnormalities in the ciliary body's position, as can occur with plateau iris configuration and syndrome, malignant glaucoma and anteriorly located annular choroidal effusions.

One of the most useful roles of UBM is in differentiating the causes of angle closure. In primary angle closure, forward bowing of the iris is typically evident. Posterior synechiae may even be detectable. With plateau iris, UBM generally demonstrates an anteriorly rotated ciliary body with obliteration of the ciliary sulcus and a flat central iris plane. If UBM reveals plateau iris configuration, the findings lead one to consider performing iridoplasty without first having a peripheral iridotomy "fail". Some patients have been noted to have findings of both plateau iris and pupillary block.

Ultrasound biomicroscopy can reveal a narrowing of the angle in scotopic compared to photopic conditions. In patients who are at risk for angle closure, the procedure should be done in low-level, mesopic lighting conditions so that the angle may be assessed at its narrowest.

Iris and ciliary body cysts are commonly discovered with UBM. They sometimes may narrow the anterior chamber angle or displace the crystalline lens or even an intraocular lens (IOL). Malignant glaucoma is characterized by a forward movement of the iris-lens diaphragm,

absence of iris bowing, a very shallow anterior chamber and possible contact between the ciliary processes and the lens equator. Ultrasound biomicroscopy can be quite useful for diagnosing cyclodialysis clefts, which are not always visible on gonioscopy.

Anterior suprachoroidal effusions may be difficult to identify by indirect ophthalmoscopy. They can easily be found with UBM. Additionally, because the water-filled probe cover is so well tolerated by patients, it can be used to image the filtering bleb or the posterior end of a tube shunt.

Ultrasound biomicroscopy can look behind a densely opaque or oedematous cornea to evaluate if penetrating keratoplasty will benefit the patient. Refractive surgeons can use UBM to assist with surgical planning prior to implanting phakic IOLs. If zonular dehiscence is suspected in an eye with a visually significant cataract, UBM allows the surgeon to identify the extent of zonular loss preoperatively. Evaluating malpositioned or dislocated IOLs with UBM assists the planning of surgical revision.

Finally, UBM can help evaluate and manage ocular and even adnexal tumours, detecting and measuring the extent of iris and ciliary body melanomas. Ultrasound biomicroscopy can measure the tumour's size and plan surgical excision precisely. In addition, there is the potential to measure the size and extent of basal cell carcinomas on the eyelid, cheek, or side of the nose.