

Ophthalmology Residency Course
In
Department of Ophthalmology
Faculty of Medicine Thammasat University

Curriculum Content

In order to achieve the core objectives, at the end of this course the Ophthalmology Residents are expected to gain knowledge and skill as follow :

1. Update on General Medicine
2. Fundamentals and Principles of Ophthalmology
3. Optics, Refraction, and Contact Lenses
4. Ophthalmic Pathology and Intraocular Tumors
5. Neuro-Ophthalmology
6. Pediatric Ophthalmology and Strabismus
7. Orbit, Eyelids, and Lacrimal System
8. External Diseases and Cornea
9. Intraocular Inflammation and Uveitis
10. Glaucoma
11. Lens and Cataract
12. Retina and Vitreous
13. Public Health Ophthalmology
14. Research in Ophthalmology
15. Computer in Ophthalmology

1. Update on General Medicine

Learning Objectives

At the end of the course, the residents should be able to

1. Describe common general medicine conditions.
2. Detect and make diagnosis of common general medicine conditions.
3. Handle the common general medicine conditions.
- 4.

Learning Contents

1. Systemic diseases
 - 1.1 Arterial hypertension
 - 1.2 Diabetes mellitus
 - 1.3 Acquired heart diseases
 - 1.4 Cerebrovascular diseases
 - 1.5 Cancer
 - 1.6 Chronic obstructive pulmonary diseases
 - 1.7 Connective tissue diseases
 - 1.8 Thyroid diseases
 - 1.9 Bleeding disorders
 - 1.10 Acquired immune deficiency syndrome
2. Pharmacology and toxicology of systemic drugs
 - 2.1 Corticosteroids

- 2.2 Non-steroidal anti-inflammatory agents
- 2.3 Analgesics
- 2.4 Anticoagulants
- 2.5 Psychotropics
- 2.6 Antimetabolites
- 2.7 Chemotherapeutics
- 2.8 Drug interactions
- 2.9 Drug abuse
- 3. Current concepts of preventive medicine
 - 3.1 Routine medical examination
 - 3.2 Hypertension
 - 3.3 Lipid abnormalities
 - 3.4 Chest x-ray
 - 3.5 Papanicolaou smear
 - 3.6 Mammography
 - 3.7 Ideal cancer screening units
 - 3.8 Sexually transmitted diseases
- 4. General medicine emergencies
 - 4.1 Cardiopulmonary arrest
 - 4.2 Shock
 - 4.3 Anaphylaxis
 - 4.4 Coma
 - 4.5 Toxic reactions to local anesthetics
- 5. Management of surgical patient

- 5.1 Preoperative
- 5.2 Intraoperative
- 5.3 Postoperative

2. Fundamentals and Principles of Ophthalmology

Learning Objectives

At the end of the course, the residents should be able to

1. Identify the anatomy of the eye including orbital walls and their foramina, the ocular adnexae, the optic nerve, the arterial and venous circulation of the eye, the orbit, and the optic nerve.
2. Identify the origin and pathway of cranial nerves I – VII.
3. Explain the biochemical compositions of various parts of the eye and its secretions including the aqueous humor dynamics.
4. Describe the embryogenesis and the genes as well as the congenital anomalies associated with the development of the eye.
5. Understand the importance of molecular genetics in ophthalmology and describe the molecular technologies for the diagnosis and treatment of human eye diseases.
6. Describe the human visual cascade and identify proteins involved in phototransduction.
7. Recognize the various functions of the retinal pigment epithelium such as phagocytosis, vitamin A metabolism and its relationship to retinal diseases.
8. Understand pharmacology of the drugs related to ophthalmology practice such as antibiotics, antiviral agents, antifungal agents, anti-glaucoma medications and anesthetic agents.

9. Recognize the importance and value of epidemiological study and clinical research and familiarize with different statistical methods frequently used in ophthalmic research.

Learning Contents

1. Anatomy

1.1 Orbit and ocular adnexa

- 1.1.1 Orbital anatomy
- 1.1.2 Cranial nerves
- 1.1.3 Ciliary ganglion
- 1.1.4 Extraocular muscles
- 1.1.5 Eyelids
- 1.1.6 Lacrimal gland and excretory system
- 1.1.7 Conjunctiva
- 1.1.8 Tenon's capsule
- 1.1.9 Vascular supply and drainage of the eyelids

1.2 Topographic features of the globe

- 1.2.1 Cornea
- 1.2.2 Sclera

1.3 The eye

- 1.3.1 Precorneal tear film
- 1.3.2 Cornea
- 1.3.3 Sclera
- 1.3.4 Limbus
- 1.3.5 Anterior chamber

1.3.6 Trabecular meshwork

1.3.7 Uveal tract

1.3.8 Iris

1.3.9 Ciliary body

1.3.10 Choroid

1.3.11 Lens

1.3.12 Ora serrata

1.3.13 Vitreous

1.3.14 Retina

1.3.15 Macula

1.4 Cranial nerves: central and peripheral connections

1.4.1 Cranial nerve I

1.4.2 Cranial nerve II

1.4.3 Cranial nerve III

1.4.4 Cranial nerve IV

1.4.5 Cranial nerve V

1.4.6 Cranial nerve VI

1.4.7 Cranial nerve VII

1.4.8 Cavernous sinus

1.4.9 Other venous sinuses

1.4.10 Circle of Willis

2. Embryology

2.1 Ocular development

- 2.2 Congenital anomalies
- 3. Genetics
 - 3.1 Molecular genetics
 - 3.2 Clinical genetics
- 4. Biochemistry
 - 4.1 Tear film
 - 4.2 Cornea
 - 4.3 Iris and ciliary body
 - 4.4 Aqueous humor
 - 4.5 Lens
 - 4.6 Vitreous
 - 4.7 Retina
 - 4.8 Retinal pigment epithelium
 - 4.9 Free radicals and antioxidants
- 5. Ocular pharmacology
 - 5.1 Pharmacologic principles
 - 5.1.1 Pharmacokinetics
 - 5.1.2 Pharmacodynamics
 - 5.2 Ocular pharmacotherapeutics
 - 5.2.1 Cholinergic agents
 - 5.2.1.1 Muscarinic drugs
 - 5.2.1.2 Nicotinic drugs
 - 5.2.2 Adrenergic agents
 - 5.2.2.1 Alpha-adrenergic agents

5.2.2.2 Beta-adrenergic agents

5.2.3 Carbonic anhydrase inhibitors

5.2.4 Osmotic agents

5.2.5 Anti-inflammatory agent

5.2.6 Antibiotics

5.2.7 Antiviral agents

5.2.8 Local anesthetics

5.2.9 Purified neurotoxin complex

5.2.10 Medications for dry eye

5.2.11 Ocular decongestants

5.2.12 Irrigating solutions

5.2.13 Diagnostic agents

5.2.14 Viscoelastic agents

5.2.15 Fibrinolytic agents

5.2.16 Thrombin

5.2.17 Antifibrinolytic agents

5.2.18 Corneal storage medium

5.2.19 Gene therapy

5.2.20 Drugs on the horizon (agents currently under investigation)

5.3 Legal aspects of medical therapy

6. Laser in ophthalmology

7. Ophthalmic ultrasonography

8. Statistics and epidemiology

8.1 Epidemiology

8.1.1 Design strategies

8.1.1.1 Descriptive studies

8.1.1.2 Analytic design

8.2 Statistics

8.2.1 Statistical analysis

8.2.1.1 Chi-square tests

8.2.1.2 *t*-tests

8.2.1.3 Correlation coefficient

8.2.1.4 Multivariable analysis

8.2.2 Data from follow-up studies

8.2.3 Statistical association

8.2.3.1 Chance

8.2.3.2 Bias

8.2.3.3 Confounding

8.2.4 Validity, generalizability, consistency

8.2.5 Sample size and power

3. Optics, Refraction, and Contact Lenses

Learning Objectives

At the end of the course, the residents should be able to

1. Describe principles of optics affecting vision and correction of refractive errors.
2. Recognize the types of corrective lens (spectacles and contact lens).

3. Perform retinoscopy, keratometry, and autorefraction.
4. Identify the common subnormal vision aids.
5. Prescribe eye glasses and contact lenses.
6. Discuss arts of prescription of eye glasses and contact lens fitting techniques.
7. Evaluate and manage the subnormal vision patients.
8. Recognize principles and features of surgical correction of refractive errors.
9. Describe principles of the ophthalmic instruments.

Learning Contents

1. Physical and geometrical optics affecting vision and correction of refractive errors
2. Principles of refraction and instruments
3. Refractive errors of the eye
4. Types of corrective lenses
5. Refraction techniques
6. Aberrations
7. The eye as an optical instrument
8. Glasses for correction of ametropia
9. Contact lenses
10. Subnormal vision aids
11. Surgical correction of refractive errors
12. Principles of ophthalmic instruments

Learning Experiences

First year resident (under supervision of second year resident, third year resident, and staff)

1. Using
 - 1.1 Retinoscope
 - 1.2 Trial lens set
 - 1.3 Phoropter
 - 1.4 Lensometer
 - 1.5 Keratometer
 - 1.6 Automated refractometer
 - 1.7 Ophthalmoscope
 - 1.8 Slit lamp biomicroscope
2. Practice in various techniques of refraction
 - 2.1 Refraction techniques
 - 2.2 Retinoscopy
 - 2.3 Subjective refraction
 - 2.4 Automated refraction
 - 2.5 Cycloplegic refraction
3. Prescribe eye glasses
4. Observe laboratory exercises
 - 4.1 Grinding of spectacle lens
 - 4.2 Mounting of spectacle lens

Second year resident

1. Supervise first year resident in performing refraction techniques
2. Study techniques of contact lens fitting

3. Familiarize with contact lens trial fitting unit

Third year resident

1. Supervise first and second year residents
2. Perform contact lens fitting and prescribe contact lens
 - 2.1 Hard contact lens
 - 2.2 Rigid gas permeable lens
 - 2.3 Soft contact lens
3. Familiarize with subnormal vision aids
 - 3.1 High plus lens
 - 3.2 Telescopic devices
 - 3.3 Magnifier
4. Expose to various types of
 - 4.1 Radial keratotomy (RK)
 - 4.2 Astigmatic keratotomy (AK)
 - 4.3 Excimer laser photorefractive keratectomy (PRK)
 - 4.4 Excimer laser phototherapeutic keratectomy (PTK)
 - 4.5 Laser in situ keratomileusis (LASIK)

4. Ophthalmic Pathology and Intraocular Tumors

Learning Objectives

At the end of the course, the residents should be able to

1. Explain how to collect specimens for ophthalmic pathologic sections.
2. Explain how to fix and stain ophthalmic pathologic specimens.

3. Interpret and differential diagnose pathologic sections of common eye diseases.

Learning Contents

1. Normal eye
2. Developmental anomalies
3. Infectious and immunologic disorders
4. Neoplasm and related masses
 - 4.1 Tumors of eyelids
 - 4.2 Tumors of lacrimal gland and lacrimal drainage apparatus
 - 4.3 Tumors of extraocular muscles
 - 4.4 Tumors of conjunctiva, caruncle, and cornea
 - 4.5 Tumors of uveal tract
 - 4.6 Tumors of retina and neural ectoderm
 - 4.7 Tumors of optic nerve
 - 4.8 Tumors of orbit
 - 4.9 Metastatic and secondary tumors
 - 4.10 Nonneoplastic masses and cysts
5. Vascular disorders
6. Trauma
7. The eye in systemic diseases
8. Specific ocular disorders
 - 8.1 Glaucoma
 - 8.2 Phthisis bulbi

8.3 Sympathetic ophthalmia

Learning Experiences

First and second year residents

1. Visit the Department of Pathology and observe the technique of specimen fixation
2. Collect and fix the specimens from operative fields

Third year resident

1. Interpret ophthalmic pathologic sections of common eye diseases

5. Neuro-Ophthalmology

Learning Objectives

At the end of the course, the residents should be able to

1. Perform and interpret neuro-ophthalmic examination and use appropriate investigations including perimetry, electrophysiology, neuro-imaging, ultrasonography.
2. Describe neuro-ophthalmic anatomy and functions of motor and sensory visual pathways, pupillary pathway.
3. Diagnose optic nerve disorders.
4. Detect ocular motor nerve palsies, facial nerve disorders, nystagmus, and disorder of accommodation.
5. Use low vision aids and rehabilitation in neuro-ophthalmic patients.
6. Recognize systemic disorders related to neuro-ophthalmic signs.

Learning Contents

1. Neuro-ophthalmic examination
 - 1.1 Testing of visual function
 - 1.1.1 Visual acuity
 - 1.1.2 Amsler grid
 - 1.1.3 Color vision
 - 1.1.4 Stereopsis
 - 1.1.5 Visual field
 - 1.1.6 Contrast sensitivity
 - 1.1.7 Electrophysiology
 - 1.1.8 Functional visual loss
 - 1.2 Technique of pupil examination
 - 1.3 Ocular motility
 - 1.4 Ocular sensation
 - 1.5 Eye lid function
 - 1.6 Facial movement
 - 1.7 Fundoscopy
2. Neuro-imaging
 - 2.1 CT (computed tomography)
 - 2.2 MRI (magnetic resonance imaging)
 - 2.3 MRA (magnetic resonance angiography)
 - 2.4 PET (positron emission tomography)
3. Visual sensory system
 - 3.1 Anatomy

- 3.2 Pathology of visual system
- 3.3 Visual field defects
- 4. Pupil
 - 4.1 Anisocoria
 - 4.2 Afferent pupillary defect
- 5. Cranial nerve palsies
 - 5.1 Oculomotor nerve
 - 5.2 Trochlear nerve
 - 5.3 Abducens nerve
 - 5.4 Multiple ocular motor nerve palsies
- 6. Ocular motor system
 - 6.1 Conjugate horizontal and vertical eye movements
 - 6.2 Vergence system
 - 6.3 Nystagmus
- 7. Facial nerve disorders
- 8. Systemic disorders with neuro-ophthalmic signs
 - 8.1 Multiple sclerosis
 - 8.2 Neurocutaneous syndromes
 - 8.3 Chronic progressive external ophthalmoplegia
 - 8.4 Myasthenia gravis
 - 8.5 Dysthyroid orbitopathy
 - 8.6 Headache
 - 8.7 Facial pain
 - 8.8 Pregnancy

8.9 Cerebrovascular diseases

8.10 Vasculitis

9. Low vision rehabilitation in neuro-ophthalmology

Learning Experiences

First year resident

1. Perform neuro-ophthalmic examinations to detect abnormal neuro-ophthalmic signs
2. Interpret basic investigations of optic nerve functions and neuro-imaging

Second year resident

1. Perform and interpret visual field and electrophysiologic tests
2. Assist and perform botulinum toxin injection in blepharospasm and hemifacial spasm
3. Assist and perform surgery in cranial nerve palsies

Third year resident

1. Perform botulinum toxin injection in various ophthalmic problems
2. Plan and perform surgery in cranial nerve palsies

6. Pediatric Ophthalmology and Strabismus

Learning Objectives

At the end of the course, the residents should be able to

1. Describe congenital anomalies of the eye.
2. Describe anatomical relationship of extraocular muscles, their actions and interactions, binocular vision, diagnostic techniques, and the character of myriad ocular alignment abnormalities.
3. Detect and manage amblyopia.
4. Proper evaluate and manage strabismic conditions.
5. Perform basic muscle surgery.

Learning Contents

Pediatric Ophthalmology

1. Difference between pediatric eye and adult eye
2. Normal visual development
3. Assessment of infants and children with decreased vision
4. Diagnosis of common congenital and developmental anomalies of the eye
5. Diagnosis and treatment of infectious and allergic ocular diseases
6. Diagnosis and management of congenital glaucoma
7. Evaluation and management of congenital cataract and other pediatric lens disorders
8. Differential diagnosis of leukocoria
9. Ocular tumors in childhood
10. Classification and diagnosis of phakomatoses
11. Diagnosis of craniofacial malformations

Strabismus

1. Anatomy and physiology of the extraocular muscles and their fascia

2. Physiology of normal binocular vision and pathology of abnormal binocular vision
3. Classification, diagnosis and treatment of amblyopia
4. Classification of various types of strabismus
5. Assessment of motor and sensory functions in strabismic patients
6. Diagnosis and treatment of strabismus
 - 6.1 Esodeviations
 - 6.2 Exodeviations
 - 6.3 Vertical deviations
 - 6.4 A and V patterns
 - 6.5 Special forms of strabismus
7. Diagnosis of nystagmus which related to strabismus and disorder of ocular motility
8. Surgery of the extraocular muscles
9. Detection and treatment of complications of strabismus surgery

Learning Experiences

First year resident

1. Children eye examination
2. Examination of various types of strabismus
3. Assist and perform muscle surgery for horizontal deviation correction

Second year resident

1. Assist and perform muscle surgery for vertical deviation correction
2. Assist congenital glaucoma surgery, congenital cataract surgery

Third year resident

1. Perform congenital cataract surgery
2. Supervise first and second year residents in strabismus surgery

7. Orbit, Eyelids, and Lacrimal System

Learning Objectives

At the end of the course, the residents should be able to

1. Identify the normal anatomy and functions of orbital and periocular tissues.
2. Recognize general and specific pathophysiological processes that affect structure and function of these tissues.
3. Apply the appropriate examination techniques and select relevant ancillary studies.
4. List the appropriate differential diagnosis for disorder of orbital and periocular tissues.
5. Understand the principles of medical and surgical management of conditions affecting orbit, eyelids, and lacrimal system.
6. Perform basic surgery of orbit, eyelids, and lacrimal system.

Learning Contents

Orbit

1. Orbital anatomy and physiology
2. Classification and management of orbital disorders
 - 2.1 Congenital
 - 2.2 Infection
 - 2.3 Inflammation

- 2.4 Tumor
- 2.5 Trauma
- 3. Orbital surgery
 - 3.1 Enucleation
 - 3.2 Evisceration
 - 3.3 Exenteration
 - 3.4 Socket reconstruction

Eyelids

- 1. Anatomy and physiology of eyelids
- 2. Classification and management of eyelid disorders
 - 2.1 Congenital
 - 2.2 Inflammation
 - 2.3 Trauma
 - 2.4 Positional defect of eyelid
 - 2.5 Tumor
 - 2.5.1 Benign
 - 2.5.2 Malignant

Lacrimal System

- 1. Anatomy and physiology of the lacrimal system
- 2. Evaluation of the tearing patients
- 3. Management of outflow disorders
 - 3.1 Lacrimal abnormalities

3.2 Nasolacrimal duct obstruction

4. Surgical techniques

Learning Experiences

First year resident : perform

1. Electric cauterization of trichiasis
2. Tarsorrhaphy
3. Probing of nasolacrimal duct
4. Evisceration
5. Enucleation

Second year resident : perform

1. Entropion correction
2. Ectropion correction
3. Blepharoplasty
4. Repair lid laceration

Third year resident : perform

1. Dacryocystorhinostomy
2. Repair canaliculi
3. Fornix reconstruction

8. External Diseases and Cornea

Learning Objectives

At the end of the course, the residents should be able to

1. Explain basic concepts of ocular inflammatory process, laboratory investigation and principle of therapy.
2. Describe, diagnose and manage ocular surface problems.
3. Describe, diagnose and manage congenital anomalies, degeneration, and dystrophy of conjunctiva and cornea.
4. Describe, diagnose and manage tumors of conjunctiva and cornea.
5. Describe, diagnose and manage anterior segment trauma.
6. Explain principles of corneal and refractive surgeries.

Learning Contents

1. Infectious and inflammatory diseases of the conjunctiva and cornea
 - 1.1 Basic concept of ocular inflammation
 - 1.2 Laboratory investigation
 - 1.3 Therapeutic principle
2. Specific infectious and noninfectious diseases
3. Disorders of the ocular surface
4. Dry eye
 - 4.1 Exposure and neurotrophic keratitis
 - 4.2 Rosacea
 - 4.3 Stevens-Johnson syndrome

- 4.4 Vitamin A deficiency
- 4.5 Recurrent corneal erosions
- 4.6 Persistent corneal epithelial defect
- 5. Congenital anomalies, degeneration, and dystrophy of conjunctiva and cornea
- 6. Tumors of conjunctiva and cornea
- 7. Anterior segment trauma
 - 7.1 Evaluation of the patient with anterior segment trauma
 - 7.2 Injuries of the ocular surface
 - 7.3 Penetrating trauma of the anterior segment
- 8. Corneal surgery
 - 8.1 Corneal transplant surgery
 - 8.2 Refractive surgery
 - 8.3 Other corneal surgical procedures

Learning Experiences

First year resident: perform

- 1. Investigation
 - 1.1 Corneal scraping
 - 1.2 Keratometry
- 2. Minor surgery
 - 2.1 Pterygium surgery
 - 2.2 Simple conjunctiva surgery
- 3. Complete process of getting the donor eye by cooperating with the Eye Bank

- 3.1 Enucleate the donor eye
- 3.2 Evaluate the whole globe
- 3.3 Preservation of donor corneoscleral rim

Second year resident: perform

1. Complicated conjunctiva surgery
2. Corneal biopsy
3. Corneal gluing
4. Assist at penetrating keratoplasty

Third year resident

1. Perform penetrating keratoplasty

9. Intraocular Inflammation and Uveitis

Learning Objectives

At the end of the course, the residents should be able to

1. Describe the immunologic mechanism.
2. Explain the general and specific pathophysiologic processes of inflammation which influence the intraocular structures both in acute and chronic stages.
3. Use the appropriate laboratory examinations.
4. Diagnose and treat uveitis and intraocular inflammations.
5. Explain the use of immunosuppressive drugs.

Learning Contents

1. Basic immunology

1.1 Principles of general immunology

1.1.1 Types of immunity

1.1.2 Cells of the immune system

1.1.3 Antigens and antibodies

1.1.4 The complement system

1.1.5 Intercellular adhesion molecules

1.1.6 Monoclonal antibodies

1.2 Mechanisms of immune reactivity

1.2.1 Cellular interaction in the immune response

1.2.1.1 Generation of the immune response

1.2.1.2 Regulation of the immune response

1.3 Hypersensitivity reactions

1.3.1 Mechanism of cell and tissue damage

1.3.2 Types of hypersensitivity reactions I-V

1.4 The ocular immune response

1.4.1 Tears, conjunctiva, cornea, anterior chamber, lens, uveal tract, and retina

1.4.2 Modulation of the immune response

1.4.3 Immune therapy in ophthalmic diseases

2. Intraocular inflammation and uveitis

2.1 Clinical approach to uveitis

2.1.1 Symptoms and signs of uveitis

2.1.2 Review of systems and associated factors

2.1.3 Classification of uveitis

2.1.4 Prevalence of uveitis

2.1.5 Investigation and medical evaluation

2.1.6 Principles of management of uveitis and ocular inflammatory diseases

2.1.6.1 Medical management

2.1.6.1.1 Corticosteroids

2.1.6.1.2 Immunomodulating agents

2.1.6.1.3 Immunosuppressive agents

2.1.6.2 Surgical management

2.1.6.2.1 Cataract surgery

2.1.6.2.2 Glaucoma surgery

2.1.6.2.3 Vitrectomy

2.2 Anterior uveitis

2.2.1 HLA B-27 related diseases

2.2.2 Behcet syndrome

2.2.3 Glaucomatocyclitic crisis

2.2.4 Lens-induced uveitis

2.2.5 Pseudophakia

2.2.6 Kawasaki disease

- 2.2.7 Herpetic diseases
- 2.2.8 Viral diseases
- 2.2.9 Juvenile rheumatoid arthritis
- 2.2.10 Fuchs heterochromic iridocyclitis
- 2.2.11 Unknown etiology
- 2.3 Intermediate uveitis
 - 2.3.1 Pars planitis
- 2.4 Posterior uveitis
 - 2.4.1 Toxoplasmosis
 - 2.4.2 Ocular histoplasmosis syndrome
 - 2.4.3 Toxocariasis
 - 2.4.4 Cysticercosis
 - 2.4.5 Candidiasis
 - 2.4.6 Viral diseases (Herpes, CMV, ARN, Rubella, Measles)
 - 2.4.7 Serpiginous choroidopathy
 - 2.4.8 Birdshot retinochoroidopathy
 - 2.4.9 AMPPE (Acute multifocal placoid pigment epitheliopathy)
 - 2.4.10 Acute retinal pigment epitheliitis
 - 2.4.11 Norcadia asteroides
- 2.5 Panuveitis
 - 2.5.1 Sarcoidosis
 - 2.5.2 Tuberculosis
 - 2.5.3 Sympathetic ophthalmia
 - 2.5.4 Vogt-Koyanagi-Harada syndrome

2.5.5 Syphilis

2.5.6 Lyme disease

2.5.7 Leptospirosis

2.6 Endophthalmitis

2.6.1 Symptoms and signs

2.6.2 Infectious endophthalmitis

2.6.3 Postoperative endophthalmitis

2.6.4 Posttraumatic endophthalmitis

2.6.5 Endophthalmitis associated with filtering blebs

2.6.6 Endogenous endophthalmitis

2.6.7 Prophylaxis

2.6.8 Diagnosis, treatment and prognosis

2.7 Masquerade syndrome

2.8 Complications of uveitis

2.8.1 Cataract

2.8.2 Glaucoma

2.8.3 Hypotony

2.8.4 Cystoid macular edema

2.8.5 Vitreous opacification

2.8.6 Retinal detachment

2.9 Ocular involvement in AIDS

2.9.1 Virology and pathogenesis

2.9.2 Natural history, transmission, diagnosis

2.9.3 Management of HIV infection

2.9.3.1 Systemic conditions

2.9.3.2 Ophthalmic conditions

2.9.3.2.1 CMV retinitis

2.9.3.2.2 PORN (Progressive outer retinal necrosis)

2.9.3.2.3 Toxoplasma retinochoroiditis

2.9.3.2.4 Syphilitic chorioretinitis

2.9.3.2.5 Pneumocystis carinii choroiditis

2.9.3.2.6 Cryptococcus choroiditis

2.9.3.2.7 Ocular adnexal Kaposi sarcoma

2.9.3.2.8 Molluscum contagiosum

2.9.3.2.9 Herpes zoster

2.9.4 Future prospects for HIV treatment

Learning Experiences

First year resident

1. Retrobulbar steroid injection
2. Subconjunctival and subtenon steroid injections

Second and third year residents

1. Intracameral tap and injection
2. Intravitreal tap and injection

10. Glaucoma

Learning Objectives

At the end of the course, the residents should be able to

1. Describe the definition and risk factors of glaucoma.
2. Explain the basic principles of aqueous humor dynamics and intraocular pressure and understand their physiology.
3. Diagnose and describe glaucomatous change of the optic nerve head.
4. Perform gonioscopy and recognize change of the angle and iris.
5. Recognize visual function test and investigation in glaucoma with emphasis on visual field interpretation.
6. Recognize different disease patterns and clinical forms of glaucoma.
7. Manage glaucoma properly with medications, laser, and surgery.
8. Perform glaucoma filtering surgery and participate in the postoperative management.

Learning Contents

1. Basic sciences of glaucoma
 - 1.1 Anatomy and pathophysiology of ciliary body, retina, and optic nerve
 - 1.2 Physiology basic of aqueous formation and outflows pathway
 - 1.3 Intraocular pressure and tonometry
 - 1.4 Circadian variations in intraocular pressure
 - 1.5 Gonioscopy
 - 1.6 Visual field in glaucoma and measurement
 - 1.7 Evaluation of optic disc and nerve fiber layer

- 1.8 Functional and psychophysical tests in glaucoma
- 2. Clinical sciences of glaucoma
 - 2.1 Classification of glaucoma
 - 2.2 Epidemiology, pathophysiology, diagnosis and treatment of
 - 2.2.1 Congenital glaucoma
 - 2.2.2 Open angle glaucoma
 - 2.2.3 Normal tension glaucoma
 - 2.2.4 Angle closure glaucoma
 - 2.2.5 Malignant glaucoma
 - 2.2.6 Glaucoma associated with developmental disorders
 - 2.2.7 Glaucoma associated with ocular diseases
 - 2.2.8 Glaucoma associated with systemic diseases and drugs
 - 2.2.9 Glaucoma associated with inflammation and trauma
 - 2.2.10 Glaucoma associated with ocular surgery
- 3. Medical and surgical management of glaucoma
 - 3.1 Medical compliance
 - 3.2 Clinical pharmacology of parasympathetic and adrenergic agents
 - 3.3 Ocular cholinergic agents
 - 3.4 Beta-adrenergic antagonists (Beta blockers)
 - 3.5 Adrenergic agonists
 - 3.6 Prostaglandin analogues
 - 3.7 Carbonic anhydrase inhibitors
 - 3.8 Hyperosmotic agents
 - 3.9 Laser iridectomy and iridoplasty

- 3.10 Laser goniotomy
- 3.11 Laser trabeculoplasty
- 3.12 Glaucoma surgery and wound healing
- 3.13 Filtration surgery
- 3.14 Complications of filtering surgery and management
- 3.15 Implants in glaucoma surgery
- 3.16 Management of coexisting cataract and glaucoma
- 3.17 Surgery for congenital glaucoma
- 3.18 Cyclodestructive procedures

Learning Experiences

First year resident

1. Perform tonometry including Schiøtz, applanation and non-contact type
2. Perform visual field test and interpret its simple abnormalities
3. Familiarize and perform gonioscopy

Second year resident

1. Perform visual field test and interpret complex abnormalities
2. Perform gonioscopy
3. Perform optic nerve evaluation under slit lamp biomicroscope
4. Perform laser iridectomy, laser trabeculoplasty, and laser goniotomy
5. Assist glaucoma filtering surgery

Third year resident

1. Perform and supervise in tonometry, gonioscopy, and ophthalmoscopy
2. Perform filtering surgery and manage postoperative course

3. Assist combined cataract and filtering surgery
4. Observe glaucoma drainage implant surgery

11. Lens and Cataract

Learning Objectives

At the end of the course, the residents should be able to

1. Describe the normal anatomy, embryologic development, physiology, and biochemistry of the crystalline lens.
2. Identify congenital anomalies of the lens.
3. Distinguish types of congenital and acquired cataracts.
4. Recognize the association of cataract with aging, trauma, medications, ocular and systemic diseases.
5. Appropriately evaluate and manage patient with cataract.
6. Describe principle of cataract surgery techniques.
7. Develop appropriate differential diagnosis and management plan for intraoperative and postoperative complications of cataract surgery.
8. Recognize the historical development of intraocular lenses.

Learning Contents

1. Anatomy
2. Biochemistry
3. Physiology

4. Embryology
 - 4.1 Normal development
 - 4.2 Congenital defects
 - 4.3 Morphological classification of congenital and infantile cataract
 - 4.4 Developmental defects
5. Pathology
 - 5.1 Aging change
 - 5.2 Drug-induced lens change
 - 5.3 Trauma
 - 5.4 Metabolic cataract
 - 5.5 Nutritional diseases
 - 5.6 Cataract associated with other diseases
 - 5.7 Lens-induced uveitis and glaucoma
 - 5.8 Exfoliation syndrome
6. Evaluation of patient with cataract
7. Management of cataract
 - 7.1 Medical management
 - 7.2 Low vision aids for cataract
 - 7.3 Indication for surgery
8. Management of cataract in special situations
9. Surgery of cataract
 - 9.1 Choices of anesthesia
 - 9.2 Intracapsular cataract extraction (ICCE)
 - 9.3 Extracapsular cataract extraction (ECCE)

- 9.4 Phacoemulsification
- 9.5 Intraocular lens (IOL) implantation in adults and children
- 9.6 Complications of cataract surgery
- 9.7 Complications of IOL implantation
- 9.8 Cataract surgery in special situations

Learning Experiences

First year resident

1. Perform retrobulbar, peribulbar block
2. Perform facial block
3. Assist cataract surgery

Second year resident

1. Perform ECCE with/without IOL implantation
2. Perform ICCE
3. Perform lens aspiration with/without IOL implantation
4. Perform YAG laser capsulotomy
5. Perform IOL power measurement

Third year resident

1. Perform phacoemulsification with IOL implantation
2. Assist scleral fixation of IOL

Note: Minimum requirement for cataract surgery (ECCE and phacoemulsification) is 20 cases in 3 years.

12. Retina and Vitreous

Learning Objectives

At the end of the course, the residents should be able to

1. Describe the basic structure and function of the retina and its relationship to the vitreous and choroid.
2. Recognize specific pathologic processes that affect the retina and vitreous.
3. Use the methods of examination and ancillary studies in establishing the diagnosis of vitreoretinal disorders.
4. Utilize data from recent prospective clinical trials in the management of selected vitreoretinal disorders.
5. Describe principles of medical and surgical treatment of vitreoretinal disorders.

Learning Contents

1. General introduction
 - 1.1 Basic anatomy of the retina and vitreous
 - 1.2 Biochemistry of the retina and vitreous
 - 1.3 Physiology of the retina and vitreous
2. Approach to retinal diseases
3. Retinal physiology and psychophysics
 - 3.1 Electrophysiologic testing
 - 3.1.1 Electroretinogram
 - 3.1.2 Electro-oculogram
 - 3.1.3 Visual evoked potentials

3.2 Psychophysical testing

3.2.1 Dark adaptation

3.2.2 Color vision

3.2.3 Contrast sensitivity

3.3 Clinical applications of visual electrophysiologic and psychophysical testing

4. Macular disease

4.1 Hereditary macular disorder

4.1.1 Best disease (Vitelliform degeneration)

4.1.2 Stargardt disease (Fundus flavimaculatus)

4.1.3 Albinism

4.1.4 X-linked juvenile retinoschisis

4.2 Acquired diseases affecting the macula

4.2.1 Central serous choroidopathy

4.2.2 Age-related macular degeneration

5. Retinal vascular disease

5.1 Hypertensive retinopathy

5.2 Diabetic retinopathy

5.3 Retinopathy of prematurity

5.3.1 Pathogenesis and staging

5.3.2 Treatment

5.4 Venous occlusive diseases (BRVO, CRVO)

5.5 Arterial occlusive diseases (BRAO, CRAO)

5.6 Vasculitis

- 5.7 Cystoid macular edema
- 5.8 Retinal telangiectasia (Coats disease)
- 5.9 Phakomatoses
- 6. Choroidal disease
 - 6.1 Choroidal hemangioma
 - 6.2 Choroidal ischemia
- 7. Metabolic disease affecting the retina
- 8. Peripheral retinal abnormalities
 - 8.1 Retinal breaks
 - 8.1.1 Posterior vitreous detachment
 - 8.1.2 Traumatic breaks
 - 8.1.3 Lesions predisposing to retinal detachment
 - 8.1.4 Lesions not predisposing to retinal detachment
 - 8.1.5 Prophylactic treatment of breaks
 - 8.2 Rhegmatogenous retinal detachment
 - 8.2.1 Anatomic reattachment
 - 8.2.2 Postoperative visual acuity
 - 8.3 Differential diagnosis of retinal detachment
 - 8.3.1 Retinoschisis
 - 8.3.2 Exudative retinal detachment
 - 8.3.3 Traction retinal detachment
- 9. Vitreous
 - 9.1 Diseases of the vitreous
 - 9.1.1 Developmental abnormalities

- 9.1.2 Empty vitreous
- 9.1.3 Asteroid hyalosis
- 9.1.4 Cholesterolosis (hemophthalmos, synchysis scintillans)
- 9.1.5 Spontaneous vitreous hemorrhage
- 9.1.6 Inflammation
- 9.1.7 Parasitic infestation
- 9.1.8 Pigment granules
- 9.1.9 Complications during cataract surgery
 - 9.1.9.1 Vitreous incarceration
 - 9.1.9.2 Vitreous loss

9.2 Vitreous surgery

- 9.2.1 Indications for and methods of vitreous surgery
- 9.2.2 Complications of vitreous surgery

10. Posterior segment trauma

10.1 Evaluation of the patient following ocular trauma

10.2 Blunt trauma (injuries in which the object does not penetrate the eye)

- 10.2.1 Vitreous hemorrhage
- 10.2.2 Commotio retinae
- 10.2.3 Choroidal rupture
- 10.2.4 Posttraumatic macular hole
- 10.2.5 Scleral rupture

10.3 Penetrating injuries

10.4 Perforating injuries

10.5 Intraocular foreign bodies

10.5.1 Surgical techniques for removal of intraocular foreign bodies

10.5.2 Retained intraocular foreign bodies

10.6 Endophthalmitis

10.7 Sympathetic ophthalmia

11. Photocoagulation

11.1 Basic principle and indications

11.2 Complications of photocoagulation

12. Adverse effects of electromagnetic energy on the retina

12.1 Radiation retinopathy

12.2 Solar retinopathy

12.3 Photocoagulation

12.4 Phototoxicity from ophthalmic instrumentation

12.5 Ambient light

Learning Experiences

First year resident

1. Indirect ophthalmoscope
2. Fundus mapping and drawing
3. Fundus examination with slit lamp and special lens

Second year resident

1. Assist vitreoretinal surgery
2. Observe and perform laser photocoagulation

Third year resident

1. Perform and interpret fundus fluorescein angiography

2. Perform simple scleral buckling procedure
3. Perform retinal cryopexy under direct visualization
4. Perform pneumatic retinopexy

13. Public Health Ophthalmology

Learning Objectives

At the end of the course, the residents should be able to

1. Describe the fundamental concepts of public health ophthalmology (PHO) and its application.
2. Relate the concepts of PHO to clinical ophthalmology and to their professional roles in the future.
3. Outline and manage the eye health plan.
4. Transfer the appropriate knowledge to the relevant personnel.
5. Participate in the national prevention of blindness programs.

Learning Contents

1. Introduction to the public health ophthalmology
2. Prevention of blindness at regional, national, and global levels
3. Public health ophthalmology course and community eye health course
4. The national prevention of blindness programs in Thailand
5. Primary eye care (PEC) and primary health care (PHC) in prevention of blindness and their integration

6. Eye health planning and management
7. Roles of different eye care levels in prevention of blindness
8. Dynamics of eye care
9. Ophthalmologists and the community
10. Ophthalmic epidemiology and biostatistics
11. Introduction to ophthalmic health system research
12. Visual rehabilitation and visual aids
13. Ophthalmic care for HIV patients

Learning Experiences

Third year resident

1. Visit different levels of eye care services to gain experience in the field surveys

14. Research in Ophthalmology

Learning Objectives

At the end of the course, the residents should be able to

1. Develop critical approach, creativity and research-oriented attitude in professional activities.
2. Acquire and evaluate new relevant scientific data and information into knowledge required for practice in ophthalmology.
3. Identify and solve patients' problem using scientific thinking.

4. Formulate hypothesis, evaluate data, and apply new knowledge to the analysis and solution of problems.
5. Present at least one original article at the scientific meeting or submit paper for publication in scientific journal.

Learning Contents

1. Research questions
2. Research objectives
3. Review of related literatures
4. Research design
5. Research methodology
6. Writing research proposal
7. Data collection
8. Data analysis
9. Ethical considerations
10. Administration and time schedule
11. References
12. Reporting of the research

Learning Experiences

First and second year resident

1. Plan and design research project
2. Write research proposal
3. Collect data

Third year resident

1. Analyze data
2. Report results of the research
3. Present and/or publish the research paper

15. Computer in Ophthalmology

Learning Objectives

At the end of the course, the residents should be able to

1. Use computer for all aspects of ophthalmology works such as word processor, presentations, data collection and analysis in research, Medline search, intranet, and internet.

Learning Contents

1. Windows
2. Microsoft office
 - 2.1 Word
 - 2.2 Excel
 - 2.3 Power point
3. Statistic program
4. Bibliographic program
5. Internet and e-mail

6. Medline search

Learning Experiences

First, second, and third year residents