

Third Edition

FORENSIC MEDICINE AND TOXICOLOGY

- This book is primarily meant for undergraduate and postgraduate students of Forensic Medicine.
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- Real photographs and illustrations included along with the theory for easy understanding.
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- The important aspects are presented in a bullet format.
- Multiple choice questions and answers of various competitive Medical PG entrance examinations are included at the end of the book.

About the Author

Dr. P. C. Ignatius completed his MD in Forensic Medicine from Government Medical College, Kozhikode in 1988. He joined the Department of Forensic Medicine, Government Medical College, Thrissur in 1990. He is now working as Professor and Head of the Department of Forensic Medicine, Government Medical College, Palakkad. He was former Professor and Head of the Department of Forensic Medicine, Kerala Police Academy. He has three decades of experience in teaching, conducting autopsies and other medicolegal works to his credit.



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"Textbook of Forensic Medicine and Toxicology prepared by Dr. Ignatius is highly informative and student friendly. The changing trends in medicolegal scenario have been clearly brought out in the relevant areas. The recent changes and additions in law relating to Medicine have been adequately updated. Easily readable and understandable language and excellent illustrations..."

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Third Edition

FORENSIC MEDICINE AND TOXICOLOGY

Dr. P. C. Ignatius

FORENSIC MEDICINE AND TOXICOLOGY

Dr. P. C. Ignatius

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FORENSIC MEDICINE AND TOXICOLOGY

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Chapter 1 INTRODUCTION

FORENSIC MEDICINE AND TOXICOLOGY

Forensic Medicine :

It is defined as the application of medical knowledge for the administration of justice.* Doctor acquires medical knowledge during his career and applies that knowledge in giving his opinions in various cases to solve many medicolegal problems faced by the legal authorities. The word 'forensic' originated from the Latin word *Forensis*, meaning 'of the forum'. In Rome, forum was the meeting place where the legal matters were discussed (Court of law).* Forensic Medicine is called Legal Medicine in European countries and United States.

Forensic pathology:

It deals with the study of various forms of violence on the human body and unnatural deaths. It essentially deals with the interpretation of autopsy findings in the investigation of unnatural deaths like injuries causing death, drowning, neck violence, suspicious and unexpected deaths. This also includes findings and interpretation of histopathology of tissues taken during autopsy.

Thanatology

It is a branch of science which deals with death and all its medicolegal aspects.*

Clinical Forensic Medicine

Examination of living persons for medicolegal purposes may be termed as clinical forensic medicine. Victims of assaults, rape and accidents, accused in criminal cases, drunkenness etc., all require examination and report. This includes collection of material evidences and formulation of opinions in various medicolegal cases by examination of living persons.

With enormous advances in knowledge and technology, fields like Forensic odontology, Forensic serology, Forensic entomology, Forensic osteology, Forensic anthropology, Forensic radiology, Forensic ballistics, Forensic

psychiatry, Forensic nursing etc. have come to be recognized as separate specialities.

Medical Jurisprudence :

(*Juris*= law; *prudentia* = knowledge)

It deals with legal aspects of practice of medicine. It includes responsibilities of the doctor and deals particularly with doctor-patient relationship,* medical negligence, rights, privileges and duties of doctors, professional misconduct, consent, medical ethics etc. It was also termed as 'State Medicine'.

Medical ethics:

It deals with the moral principles which should guide members of the medical profession in their dealings with the patients and with the State. It is the moral code of conduct. The word ethics is derived from the Greek word '*ethikos*' which means the '*rules of conduct*'.

Medical etiquette :

It deals with the conventional laws of courtesy observed between members of the medical profession. Ethical behaviour is a self-imposed duty upon each other. A doctor should not criticize or denigrate the professional ability of another doctor.

Doctor has to execute two types of duties in his career. One is his medical duty and the other is his legal duty. All individuals in the community have their commitment to the society but doctor's social commitment is much higher than others' since the doctor is dealing with human life. He has to issue certificates in various medico legal cases. He has to appear before the court to testify his reports. Doctor should be impartial. Doctor has to give his opinion by scientifically analysing the facts observed by him. He has no victim to save and no accused to be punished. Truth, honesty and integrity should be the basic qualities that should guide a doctor in his career.

Toxicology:

It is the study of poisons. It deals with the signs and symptoms, diagnosis and treatment of poisons and various analytical methods to detect them.* Forensic toxicology deals with the medicolegal aspects of poisoning, e.g. the situations of poisoning, duties of doctors in poisoning cases admitted in hospitals and various laws regarding the handling and control of poisons and drugs.

History

Medicine and law were inseparable from the time of origin of human communities and civilizations. Law-medicine problems are found written in records of Egypt, Samaria, Babylon, China and India. In China *Materia Medica* was written in about 3000 B. C. which gives information on drugs and poisons. The Code of Hammurabi, by the King of Babylon (about 2200 B. C.) is considered to be the oldest medicolegal code.* Chinese laws were prevalent from 4000 B.C.

Egyptian laws were prevalent from 3000 B.C. They knew the art of mummification. Imhotep was the chief justice and physician to *pharaoh* Djoser and he can be considered the first medicolegal expert.* Jewish laws and Greek laws were prevalent from about 1200 B.C. Socrates (470 – 399 B.C.), the great philosopher and social reformer in Athens, was executed on the crime of 'misleading the young generation of Greece', by being given the poisonous plant hemlock.

Hippocrates (460-377 B.C.) has contributed to the code on medical ethics. He is considered the father of Modern Medicine.



Fig. 1.1. Code of Hammurabi inscribed on clay (2200.B.C)



Fig. 1.2. Code of Hammurabi inscribed on laterite stone



Fig. 1.3. Moses with 'Ten Commandments' - the religious and moral background of Jewish law, which came into existence by 1200 B.C.



Fig. 1.4. Execution of Socrates; Hemlock was the poison given to him



Fig. 4. 37. Ear to ear incision is made.



Fig. 4. 38. Scalp is reflected.



Fig. 4. 39. Skull vault is exposed.



Fig. 4. 40. Skull is horizontally cut.



Fig. 4. 41. Sagittal sinus is opened.



Fig. 4. 42. Dura on either side of the sagittal sinus is cut.



Fig. 4. 43. Dura is horizontally cut and removed.

PRESUMPTION OF DEATH

This question arises in cases of inheritance of property or obtaining insurance money when a person is alleged to have been dead and body is not found. Under Sec. 107 of Indian Evidence Act, a person is presumed to be alive if there is nothing to suggest the probability of death of a person within 30 years. Sec. 108, I.E.A. states that, if proof is produced that the same person has not been heard of for 7 years by his friends or relatives, death is presumed.

PRESUMPTION OF SURVIVORSHIP

This question may arise in cases of inheritance of property when two or more persons die in a common disaster, e.g. earthquake, plane crash, shipwreck etc. The question may arise as to who survived longest when no direct evidence is available on this. In the absence of such evidences, the survivorship is presumed considering the age, sex, physis, diseases, severity of injuries and mode of death. Young person will survive longer than the aged persons. Males will survive longer than females. Person with less severe injury will survive longer.

QUESTIONS

1. Define autolysis and putrefaction. Briefly describe the decomposition changes on the body 24 hrs after death
2. Enumerate the changes within 18 hrs after death. Describe briefly postmortem cooling and hypostasis and their time of occurrence
3. Define death. Discuss the M/L problems arising in the certification of death.
4. Describe the features of postmortem staining and adipocere. What are the medicolegal informations available from them? Describe in detail how they can help in postmortem clocking.
5. Write short notes
 - a) Harvard's Criteria b) Molecular death c) Somatic death d) Postmortem calorcity e) Algor mortis f) Pathophysiology of rigor mortis g) Presumption of death h) Cadaveric spasm i) Cadaveric lividity/suggillations/livormortis/postmortemstaining/hypostasis j) Postmortem delivery k) Entomology of cadaver l) Marbling m) Colliquative putrefaction n) Casper's dictum o) Adipocere p) Mummification q) Presumption of survivorship r) Suspended animation
4. Differentiate between
 - a) Somatic and Molecular deaths
 - b) Hypostasis and Contusion (bruise)
 - c) Rigor mortis and Cadaveric spasm

Viva: In addition to the above questions – presumption of death, artificial mummification, vegetative life, living cadaver transplantation (beating heart donor)

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Multiple Choice Questions are included in Section 3 of the book. Answers of MCQ's are indicated by *

Chapter 8

CARDIAC POISONS

CERBERA THEVETIA / *Thevetia Nerifolia* (Yellow oleander, कनेर (पीली), செம்பவரளி)

It is called yellow oleander. It has lanceolate leaves and bell shaped yellow flowers. It may grow up to a small tree. All parts of the plant are poisonous. When incised a white juice is extruded. The fruit contain a single nut which is triangular in shape with 4 chambers each enclosing a pale yellow seed. The toxins are more concentrated in the seeds. The seed is taken ground with sugar and taken.



Fig.8.1. Yellow oleander (*Cerbera thevetia*)



Fig. 8. 2. Trunk of yellow oleander



Fig. no. 8.3. Oleander flower and fruit



Fig. 8.4. Ripe fruit is black



Fig.8.5. *Cerbera thevetia* seeds

Identification of poisonous snakes

- I. At first, look for the belly scales. If they are divided, it is non poisonous. If they are single scales, it may be poisonous or non poisonous.
- II. Then look for the head. If the head is triangular and covered with small scales, it may be poisonous (viper). Then look for the pit between eye and nostrils (pit viper). If there is an arrow mark or bird foot mark on the centre of head, it is poisonous (saw scaled viper).
- III. If the head scales are large, it may be poisonous or non poisonous. Look for the 3rd supra labial and if it is touching the eye and the nasal shield it is poisonous (cobra or coral snake).
- IV. If the 3rd supra labial is not touching eye and nasal shield, then look at the ventral aspect of head. If the 4th infra labial is larger than the others on either side, it is poisonous (krait)
- V. If the head is black and the other part of the body is of uniform color without dots, it is poisonous (coral snake)

COBRA

These are two types.

1. Common cobra (*Naja naja*, Nag)

(ನಾಗ, அம்பலர், நச்சுப் பாய்ப்பு, ನಾಗರ ಪಾಪು)

Cobra has a hood. On the dorsal side of the hood it bears a spectacle or a monocle mark (*Naja Kaouthia*). There may be sometimes 3 bands on underside of the mark. There is a white band at the point of separation between the hood and body. The length is about 1.5 to 2 metres.

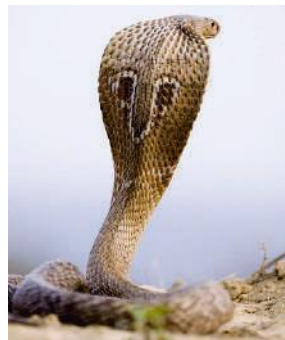


Fig.17.6. Common cobra (*Naja naja*)

The belly scales are single up to the genital pore and double thereafter. There are two poisonous fangs on the upper jaw which are grooved followed by one or two small teeth. Common cobra is predominantly neurotoxic and slightly hemotoxic.

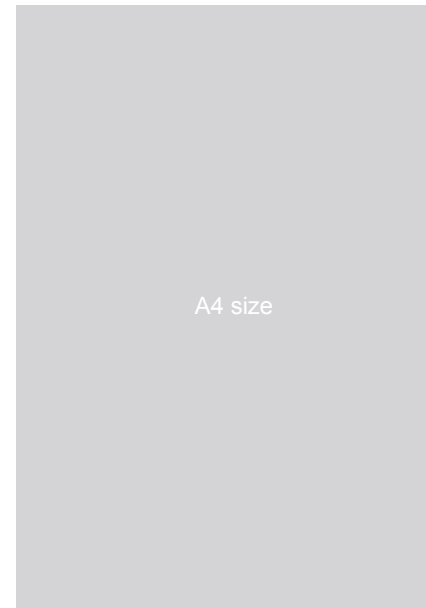
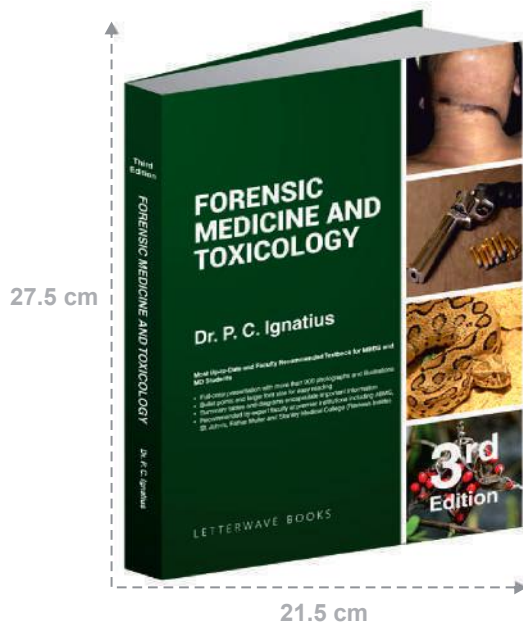


Fig. 17.7. Head of cobra; the 3rd supra-labial shield is larger and touching the eye and the nasal shield. Pupils are circular.

Cobra has large scales on head and the third supra-labial touches the eye and the nasal shield.



Fig. 17.8. Monocle cobra (*Naja Kaouthia*)



PREVIEW

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