NPTEL- DTH Swayamprabha Video Lectures in Microbiology

Infectious diseases continue to contribute to mortality and morbidity worldwide. The discovery on antibiotics did not bring an end to the era of infections. Infectious disease continues to be the commonest clinical presentations in clinical practise. The emergence of antibiotic resistance has only aggravated this situation. So, the present course was devised to discuss the common infective syndromes as encountered by the medical graduate in their clinical practise. It will help the medical graduate understand these infections. The course would also be useful for anyone interested in working with human pathogens i.e. the science graduate or the biotechnologist.

The course starts with a few lectures on methodologies used in the diagnosis of bacterial, viral, fungal and parasitic infections.

Then, the course is divided into the common presentation of infections as seen in clinical practise. Each clinical presentation has been discussed by enumerating the various microbes causing it e.g. Subcutaneous infections, Meningitis, Fever etc. The clinical presentations, pathogenesis and laboratory diagnosis of these conditions are discussed in detail with presentations of case histories of patients presenting with these infections. The appropriate samples to be collected in different phases of infection are discussed. This would ensure that the laboratory reports would be optimally utilised in reaching an accurate clinical diagnosis. The pathogens causing the different clinical conditions have been discussed in detail, so the student is able to understand their morphology, cultural characters and methodology involved in identification. Selection of antimicrobials used to treat these pathogens also has been discussed along with laboratory methods to detect their sensitivity where relevant.

The epidemiology of these clinical conditions and prophylaxis available against them has been covered. The currently available vaccines and other methods involved in prevention of common clinical conditions like diarrhoea have been discussed in detail

Developments in field of medicine and increasing use of technology especially interventional technologies has led to the emergence of Hospital acquired infections. These infections when combined with the bugbear of antibiotic resistance may result in negating the advances that have been made in health sciences. So, a final section on Hospital acquired infections has been added. It will cover their causative agents, common clinical presentations and methodologies used to prevent them including appropriate methods to dispose the Biomedical waste generated in health care facilities.

I hope these videos will facilitate learning by the medical graduate during his journey in the medical college and be useful even later when the doctor encounters a patient of infectious disease during his medical practise.

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1.1. MICROBIOLOGY

1.1.1. BLOCK-I INTRODUCTION & PRINCIPLES OF DIAGNOSIS OF INFECTIOUS DISEASES

Sl.No	Blocks / Topics	Contents	Expert	Time
1	Introduction to the course	Role & Scope of Clinical Microbiology in practice	Dr. Renu Bharadwaj	0:19: 24
2	Introduction to pathogenic **Bacteria** and their Laboratory Diagnosis (Direct Methods)	Brief morphology of bacteria, Gram staining, General steps in their laboratory diagnosis including Microscopy & Culture	Dr. Jyoti Nagmoti	0:40:25
3	Immunology in the diagnosis of Bacterial diseases & Molecular diagnosis. (Indirect Methods)	Basic Principles of Immunity, Antigen-Antibody reactions and serological reactions. PCR; types & role in diagnosis	Dr. Anju Kagal	1:06:43
4	Introduction to pathogenic **Viruses** and their Laboratory Diagnosis	Classification, and approach to their laboratory diagnosis (Direct & Indirect diagnosis)	Dr. Chhaya Chande	0.39.02

5	Introduction to pathogenic **Fungi** and their Laboratory diagnosis	Classification, Enumeration of pathogenic fungi, morphology and laboratory diagnosis	Dr. Ravinder Kaur	0:20:10.
6	Introduction to Medically important **Parasites** and their Laboratory Diagnosis	Classification, general morphology and approach to the laboratory diagnosis of parasitic Infections	Dr. Ravinder Kaur	0:15:47

1.1.2. BLOCK-II SKIN & SOFT TISSUE INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
7	Superficial Infections	Work up of a case of Carbuncle including spectrum of soft tissue infections, list of possible causative agents,its differential diagnosis, laboratory diagnosis & management ***Staphylococcus aureus*:** Morphology, clinical manifestations, pathogenesis & laboratory diagnosis, epidemiology & antimicrobial spectrum	Dr. Renu Bharadwaj	0:33:20
8	Gas Gangrene	Workup of a case, causative organisms. Its pathogenesis, Laboratory Diagnosis & Management	Dr. Renu Bharadwaj	0:26:17
9	Anthrax	Work up of a case of Malignant pustule: causative agent, its	Dr. Renu Bharadwaj	0:23:42

		laboratory Diagnosis & Management		
10	Superficial Mycoses	Work up of a case, differential Diagnosis & laboratory diagnosis **Malassezia furfur** **Dermatophytosis:** Classification, Morphology, Clinical manifestations, Pathogenesis & Laboratory Diagnosis of pathogens.	Dr. Ravinder Kaur	0:26:31
11	Superficial & Subcutaneous Mycoses	Work up of a case, Clinical manifestations and laboratory diagnosis of **Candidiasis** Case history, Morphology, Clinical manifestations, pathogenesis & Laboratory Diagnosis **of Mycetoma**	Dr. Ravinder Kaur	0:32:29.
12	Actinomycosis	Work up of a case, Clinical manifestations and laboratory diagnosis of Actinomycosis	Dr. Ravinder Kaur	0:16:24
13	Leprosy	Work up of Cases, Classification, Pathogenesis &laboratory diagnosis	Dr. Anju Kagal	
14	Viral Infections of the skin	Clinical case and its differential Diagnosis. Clinical presentation of Human Herpes Viruses & HPV : their morphology, pathogenesis & Laboratory Diagnosis. Discussion of other viral infections of skin	Dr. Chhaya Chande	0:32:43

1.1.3. BLOCK-III RESPIRATORY TRACT INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
15	Upper Respiratory Tract infections (URTI)	Work up of a case of sore throat and a list of causative agents. ***Streptococcus pyogenes***: pathogenesis, laboratory diagnosis and antimicrobial spectrum	Dr. Anju Kagal	0:28:39
16	Diphtheria	Work up of a case, clinical presentation, pathogenesis, laboratory diagnosis, prevention & management	Dr. Jyoti Nagmoti	0:23:01
17	Whooping Cough	***Bordetella pertussis*** infections: Case history followed by pathogenesis, sample collection, laboratory diagnosis & prophylaxis	Dr. Anju Kagal	0:13:41
18	Viral URTI	Enumerate the viruses. ***Influenza Virus****: Morphology,* Pathogenesis, laboratory diagnosis, management, epidemiology & prophylaxis. Brief overview of ***Corona viruses***, ***RSV & Parainfluenza viruses***	Dr. Chhaya Chande	0:33:19
19	Community acquired pneumonia	Case work up of a case of pneumonia. Its differential diagnosis, disease burden and causative agents. ***Streptococcus pneumoniae****:* pathogenesis, laboratory diagnosis, antimicrobial susceptibility and available vaccines	Dr. Jyoti Nagmoti	0:24:27

20	Atypical Pneumonia	Brief overview of ***Chlamydia and Mycoplasma*** & their laboratory diagnosis	Dr. Anju Kagal	0:31.20
21	Fungi causing Pulmonary Mycoses	Case history, list of causative agents, pathogenesis and laboratory diagnosis of Histoplasmosis and Aspergillosis	Dr. Ravinder Kaur	0:47:30
22	Tuberculosis	Case history followed by pathogenesis, laboratory diagnosis, Antimicrobials used for therapy & RNTCP program guidelines	Dr. Anju Kagal	0:45:16
23	Non-Tubercular Mycobacteria	Classification, Pathogenesis and laboratory diagnosis	Dr Anju Kagal	

1.1.4. BLOCK-IV GASTROINTESTINAL TRACT INFECTIONS

SI.No	Blocks / Topics	Contents	Expert	Time
24	Diarrhea	Case history, Causative agents of Diarrhea ***E.coli*** : Diarrheagenic ***E.coli,*** Clinical manifestations, pathogenesis, Laboratory Diagnosis and Antimicrobials used for therapy.	Dr Renu Bharadwaj	0:24:54
25	Viral Diarrhea	Case history, enumeration of Viruses causing diarrhea , laboratory diagnosis & prophylaxis	Dr. Chhaya Chande	
26	Cholera	Case report, Morphology, Classification, Clinical manifestations, pathogenesis &	Dr. Renu Bharadwaj	0:27:36

		Laboratory Diagnosis of ***V.cholera*** **.** In brief about other comma shaped organisms		
27	Bacillary Dysentery	Work up of a case. Causative agents of Dysentery ***Shigella***: pathogenesis, Laboratory Diagnosis and antimicrobials used for therapy	Dr. Jyoti Nagmoti	0:42:24
28	Protozoal Dysentery	***E.histolytica***: Clinical manifestations, pathogenesis, Morphology, Life cycle & Laboratory Diagnosis.	Dr. Jyoti Nagmoti	0.29.03
29	Intestinal Protozoa causing diarrhea	Clinical presentation, laboratory diagnosis of ***Giardia***	Dr. Ravinder Kaur	0.11.20
30	Intestinal Sporozoa	Clinical presentation, laboratory diagnosis of ***Sporozoa***	Dr. Ravinder Kaur	0:32:54
31	Parasitic infestations: Intestinal Nematodes	Clinical Presentation, Morphology, Life Pathogenesis and laboratory diagnosis of ***A.lumbricoides, E.vermicularis, T.trichura***	Dr. Anju Kagal	0:40:32
32	Parasitic infestations: Intestinal Nematodes Part 2	Clinical Presentation, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of ***A.duodenale, S.stercoralis,***	Dr. Anju Kagal	035:51
33	Parasitic infestations: Cestodes	Clinical presentation, Etiological agents, Morphology, Life cycle, Pathogenesis and laboratory diagnosis of ***Taenia solium , Taenia saginata and Echinococcus granulosus.***	Dr. Anju Kagal	0.35.51
34	Food Poisoning	Clinical case, enumeration of etiological agents, Source, and	Dr. Chhaya Chande	0:41:39

		Investigations of outbreaks of Food Poisoning. (***B.cereus, C.perfringens, S. Aureus, C.botulinum, V.parahemolyticus***)		

1.1.5. BLOCK-V UROGENITAL INFECTIONS

Sl.No	Blocks / Topics	Contents	Expert	Time
35	Urinary Tract Infection	Work up of a case. Definition, Differential diagnosis and laboratory diagnosis of Urinary Tract Infection. Enterobacteriaceae & in brief about Uro-pathogenic ***E.coli, Proteus and Klebsiella***	Dr. Renu Bharadwaj	0:28:43
36	Urethritis - Gonorrhoea	Case history, Differential Diagnosis ***N.gonorrhoeae:*** Pathogenesis, Clinical features ,laboratory diagnosis and antimicrobials used for therapy	Dr. Jyoti Nagmoti	0:23:56
37	Non-Gonococcal Urethritis (NGU)	*Case history, Clinical features and laboratory diagnosis of* ***T.vaginalis, G.vaginalis, C.trachomatis, M.hominis, U.urealyticum*** *infections* causing NGU	Dr. Jyoti Nagmoti	0:35:10
38	Genital Ulcers & other Genital tract infections	Work up of a case, differential diagnosis and epidemiology. ***T.pallidum*** : Clinical features,	Dr. Jyoti Nagmoti	0:38:10

		complications & laboratory diagnosis of ***Syphilis*** Brief Account of ***H.ducreyi, Lymphogranuloma venereum, Granuloma inguinale***		
39	Viral STD: HIV	**HIV**: Clinical presentation, Morphology, pathogenesis & Laboratory Diagnosis	Dr. Chhaya Chande	0:49:55

1.1.6. BLOCK-VI LIVER AND BILIARY SYSTEM

SI.No	Blocks / Topics	Contents	Expert	Time
40	Acute Hepatitis	Work up of a case of infective hepatitis, Brief Introduction, disease burden and Causative agents of Acute hepatitis Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of ***Hepatitis A*** and ***Hepatitis E Viruses***	Dr. Chhaya Chande	0:26:43
41	Chronic Hepatitis	Morphology, Classification, Clinical manifestations, pathogenesis & Laboratory Diagnosis of ***Hepatitis B, C*** *and* ***D Viruses***	Dr. Ravinder Kaur	0:42:51

1.1.7. BLOCK-VII CNS INFECTIONS

SI.No	Blocks / Topics	Contents	Expert	Time
42	Meningitis	Clinical case. Differential Diagnosis, and laboratory diagnosis of Meningitis ***N.meningitidis, H.influenzae:*** Pathogenesis and laboratory diagnosis.	Dr. Renu Bharadwaj	0:33:53
43	Chronic meningitis	Case, Differential Diagnosis and laboratory diagnosis. Cryptococcal Meningitis & TB meningitis: Laboratory diagnosis and therapy.	Dr. Ravinder Kaur	0:43:02
44	Encephalitis	Work up of a case, disease burden, clinical features and laboratory diagnosis of Encephalitis ***Arboviruses*** causing encephalitis : ***Japanese encephalitis virus***	Dr. Chhaya Chande	0:44:15
45	Acute Flaccid Paralysis	***Poliomyelitis:*** Clinical presentation, laboratory Diagnosis, Epidemiology & Immunization	Dr. Chhaya Chande	0:32:03
46	Brain abscess	Case presentation, Differential Diagnosis and Laboratory diagnosis In brief about **Nonsporing anaerobes**	Dr. Jyoti Nagmoti	0:35:44

47	Parasites infecting the CNS	Clinical presentations, enumerate the pathogens and laboratory diagnosis. Primary amoebic mening0-encephalitis: ***Acanthamoeba, Naegleria***	Dr. Ravinder Kaur	0:27:03
48	Bacterial Toxins affecting the Nervous system	***Clostridium tetani, Clostridium botulinum***	Dr. Renu Bharadwaj	0:33:24
49	Other Viral CNS infections	Introduction, Pathogenesis and laboratory diagnosis of ***Rabies***	Dr. Chhaya Chande	0:30:42

1.1.8. BLOCK-VIII PYREXIA OF UNKNOWN ORIGIN

Sl.No	Blocks / Topics	Contents	Expert	Time
50	PUO Typhoid and Paratyphoid fevers	Case of PUO, Definition, Differential Diagnosis, and Laboratory Diagnosis of PUO. Morphology, Pathogenesis, Clinical features and laboratory diagnosis of ***S.typhi,*** *&* ***S.paratyphi*** infections	Dr. Renu Bharadwaj	0:36:37
51	Brucellosis, Leptospirosis	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of ***Brucellosis***, ***Leptospirosis***	Dr. Renu Bharadwaj	0:29:58
52	Rickettsial infections	Clinical features, Pathogenesis, Clinical features and laboratory diagnosis of ***Rickettsial*** *infections*	Dr. Jyoti Nagmoti	0:29:19
53	Viral fevers	Clinical features, list of causative agents, Disease burden,	Dr. Ravinder Kaur	0:24:35

		pathogenesis, Clinical features and Laboratory diagnosis of ***Dengue*** and ***Chikungunya*** virus infections		
54	Malaria	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of ***Plasmaodium*** infections	Dr. Anju Kagal	
55	Filariasis	Clinical features, disease burden, pathogenesis, Life cycle and Laboratory diagnosis of ***W.bancrofti*** In brief about **Trypanosomiasis**	Dr. Jyoti Nagmoti	0:22:46

1.1.9. BLOCK-IX HOSPITAL ACQUIRED INFECTIONS & MISCELLANEOUS

Sl.No	Blocks / Topics	Contents	Expert	Time
56	Hospital Acquired Infections (HAI)	Definition, Etiological agents, Pathogenesis, Source tracing and laboratory diagnosis (with special reference to: ***Pseudomonas and Acinetobacter***)	Dr. Jyoti Nagmoti	0:28:39
57	Prevention of HAI	Universal safety precautions, Care bundles in relation to VAP, SSI, CRBSI, UTI	Dr. Anju Kagal	
58	Biomedical Waste its Management	Introduction, Waste categories, Waste treatment and Disposal	Dr. Ravinder Kaur	0:25:17