Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE
Deemed to be University

Maduravoyal, Chennai – 600 095, Tamilnadu, India
(An ISO 2001:2018 Certified Institution)

University with Graded Autonomy Status

SYLLABUS & CURRICULUM
for
M.D. PATHOLOGY

2020 onwards

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M.D. PATHOLOGY

Activities

- PG orientation program.
- Research (Dissertation) work.
- Research methodology and biostatistics class.
- Introduction to laboratory medicine.
- Anatomy postings for normal histology and seminars (7days).
- Teacher training program (attended and conducted).
- Journal review and group discussion.
- Departmental/ Integrated lectures and case discussion.
- Peripheral postings (Forensic Medicine (Autopsy), Biochemistry, Microbiology, Blood Bank, Oncopathology, Neuropathology).
- Death audit/scientific /clinical meetings.
- Scientific contributions (CME/workshop/Conference).
- Publications (paper/poster/journal).
- Record of routine reporting to the postings.
- Record of departmental activities done by PG student.
- Periodic evaluation of PG student.
- Record of attendance at PG activities.
- Final evaluation of academic performance of PG student (thesis/ theory/ practicals/ viva voce).

COMPETENCY BASED POSTGRADUATE STUDY IN MD PATHOLOGY

SPECIFIC LEARNING OBJECTIVES

A. Cognitive domain

1) Student should be able to diagnose routine and complex clinical problems on the basis of histopathology (surgical pathology), cytopathology specimens, Haematology and various tests of Laboratory

Medicine (clinical pathology, clinical biochemistry) as well as Blood Banking (Transfusion Medicine).

2) Able to describe pathology findings on the basis of histopathology, cytopathology, clinical pathology as well as blood banking.

3) Should be able to teach pathology and share the knowledge with under graduates and other professionals.

4) Should be able to interpret and correlate clinical and laboratory data so that clinical manifestations of diseases can be explained.

5) Advise on the appropriate specimens and tests necessary to arrive at a diagnosis in a problematic case.

6) Capable of doing basic research methodology, fundamental and applied research. Should plan, execute, analyse and present research work.

7) Correlate clinical and laboratory findings with pathology findings at autopsy, identify miscorrelations and the causes of death due to diseases (apart from purely metabolic causes).

8) Make and record observations systematically and maintain accurate records of tests and their results for reasonable periods of time. Identify problems in the laboratory, offer solutions there of and maintain a high order of quality control.

9) Should be able to maintain records of various tests and capable to follow safe disposal of laboratory waste.

10) Able to supervise and work with subordinates and colleagues in a laboratory.

B. Affective domain

1) Always maintain ethical principles and proper etiquette in handling the patients and other health personnel
2) Should respect the rights of the patient including the right to information and second opinion.

3) Should be able to function as a part of a team, develop an attitude of cooperation with colleagues.
4) Should be able to interact with the patient and other colleagues to provide the best possible diagnosis or opinion.
5) Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching.

C. Psychomotor domain

1) Able to perform routine tests in a Pathology Laboratory including grossing of specimens, processing, cutting of paraffin and frozen sections, making smears, and staining.
2) Able to collect specimens by routinely performing non-invasive out-patient procedures such as venipuncture, finger-prick, fine needle aspiration of superficial lumps and bone-marrow aspirates.
3) Able to provide appropriate help to colleagues performing an invasive procedure such as a biopsy or an imaging guided biopsy.
4) Perform an autopsy, dissect various organ complexes and display the gross findings.
5) Should be familiar with the function, handling and routine care of equipments in the laboratory.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive domain

A post graduate student upon successfully qualifying in the MD(Pathology) examination should have acquired the following broad theoretical competencies and should be:

1. Capable of offering a high quality diagnostic opinion in a given clinical situation with an appropriate and relevant sample of tissue, blood, body fluid, etc. for the purpose of diagnosis and overall well being of the ill.

2. Able to teach and share his knowledge and competence with others.

3. The student should be imparted training in teaching methods in the subject which may enable the student to take up teaching assignments in Medical Colleges/Institutes.

4. Capable of pursuing clinical and laboratory based research. He/she should be introduced to basic research methodology so that he/she can conduct fundamental and applied research.

B. Affective domain

1. The student will show integrity, accountability, respect, compassion and dedicated patient care.
2. The student will demonstrate a commitment to excellence and continuous professional development.
3. The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
4. The student should show sensitivity and responsiveness to patients' culture, age, gender and is abilities.

C. Psychomotor domain

At the end of the course, the student should have acquired skills, as described below:

Surgical pathology

- A student should be able to demonstrate gross examination and diagnose at least 80% of the lesions received on an average day at teaching hospital.
- Perform an autopsy, dissect various organ complexes and display the gross findings.

- ❖ Student should be able to demonstrate appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies, nerve biopsies and their orientation of tissues in paraffin blocks.
- ❖ Able to collect specimens by routinely performing invasive procedure such as a biopsy or an image guided biopsy.
- ❖ Should have applied knowledge on tissue processing machine, microtome, cryostat and various laboratory instruments.
- ❖ Stain paraffin sections with at least the following:
  i. Haematoxylin and eosin
  ii. Stains for collagen, elastic fibers and reticulin
  iii. Iron stain
  iv. PAS stain
  v. Acid fast stains
  vi. Any other stains needed for diagnosis.
- ❖ Demonstrate understanding of the principles of:
  i. Fixation of tissues
  ii. Processing of tissues
  iii. Section cutting and maintenance of related equipment
  iv. Differential (special) stains and their utility.
- ❖ Cut a frozen section using cryostat, stain and interpret the slide in correlation with the clinical data provided.
- ❖ Demonstrate the understanding of the utility of various immuno-histochemical stains especially in the diagnosis of tumor subtypes.

Cytopathology

Able to collect specimens by routinely performing invasive procedures such as fine needle aspiration.

- ❖ Independently prepare and stain good quality smears for cytopathological examination and decide on types of staining in a given case.

- ❖ Be conversant with the techniques for concentration of specimens: i.e. various filters, centrifuge and cytocentrifuge.
- ❖ Given the relevant clinical date he/she should be able to independently and correctly:
  i. Diagnose at least 75% of the cases received in a routine laboratory and categorize them into negative, inconclusive and positive.
  ii. Demonstrate ability in the technique of screening and dotting the slides for suspicious cells.
  iii. Indicate correctly the type of tumour, if present
  iv. Identify with reasonable accuracy the presence of organisms, fungi and parasites.

Haematology

- ❖ Correctly and independently perform the following special tests, in addition to doing the routine blood counts:
  i. Haemogram including reticulocyte and platelet counts.
  ii. Bone marrow staining including stain for iron
  iii. Blood smear staining
  iv. Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte, Alkaline Phosphatase (LAP), PAS, Sudan Black, etc.
  v. Hemolytic anemia profile including HPLC, Hb electrophoresis vi) Coagulation profile including PT, APTT, FDP.vii) BM aspiration and BM biopsy.
- ❖ Demonstrate the principle and interpretation of results and the utility in diagnosis of the following:
  i) Platelet function tests including platelet aggregation and adhesion PF3 release.

ii) Thrombophilia profile: Lupus anticoagulant (LAC), Anticardiolipin Antibody (ACA), Activated protein C Resistance (APCR), Protein C (Pr C), Protein S (Pr S) and Antithrombin III (AT III)

iii) Immunophenotyping of leukaemia

iv) Cytogenetics.

v) Molecular diagnostics.

❖ Describe accurately the morphologic findings in the peripheral smears and bone marrow smears and arriving at a correct diagnosis in at least 90% of the cases referred to the Haematology clinic, given the relevant clinical data.

Laboratory Medicine

- Demonstrate and perform:
  i) Routine urinalysis including physical, chemical and microscopic, examination of faeces and identify the ova and cysts of common parasites.
  ii) Macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.
  iii) A complete examination: physical, chemical and cell content of Cerebrospinal fluid (C.S.F), pleural and peritoneal fluid.
  iv) Semen analysis.
  v) Examination of peripheral blood for commonly occurring parasites.

- Independently and correctly perform at least the following quantitative estimations by manual techniques and/or automated techniques.
  i) Blood urea
  ii) Blood sugar
  iii) Serum proteins (total and fractional)
  iv) Serum bilirubin (total and fractional)

- Demonstrate familiarity with the following quantitative estimations of blood/serum by Automated Techniques:
  Serum cholesterol, Uric acid Serum Transaminases (ALT and AST/SGOT and SGPT), etc.
- Explain the principles of Instrumentation, use and application of the instruments commonly used in the labs eg. Photoelectric colorimeter, Spectrophotometer, pH meter, Centrifuge, Electrophoresis apparatus, ELISA Reader, flow cytometer, PCR.

Transfusion Medicine

The student should be able to do independently and perform the following:

- ❖ Selection and bleeding of donors
- ❖ Preparation of blood components i.e Cryoprecipitates, Platelet
- ❖ Concentrate, Fresh Frozen Plasma, Single Donor Plasma, Red Blood Cell concentrates.
- ❖ ABO and Rh grouping.
- ❖ Demonstrate familiarity with Antenatal and Neonatal work up.
  - Direct antiglobulin test
    i. Antibody screening and titre.
    ii. Selection of blood for exchange transfusion
- ❖ Demonstrate familiarity with principle and procedures involved in:

i. Resolving ABO grouping problems.

ii. Identification of RBC antibody.

iii. Investigation of transfusion reaction.

iv. Testing of blood for presence of:

a. HBV (Hepatitis B Virus Markers).

b. HCV (Hepatitis C Virus Markers).

c. HIV (Human Immunodeficiency Virus Testing)

d. VDRL

e. Malaria

Immunohistochemistry

Skills (desirable)

- Be able to perform immune- histochemical staining using paraffin section with at least one of the commonly used antibodies (Cytokeratin or LCA) using PAP method.

SYLLABUS

Course contents

I. General Pathology

Overview of basic pathological mechanism underlying diseases including inflammation, tissue repair, hemodynamic disorders, immunological disorders, neoplasia, genetics and radiation

II. Systemic Pathology

It deals with study of normal structure and function of various organ systems and their diseases. Their gross and microscopic alterations are correlated with clinical features.

III. Haematology

It deals with normal features and diseases of the blood and bone marrow.

1) Laboratory Medicine (Clinical Biochemistry/ Clinical Pathology including Parasitology).
2) Transfusion Medicine (Blood Banking).

3) The student is expected to acquire a general acquaintance of techniques and principles and to interpret data in the following fields.

a. Immunopathology
b. Electron microscopy
c. Histochemistry
d. Immunohistochemistry
e. Cytogenetics
f. Molecular Biology
g. Maintenance of records
h. Information retrieval, use of computer and Internet in medicine.
i. Quality control, waste disposal

IV. Autopsy Pathology

- ❖ To study the technique of autopsy and ability to perform a complete autopsy independently with some physical assistance.
- ❖ Identify all major lesions which have caused, or contributed to the patient's death on macroscopic examination alone and on microscopy in at least 90% of the autopsies in an average teaching hospital.
- ❖ In places where non-medico-legal autopsies are not available each student should be made to observe at least five medico-legal autopsies.

E.Cytopathology

Imply background features for evaluating and reporting of cytopathology specimens with indicating,

1. Choice of site from which smears may be taken
2. Type of samples.
3. Method of obtaining various specimens (urine sample, gastric smear, colonic lavage etc.).
4. The principles and preparation of solutions of stains.

F. Laboratory Medicine

- To study the principles and methodology of quality control in the Laboratory.
- Possess knowledge of the normal range of values of the chemical content of body fluids, significance of the altered values and its interpretation.
- Possess knowledge of the principles of following specialized organ function tests and the relative utility and limitations of each and significance of the altered values.

    i) Renal function tests
    ii) Liver function tests
    iii) Pancreatic function tests
    iv) Endocrine function tests
    v) Tests for mal absorption

- To study advantages and disadvantages, scope and limitation of automation in the laboratory.

G. Transfusion Medicine (Blood Banking)

The student should possess knowledge on-

- Basic immunology
- ABO and Rh groups
- Clinical significance of other blood groups
- Transfusion therapy including the use of whole and RBC concentrates
- Blood component therapy
- Rationale of pre- transfusion testing.
- Infections transmitted in blood.
- Adverse reactions to transfusion of blood and components.
- Quality control in blood bank

H. Basic Sciences (in relation to Pathology)

1) Immunopathology

- Demonstrate the current concepts of structure and function of the immune system, its aberrations and mechanisms.
- Demonstrate the scope, principles, limitations and interpretations of the results of the following procedures employed in clinical and experimental studies relating to immunology.
    a) ELISA techniques
    b) Radioimmunoassay
    c) HLA typing
- Interpret simple immunological tests used in diagnosis of diseases and in research procedures.
    I. Immuno electrophoresis
    II. Immuno fluorescence techniques especially on kidney and skin biopsies
    III. Anti-nuclear antibody (ANA)
    IV. Anti-neutrophil cytoplasmic antibody (ANCA)

2) Electron Microscopy

- Demonstrate the principles and techniques of electron microscopy and the working of an electron microscope (including Transmission and Scanning Electron microscope: TEM and SEM)
- Recognize the appearance of the normal sub cellular organelles and their common abnormalities (when provided with appropriate photographs).

3) Enzyme Histochemistry

- To the principles, use and interpretation of common enzyme histochemical procedures (Alkaline Phosphates, Acid Phosphates, Glucose-6-Phosphate Dehydrogenase, Chloroacetate Esterase)

4) Immunohistochemistry

- ❖ Demonstrate familiarity with the principles and exact procedures of various immunohistochemical stains using both PAP (Peroxidase-anti-peroxidase) and AP-AAP (Alk. Phosphatase) ABC (Avidin-Biotin Conjugate) systems; employing monoclonal and polyclonal antibodies.

- ❖ Be aware of the limitations of immune-histochemistry.

5) Molecular Biology

- ❖ Should understand the principles of molecular biology especially related to the understanding of disease processes and its use in various diagnostic tests.
- ❖ Should be conversant with the principle and steps and interpretation of Polymerase chain Reaction (PCR), Western Blot, Southern Blot, Northern Blot and Hybridisation) procedures.

6) Cytogenetics

- ❖ Demonstrate the methods of Karyotyping and Fluroescent in-situ Hybridisation (FISH)

7) Tissue culture

- ❖ Demonstrate the methods of tissue culture.

8) Principles of Medical Statistics

- ❖ Demonstrate the importance of statistical methods in assessing data from patient material and experimental studies.

INSTRUCTIONS

1. All MD students should keep the portfolio updated.
2. The entries made in the portfolio need to be endorsed by concerned Faculty at the end of each item.
3. The book has to be submitted at the end of the tenure of MD.
4. The students should fill all the required columns.
5. Write all the practical work/exercises/ tests done during each posting and get it signed from respective Faculty members.
6. Write all the discussions/ tutorials done with respective Faculty in-Charge during each posting and get it signed from respective Faculty member.
7. Write all the Seminars/ Journal clubs/ Symposia presented and get it signed by the Faculty in-charge of that area.
8. The students will be rotated in following sections during 3 years:

	Section / Subject	**Duration in Months**
1.	Surgical Pathology and Autopsy and pathology techniques	12
2.	Haematology and laboratory medicine	10
3.	Cytopathology	08
4.	Transfusion Medicine /Blood bank	02
5.	Museum techniques and record management	01
6.	Basic Sciences including Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and Cytogenetics, etc – Advanced techniques	02
	Total	**35 months**

9. There will be Formative Assessment in theory /Viva Voce/ Practical at the end of each posting.
10. The Portfolio has to be presented as and when required by Faculty.

Proposed schedule of rotation: **Total 35 months**

	Section / Subject	**Duration in Months**
1.	Surgical Pathology and Autopsy	9
2.	Surgical Pathology Techniques	1
3.	Hematology	10
4.	Cytopathology	8
5.	Laboratory Medicine	1
6.	Transfusion Medicine /Blood Bank	2
7.	Basic Sciences including Immunopathology, Electron microscopy, Molecular Biology, Research Techniques and Cyto genetics, etc - Advanced techniques	2
8.	Elective / Reorientation	2
	Total	**35 months**

FORMATIVE ASSESSMENT DURING TRAINING PERIOD

1) Quarterly assessment
2) Laboratory based learning
3) Self-directed learning
4) Departmental and interdepartmental learning
5) Scientific contribution work

Summary of formative assessments

No.	Date	Laboratory posting	Type of assessment	Average Grade

SUMMATIVE ASSESSMENT AT THE END OF TRAINING PERIOD

1) Thesis- under recognized post graduate teacher guidance, the result and written work up of thesis should be submitted at least six months before the theory/practical examinations.

The thesis will be examined by one internal and two external examiners, who shall not be the examiners for theory and practical examinations.

A post graduate student shall be allowed to appear for the examination only after the acceptance of the thesis by the examiners.

2) Theory

The examinations shall be organised on the basis of 'Grading'or 'marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D. / MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period

There shall be four theory papers:

Paper I: General Pathology, Pathophysiology, Immunopathology and Cytopathology

Paper II: Systemic pathology

Paper III: Haematology, Transfusion Medicine (Blood Banking) and Laboratory Medicine

Paper IV: Recent advances and applied aspects.

SCHEME OF EXAMINATION

A. THEORY EXAMINATION

There shall be four question papers, each of three hours duration. Each paper shall consist of 10 short essay questions carrying 10 marks each .Total marks for each paper will be 100.

Paper I = 100 Marks
Paper II = 100 Marks
Paper III = 100 Marks
Paper IV = 100 Marks

Total 400 Marks

3) Practicals / Clinical and Oral / viva voce Examination

The practical/clinical examination should consist of the following and should be spread over two days.

I Clinical Pathology

- Discussion of a clinical case history
- Plan relevant investigations of the above case and interpret the biochemistry findings.
- Two investigations should be performed including at least one biochemistry exercise/clinical pathology exercise like CSF, pleural tap etc. analysis and complete urinalysis.

II Haematology

- Discuss haematology cases given the relevant history. Plan relevant investigations
- Perform complete hemogram and at least two tests preferably including one coagulation exercise
- Identify electrophoresis strips, osmotic fragility charts etc. Interpretation of data from autoanalysers, HPLC and flow cytometry.

Examine report and discuss around ten cases given the history and relevant blood smears and/or bone marrow aspirate smears and bone marrow biopsy interpretation.

III Transfusion medicine

- Perform blood grouping
- Perform the necessary exercise like cross matching.
- Coomb's test, gel cards interpretation.

IV Histopathology

- Examine, report and discuss 12-15 cases histopathology and 5-8 cytopathology cases, given the relevant history and slides.
- Perform a Haematoxylin and Eosin stain and any special stain on a paraffin section. Should be conversant with histopathology techniques including cryostat.

V Autopsy

- Given a case history and relevant organs (with or without slides), give a list of anatomical diagnosis in a autopsy case.

VI Gross Pathology

Describe findings of gross specimens, give diagnosis and identify the sections to be processed. The post graduate student should perform grossing in front of the examiners for evaluation.

VII Basic Sciences

- 10-15 spots based on basic sciences be included
- Identify electron micrographs
- Identify gels, results of PCR, immunological tests including interpretation of Immuno fluroscence pictures.
- Identify histochemical and immuno-histochemistry stains
- Teaching exercise 10min

All practical exercises are to be evaluated jointly by all the examiners.
An oral question-answer session should be conducted at the end of each exercise.

a) Viva on dissertation and research methodology

b) General Viva-Voce.

PRACTICAL EXAMINATION

Duration: 2 days

Total marks: 300 [Practical- 200+ Pedagogy- 20 + Viva-voce-80]

DAY 1

Sl No.	Exercise		Max. marks allocated
1	A	Autopsy- reconstructed autopsy and discussion	15
	B	Gross and morbid anatomy [10 specimens x 2 marks each] - Diagnosis and discussion	20
	C	Grossing of specimen	05
2	Hematology and Cytology slides [8+7]x2 marks each - Diagnosis and discussion		30
3	Clinical Pathology, Hematology and Blood Banking		40
	A	Case history: discussion of history and enumeration of investigations [10 marks]	
	B	Interpretation and discussion of results [15 marks]	
	C	Blood banking and hematology techniques- discussion [15 marks]	
	Allotment of topic for pedagogy		

DAY 2

Sl. No.	Exercise		Max. marks allocated
1	Histopathology slides –15 slides x 3 marks each - Diagnosis and discussion		45
2	Histopathology techniques		25
	A	HE stain [5 marks]	
	B	Discussion on HP techniques [5 marks]	
	C	Special stain for discussion and interpretation [5 marks]	
	D	Cytology stain- stain a PAP smear, discussion of technique and interpretation of results [5 marks]	
	E	Stained imprint/ intraoperative/ FS slide for interpretation [5 marks]	
3	Basic Sciences: 10 charts x 2marks each - IHC, IF, EM, PCR, FISH, cytogenetics, electrophoresis, histograms from auto analysers, HPLC, flow cytometry		20
4	Pedagogy		20
5	Viva voce, including discussion on research methodologies and dissertation		80

Maximum marks for M.D. Pathology	Theory	Practical & Viva	Grand Total
	400	300 (Practical – 200 & Viva – 100)	700

MARKS QUALIFYING FOR A PASS

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examination. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the degree examination.

READING MATERIAL

The following is a list of reading material that may be helpful to a postgraduate student of Pathology. The habit of referring to current literature and the method of searching for literature must be made a mandatory component of the training.

JOURNALS AND PERIODICALS

- Acta Cytologica
- The American Journal of Pathology
- The American Journal of Surgical Pathology
- The American Journal of Hematology
- The American Journal of Clinical Pathology
- Archives of Pathology and Laboratory Medicine
- British Journal of Haematology
- Blood
- Diagnostic Cytopathology
- Histopathology
- Human Pathology
- Indian Journal of Cytology
- Indian Journal of Pathology and Microbiology
- Journal of Pathology

- Journal of Clinical Pathology
- Laboratory Investigation
- Modern Pathology
- Pathology
- Seminars in Hematology
- Seminars in Diagnostic Pathology
- Virchows Archives
- Year Book Series
- Recent Advances Series

The list of journals is incomplete. It is also expected that the students make it a habit to read other journals because pathology is not confined to pathology journals alone. Specialty journals such as those related to oncology (Cancer, British Journal of Cancer, International Journal of Cancer, Cancer Research, Journal of National Cancer Institute, Journal of Surgical Oncology etc.) are excellent sources of information regarding the pathology of tumours. Similarly journals related to Cardiology, Chest Diseases, Dermatology, Endocrinology, Gynecology, Gastroenterology, Hepatology, Nephrology, Neurology, Neurosurgery, etc. are invaluable sources of material on the appropriate pathology. Further Journals such as Lancet, New England Journal of Medicine, Nature and Science are a must for every postgraduate student who wishes to keep abreast with what is new in medical science and therefore in pathology.

BOOKS

- Histology for Pathologists. Stephen S. Sternberg (Ed), Raven Press, New York.
- General Pathology JB Walter, MS Israel. Churchill Livingstone, Edinburgh.
- Robbin‘s Pathologic Basis of Disease Ramzi S. Cotran, Vinay Kumar, Stanley L Robbins WB Saunders Co., Philadelphia.
- Pathology Emanuel Rubin, John L Farber. JB Lippincott Co., Philadelphia.
- Anderson‘s Pathology. John M Kissane (Ed). The CV Mosby Co., St. Louis
- Ackerman‘s Surgical Pathology. Juan Rosai Mosby. St. Louis
- Diagnostic Surgical Pathology. Stephen S Sternberg. Lippincott, William Wilkins. Philadelphia
- Systemic Pathology. W St. C Symmers (Series Ed) Churchill Livingstone, Edinburgh
- Diagnostic Histopathology of Tumours. Christopher DM Fletcher (Ed). Churchill Livingstone. Edinburgh.
- Soft Tissue Tumors. Franz M Enzinger, Sharon W Weiss. Mosby, St. Louis
- Cardiovascular Pathology Malcolm D Silver Churchill Livingstone New York.
- Pathology of Pulmonary Diseases Mario J Saldhana. JB Lippincott Co., Philadelphia
- Spencer‘s Pathology of the Lung. PS Hasleton. Mc Graw-Hill, New York.
- Dahlin‘s Bone Tumors. K Krishnan Unni. Lippincott-Raven Publishers, Philadelphia, New York
- Bone Tumours Andrew G Huves WB Saunders Co. Philadelphia
- Greenfield‘s Neuropathology. J Hume Adams (Ed) Edward Arnold, London.
- Russel & Rubeinstein‘s Pathology of the Tumours of the Nervous System.

Darrell D Bigna Roger E Mc Lendon, Janet M Bruner (Eds.), Arnold, London.

- Rosen‘s Breast Pathology. Paul Peter Rosen. Lippincott-Raven Publishers, Philadelphia. New York.
- Pathology of the Gastrointestinal Tract. S-I Chun Ming. Harvey Goldman (Eds.) Williams & Wilkins, Baltimore.
- Haynes and Taylor Obstetrical & Gynaecological Pathology. H Fox, M Wells. Churchill Livingstone New York.
- Heptinstall‘s Pathology of the Kidney. J Charles Jenetie, Jean L. Olson, Melvin M Schwart Fred G Silva (Eds). Lippincott-Raven Publishers, Philadelphia, New York.
- Potter‘s Pathology of the Fetus & Infant. Enid Gilbert-Barnes (Ed). Mosby, St. Louis • Lever‘s Histopathology of the Skin, David Elder (Ed), Lippincott-Raven Publishers, Philadelphia, New York.
- Theory and Practice of Histological Techniques, Bancroft JD, Stevens A, Turner DR, Churchill Livingstone, Edinburgh
- Histotechnology – A Self Instructional Text, Carson FL, American Society of Clinical Pathologists, Chicago.
- Histochemistry Theoretical and Applied. AG Everson Pearse. Churchill Livingstone. Edinburgh.
- Manual & Atlas of Fine Needle Aspiration Cytology. Svante R Orell, Gregory F Sterrett, Max N. J. Walters, Darrel Whitaker: Churchill Livingstone, London.
- Cytopathology. Zuher M Zaib. Little Brown and Company, Boston.
- Diagnostic Cytology and its Histopathologic Basis, Koss LG, J.B. Lippincott, Philadelphia
- Comprehensive Cytopathology, Bibbo M, W.B. Saunders Co, Philadelphia.
- William‘s Hematology Beutler E, Lichtmann MA, Coller BS, Kipps TJ, McGraw Hill, New York.

- Postgraduate Hematology Hoffbrand AV, Lewis SM, Tuddenham EGD, Butterworth Heinemann, Oxford.
- Wintrobe‘s Clinical Hematology, Lee GR, Foerster J, Lupeus J, Paraskevas F, Gveer JP, Rodgers GN, Williams & Wilkins, Baltimore.
- Practical Haematology, Dacie JV, Lewis SM, Churchill Livingstone, Edinburgh
- Bone Marrow Pathology, Bain BJ, Clark DM, Lampert IA, Blackwell Science, Oxford
- Leukemia Diagnosis-A guide to the FAB Classification, Bain BJ, J.B. Lippincott, Philadelphia.
- Clinical Diagnosis and Management by Laboratory Methods, Henry JB, WB Saunders. (Indian Edition, Eastern Press, Bangalore).