

# Veterinary Forensic Medicine

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Forensic Medicine is that part of Medicine which describes on various procedures to be adopted to investigate on the crime and the legal steps to be undertake against the criminal or offender under the code of law. There is mention of it in the code of Hammurabi (Babylon-2200 B.C.), which being the oldest code on medical-legal cases.

As like of human forensic medicine veterinary forensic medicine has got the same implication when cruelty or casualty is caused on animals. This is also known as legal medicine or legal veterinary Medicine.

¶ The veterinary students, custodians of rules and regulations, police man, the animal owners and general public must gain fundamental knowledge on veterinary jurisprudence, veterinary forensic medicine and toxicology. ¶ Veterinary forensic medicine deals with veterinary aspects of laws *i.e.* death, injury, brutality, poisoning, malacious practice, fraud, accidents, etc. of animals. Forensic medicine is very important subject in the criminal justice system. This science plays a pivotal role in deciding vetero legal court cases.



**The Coroner inquest.** This is conducted in Bombay and Calcutta under Coroner Act. There is no need to inform the crime to Magistrate. The recent development of it as per recommendation of the Law Commission is enactment of Central Act called Coroner Act, 2008.

**The Magistrate inquest.** Here the Magistrate inquest the District Magistrate or sub-divisional Magistrate or as empowered to Collector, Deputy Collector or Tahsildar to conduct inquest in case of death, in case of man death in the prison or death due to firing. This may not be followed in animal's death.

## AUTOPSY

The term autopsy is a Greek term *autopsia* which denotes "to see for one self". In 44 B.C. Julius caesor was the subject of an official autopsy after he was murdered by rival senators.

Autopsy is to be demonstrated to the students by Forensic teachers. This is the procedure by which it is possible to ascertain the cause of the death. Thus, it is very much important in veteriolegal cases of sudden death or suspicious death of animals. This is conducted at the request of Magistrate through Police Officer.

## ✓ **COMMON OFFENCES AGAINST ANIMALS**

The illegal acts or offences practised against animals include maiming, bestiality, doping, wound and poisoning. The impact of these mischievous activities varies in the severity. It may be



annoyance, reduced performance, permanent disable/unproductive or death. These are punishable under different Sections of IPC.

### A. Maiming

Maiming means making an animal useless by violence *e.g.*, fracture of bones, dislocation of joints, cutting tendons of legs and neck, injury to udder or teat in lactating animals and introducing blunt object to the vagina or rectum. Presence of external injury at the site of damage should be examined and recorded which may provide certain evidence about the violence applied in creating such condition.

### B. Mechanical injuries (Wound)

It is defined as the break of the continuity of the tissues of the living body. The injury produced by violence or mechanical force may be raised both in the civil and criminal Courts. Such injuries are termed as veterolegal wounds. These wounds are classified as bruises, contusions, abrasions, incised wound, lacerated wound, punctured wound and gunshot wound.

(a) **Incised wound.** An incised wound is a clear cut through the tissues. It is produced by an object having sharp cutting edge *e.g.*, razor, knife, scalpel, sword, axe etc. Edges of the wounds are sharp, even, clean cut and well defined. Gaping, retraction of incised tissues, is more if the underlying muscle fibers have been cut transversely and less when cut longitudinally. At the point of commencement wound is deeper and it gradually becomes shallower towards the end of the cut. There will be severe hemorrhage leading to death if bigger blood vessels are cut. Length of cutting edge of weapon has no relation to the length of an incised wound. Usually the length of the wound is greater than its depth and width. While describing this type of wound it is necessary to mention its direction and the depth at either end.

(b) **Firearm wounds (Gunshot wound).** A firearm is an instrument which discharges a missile by the expansive force of the gases produced by the burning of an explosive substance produced by various kinds of firearms *e.g.*, revolver, pistol, rifle, shotgun etc. The characteristics of a wound depend on the distance from which the weapon is discharged, the size of the shot, the nature of the explosive and the gun itself. There is possibility of two wounds *i.e.* entrance wound and exit wound particularly by revolvers or pistol.

The discharge from the muzzle, *i.e.* gases, flame, powder, smoke and metallic particles are blown into the body. The powder residue is usually visible in the subcutaneous and deeper areas. The point of entry or the entrance is blackened by powder and smokes and charred by flame. This wound is large and shows triangular, stellate, cruciate or elliptic due to the expansion of the liberated gases in the skin and tissue. The margins are contused and everted. There is absence of burning, blackening and tattooing around the wound of entrance. Singeing of the hair may be present due to the escape of hot gases.

An exit wound may occur if the bullet does not fragment. Exit wounds may vary considerably in size and shape. These may be round, stellate, cruciate, elliptical, crescent shaped or appear as linear lacerations. In some cases, the entrance and exit wounds may look alike. The exit wound is of help in determining the direction of fire, posture of the victim at the time of shooting, and the number of bullets fired to the body. The exit wound is usually smaller than the entrance wound when the weapon has been fired at very close range. With increased range, the exit wound is larger than the wound of entrance. With high velocity bullet, the two wounds may be of the same size. The edges of the exit wound are free from signs of burning, blackening or tattooing.



(c) **Punctured wound (Penetrating wound).** A punctured wound or stab wound is produced by the penetration of a pointed object such as needle, nail, dagger, arrow, spear, knife etc. into the body. This type of wound is designated as perforating wound if the weapon enters the body on one side and comes out from the other side. The wound of entry is comparatively longer with inverted edges and at the exit it is smaller with everted edges. Sometimes a broken fragment of the weapon is found inside the wound. The object may penetrate deep into the tissue and may enter into the body cavity and damage the vital organs. Here external hemorrhage is slight. But internally there may be marked bleeding causing death. Depth of the punctured wound will give some clue to the length of the weapon used.

(d) **Lacerated wound.** Laceration is tearing of tissues. In this type of wound edges are ragged and uneven with blunt or pointed end. Wounds are generally caused by fall on hard surfaces, traffic accidents, barbed wire, claws or horns of animal.

This type of wound is more prone to infection and the healing process is delayed. An irregular scar is formed by granulation. Consequences of the laceration of the internal organs like liver, brain, spleen are always grave.

(e) **Abrasion.** It usually involves the superficial layers of the epidermis only. This type of wound is caused by the rubbing action due to dragging, vehicular accident or fall on a rough surface. Depending on the areas of body surface exposed as well as the magnitude of the abrading force, the size of the wound and extent of the tissue damage vary. They are simple injuries with little bleeding. The wounds heal rapidly without formation of scar. Sometimes abrasions, contusions and lacerations are produced by a particular object.

(f) **Contusions (Bruises).** Contusions or bruises are the effusion of blood into the tissues due to the rupture of blood vessels. Contusions, caused by blunt trauma, are present either in the skin or in the internal organs. But in majority of the situations the effects are extended up to the subcutaneous fat layer. Externally the wound is characterized by painful swelling and usually without destruction of the skin. Bruises may be seen in association with abrasions or lacerations. When a large blood vessel is injured, a big mass called haematoma is produced. As a general rule, the size and shape of the bruises are modified by the type of tissue, age of the animal, intensity of the violence and presence of the diseases. At autopsy, bruises may not be detected easily.

**Other wounds i.e.,** self-inflicted or fabricated wound (Wounds produced by an animal on his own body) or therapeutic wound (Wounds produced by doctors during treatment) should be differentiated with the help of history and/or autopsy examination. While describing veterolegal wounds it is desirable to know and record the information on the following heads :

- Type of injury
- Site of injury
- Size of injury
- No. of injury
- Depth of injury
- Direction of injury
- Condition of edges, ends and floor
- Presence of foreign bodies
- Presence of suppuration or granulation tissues.



### FORMAT OF A WOUND CERTIFICATE

Place : .....

Date : .....

Time : .....

This is to certify that at the request of (1) .....

I have this day examined (2) .....

belonging to (3) .....

This said animal has got the injuries on its body (4) .....

I am of opinion that (5) .....

Signature .....

Qualification .....

Designation .....

Registration No. ....

- (1) Name of the party *i.e.*, Police Officer or Magistrate who has sent the animal.
- (2) Species, breed, sex, age body weight colour, identification mark.
- (3) Name and address of the owner/messenger.
- (4) Description of injuries.
- (5) Severity of injury in terms of minor, moderate, severe or fatal. Presence of any foreign bodies in the wound *e.g.*, glass, metal, dirt, hair etc. should be noted. When fracture/dislocation of the bone/joints is suspected, X-ray examination is performed for confirmation.

### C. Cruelty against animals

These are described under the 'Prevention of cruelty to Animals Act, 1960'. The common cruelties practised against animals are beating, over loading, using a diseased animal for work and starvation.

Guidelines have been prescribed for various activities *e.g.*, (i) maximum carrying capacity in a two-wheeler vehicle by medium sized bullock having body weight between 250-350 kg is 700, 1050 and 1400 kg when the wheel is with ball bearings, with pneumatic tyres and without pneumatic tyres, respectively. (ii) Adequate air space, provision of drinking water and first aid box, vaccination and fitness certificate and emergency contact address should be available with the animals under transportation.

*SPCA - Society for Prevention of Cruelty to Animals*

### D. Malicious Poisoning

It is intended or planned to take revenge against the enemy or to obtain the hide, meat, tusk etc. for commercial purpose. Some of the reports of this unlawful or criminal killing of animals through administration of agrochemicals, rodenticides and poisonous plants are given below :

(a) **Rodenticides (Zinc phosphide).** It is a comparatively cheap and effective rodenticide and hence is commonly used to kill the dog, rat, mice and squirrels. This compound upon ingestion reacts with the hydrochloric acid in the stomach and liberates phosphine. Absorbed phosphine is responsible for cellular necrosis in the gastro-intestinal tract and other vital organs.



About five gram of the compound would be sufficient to bring death of a dog having body weight of 25 kg. Clinical signs of the Poisoning are dullness, dyspnoea, abdominal pain, ataxia, prostration, convulsion coma and death with 4-24 hours of ingestion. The characteristic features of autopsy are emission of garlicky odour from stomach contents, pulmonary congestion and oedema, sub pleural haemorrhages, fatty degeneration and necrosis of liver and gastroenteritis. Symptomatic treatment may be given to alleviate the suffering.

(b) **Herbicides (Dinitro and Bipyridinium compounds).** Dinitro compounds (Dinitro ortho cresol and dinitrophenol) and bipyridinium or dipyrilidinium compounds (Paraquat and diquat) are extensively used in agricultural practices for the control of weeds. These weed-killers are sometimes used as a potent agent of malicious poisoning in dogs and cattle. There is interference of the electron transport chain in energy metabolism of cells coming in contact with poisons.

Rapid onset of rigor mortis, yellowish green coloration of tissues, degenerative changes in parenchymatous organs, gastroenteritis and dark coloured blood are noticed during post-mortem examination of the animals with dinitro compounds poisoning. Post-mortem lesions of the bipyridinium compounds include haemorrhagic gastritis, congestion of liver, kidney, spleen and lungs with ulceration of buccal and pharyngeal tissues. Analysis of the urine and suspected materials would help in the confirmatory diagnosis of the poisoning.

(c) **Poisonous plants.** Certain parts of the plant when administered either orally or parenterally to the animal produce unwanted effects leading to death.

*Abrus precatorius.* Particularly the leather workers use the seeds of the plant for killing cattle in order to obtain hides. It is also used for the purpose of revenge. The plant is found all over India. It is a slender, twining and climbing plant. Seed pod is 2.5 to 5.0 cm long and borne in clusters. The seeds are egg-shaped and bright scarlet colour with a large black spot at one end. On an average seeds are 8 mm long, 6 mm broad and weight 105 mg. Seeds may be white with black spot, all black, yellow or blue. Seeds are tasteless and odourless. It contains a certain active principle called abrin and abralin.

When the needle shaped extract of seeds is injected under the skin, the animal exhibited the signs of inflammation, oedema, oozing of haemorrhagic fluid from the site of puncture and necrosis surrounding the site of injection. Appetite of the animal is reduced with after 3 to 4 days. Movement of the animal is ceased. Tetanic convulsions are a characteristic feature.

Subcutaneous injection of 90-120 mg abrin is more potent than the oral route. Dose within 3-5 days of illness has been recorded.

Fragments of the needle may be detected during post-mortem examination. Edematous swelling at the site of injection and petechial haemorrhages under the skin, pleura, pericardium and peritoneum are characteristic features. The internal organs are congested and show haemorrhages.

The seeds are decorticated, and alone or mixed with datura, opium and onion. A paste is made with spirit and water. Small, sharp and pointed spikes or needles or 'suis' are prepared. After sun drying the needles are 15 mm long and weigh 90 to 120 mg. Two needles are inserted or deposited in the muscular areas.

*Calotropis gigantean.* This plant grows wild throughout India. *Calotropis gigantean* has purple flowers and *Calotropis procera* has white flowers. The active principles of the plant are uscharin, calotoxin, calactin and calotropin. The leaves and stalk yield thick milky juice when incised.



#### **(d) Others**

One of the important toxicological hazards to farm animal is administration of arsenical compounds. Though the metallic arsenic is not poisonous, arsenic trioxide is potentially toxic. The compound is used in fruit sprays, weed-killers, insecticides, rat poisons, fly papers, calico printing, preparation of wallpapers and artificial flowers, dying and for protection of timber against white ant. It interferes with cellular respiration by combining with the sulphahydril group of mitochondrial enzyme. The target area is vascular endothelium where oedema with haemorrhages are seen especially in the intestinal tract resulting in depression of the nervous system.

In per acute form of the poisoning, animal die without showing premonitory signs. However, acute form is characterized by watery diarrhoea with/without blood, abdominal pain, depression, weak pulse and cardiovascular collapse within few hours.

No significant autopsy lesions are detected in per acute toxicosis. Gastroenteritis, rupture of blood vessels, necrosis of epithelial and sub-epithelial tissues with blood tinged and foul smelling intestinal content may be noticed in delayed type of poisoning. Besides, there is diffuse



inflammation of liver, kidneys and other visceral organs. Determination of arsenic in liver, kidney or stomach content by Marsh's test or Reinsch's test confirms the diagnosis. Therapeutic measure comprises of administration of British anti-lewisite (BAL), blood transfusion and fluid therapy.

### **(e) Bestiality**

This unnatural offence is a form of perversion where the perverted sexual instinct finds an attempt of gratification through animals. This is usually but not necessarily performed by males with either male or female animals. More often animals like bitches, cows, she-asses, mares, ewes and does are involved. Involvement of birds like chicken, ducks and geese are also reported. Though vaginal intercourse is common, but intercourse may be carried out through anus or nostril. Involvement of large birds like chicken, ducks and goose are also reported. The circumstances where this is practised include : mentally abnormal person, person craving for sex and unable to get the opportunity, lonely human engaged in grazing cattle or due to the superstitious belief that man with venereal diseases may be cured after intercourse with animals. Both the accused and the alleged animals are examined for confirmation of this sexual offence.

In this case materials are collected around the genitalia or adhering to the surrounding hairs from the vagina of the animal with which the offences has been committed for the detection of human seminal fluid and/or spermatozoa. There may be marks of abrasions or lacerations with effusion of blood in the organ of intercourse. The presence of gonorrhoeal discharges with isolation of causative agents in the animal is a confirmatory evidence of this illegal act. Detached hairs may also be found adherent to the person or clothes of accused. Hairs are examined for their animal origin or compared for the similarity with the animal employed as passive agents. The examination of the active agent is human beings and examined by medical doctors.

### **(f) Doping**

It is defined as the administration of any substance, other than a normal nutrient, for the purpose of affecting its speed, stamina, courage or conduct of the animal. The practice of doping dates back 1903 when the American trainers practised this in racehorses before/during race. The stimulants like caffeine, strychnine, cocaine and its derivatives and sedatives or analgesics such as chloral hydrates, barbiturates, opium, morphine and camphor are used in order to achieve the desirable effects. Doping is an illegal act. Clinical examination of the animal coupled with identification of the drug in the blood, viscera or other suspected materials may assist in legal procedures.