

Review Research Paper

Anaesthetic Deaths: A Medico-Legal Scenario

¹Amit Kumar, ²Ashok Kumar Srivastava, ³Bindu Sharma

Abstract

Anesthetic practice is always at high risk in medical profession. Most of the time there is only a little interaction between the patient and the anaesthesiologist and people are not much aware about the anaesthesia & the risks involved. In perioperative deaths, anesthetists are also blamed and patient or his relatives react in a hostile manner towards the anaesthesiologist and many a times they seek redressal in a police station/courts of law. To avoid negligence anaesthetist must do pre-anesthetic checkup, take informed consent, check the equipment/monitors/drugs, attends the patient till he comes out from the effect of anaesthesia. Improved monitoring especially the greater use of pulse oxymetry and capnography has undoubtedly decreased the complications. If death occurs, discussion between Forensic pathologist, surgeon and anesthetist is the right solution for investigation of such deaths which may more fruitful than a bare autopsy.

Key Words: Anesthetic death, Pre-anaesthetic checkup, Medical Negligence, Cardiac arrest

Introduction:

Anaesthetic death is defined as death occurring within 24 hours of administration of anaesthesia due to causes related to anaesthesia. However, death may occur even afterwards due to its complications. [1,2]

The incidence of actual anaesthetic deaths is quite low in comparison to surgical deaths. In a survey conducted by Lunn & Mushin found that where 1 in 166 surgical patients die within 6 days, only 1 in 10,000 is actually due to the effects of the anesthesia alone. The survey also showed that the causes have not changed significantly during the last 30 years in spite of marked changes in anaesthetic technology. [3, 4] In another study of peri-operative deaths, the most common (56%) cause of death is disease/injury for which the operation was done, which is followed by shock & inevitable risks of the operation (30%).

The risk and complication of anaesthesia contributes only 08% of total deaths of which overdose, maladministration, bad choice of anesthetic agent & equipment failure are the important reason behind such casualties.[5, 6]

Anaesthetic death is one of the most stressful events as experienced by anaesthetists who may vary from person to person or even from case to case. For some it may be the emotional trauma and for others it may be the impact on their professional functioning.

This article explores the ways by which we can learn to identify and anticipate the causes of peri-operative deaths and if it is inevitable how to defend himself. It also outlines the medico-legal aspects including autopsy protocol and current litigations relevant to the anaesthetists in relation to a perioperative death.

Causes of Anaesthetic Deaths: [4, 6, 7]

1. **Death due to Anaesthetic Agent:** Hypersensitivity or adverse effects of anaesthetic agents causing cardiac arrhythmia/arrest or respiratory failure due to mayo-neuronal blockage and rarely by liver necrosis and malignant hyperthermia as in cases of halothane administration.
2. **Death due to Anaesthetists (Human Error):** Improper techniques & equipments, lack of experience, gross negligence in precautions, careless in method, accidents during intubation/bronchoscopy, over dose of drugs and improper pre-anaesthetic medication.
3. **Deaths due to Equipment Failure:** Malfunction of apparatus, kinked pipes, cross tubes, explosion etc.
4. **Deaths due to Functional Problems:** Vagal inhibition, obstruction to glottis, cardiac arrhythmia, hypotension, sluggish reflex action as in unconscious patients.

Corresponding Author:

¹Associate Professor, Dept. of Forensic Medicine
Subharti Medical College

Swami Vivekanand Subharti University
Delhi Hardwar bypass road, Meerut 250005
E-mail: dramit1995@rediffmail.com

²Prof. & HOD, Dept. of Forensic Medicine

³Assoc. Prof. Dept. of Biochemistry
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5. **Death due to factors other than Anaesthesia;** Disease/injury for which anaesthesia and operation is being done, surgical mishap (unintentional cutting/tearing of large blood vessels), postoperative events (pneumothorax, pulmonary embolism, aspiration), physical condition of patient (old age/diabetes/hypertension), inadequate communication between staff and unforeseeable conditions e.g. haemoglobinopathies (sickle cell anemia), occult coronary artery disease, transfusion hepatitis, and AIDS.

This all leads to **cardiac arrest or asphyxia due to respiratory failure.** Cardiac arrest is the commonest, occurs due to oxygen depletion or carbon dioxide accumulation due to fault/failure in technique. Most of cardiac arrest occur under relative light anaesthesia and therefore tend to occur at either the start of operation or at the end of surgical procedure.

Asphyxia of myocardium, overdose of anaesthetic agents & reflex vagal stimulation are the three most common patho-physiological events by which cardiac arrest become supervenes.

Respiratory failure usually occurs during and/or after the anaesthesia/surgical procedure due to overdose of premedication drugs (Barbiturates, Benzodiazepines, morphine etc.) or anaesthetic agents, administration of opiates during postoperative period, laryngospasm/bronchospasm of varying reasons, hypoventilation and subsequent hypoxia due to hyperventilation by anesthetic agents.

Medico-legal Aspects related to Anaesthetic Deaths and Malpractice:

Doctor's duty in Anaesthetic Practices: Anaesthetist must attend the patient a day before surgery, do Pre Anaesthetic Check-up and investigate the patient for any alarming situations if required. He must record everything on the case sheet.

1. **Informed Consent:** Before administration of anaesthesia, the Anaesthetist must take the consent in writing from the patient or his legal guardian/parents if he/she is unconscious or below 18 years of age. Before consent, anaesthetist must explain the procedure of anaesthesia, type & nature of anaesthetic agent, its side effects, complications & risks involved in the procedure clearly to the patient in local language, so that he can understand the nature and consequences of giving consent.

It is the ultimate right of the patient to accept or refuse the medication. Nothing should be decided against the patient's will.

2. **Reasonable Degree of Skill & Care:** The duty of Anaesthetist starts when the patient, his surgeon or nursing home/hospital approaches the anaesthetist and he accepts the work. It is the duty of the anaesthetist to attend the patient, assess him and optimize the patient with necessary investigations and treatment.

He must apply reasonable degree of skill and care in the selection of anaesthetic agent and the procedure. It is the duty of the hospital management to provide adequate and trained hands. They must provide all necessary latest functioning equipment. Trainee should be regularly supervised by the seniors. Anaesthetic must adhere to standard practice and follow the protocols of the institution.

Any act or omission by anaesthetist causing bodily injury, disease or death of the patient is negligence for which he/she can be sued in the civil court or in consumer forum for compensation or can be punished under Sec. 304-A IPC in criminal court. Negligence against an anaesthetist can be proved when injury has occurred only from anaesthetic procedures due to deviation from the standard protocol.

The burden of proving that the anaesthesiologist was negligent falls on the complainant. Court allows both parties to prove their case by means of producing evidence. This may include records, books, journals or expert witnesses.

But when the negligence is gross and obvious to even a lay man, it comes under the doctrine of *res ipsa loquitur*, for example, when pre-anaesthetic evaluation is not done before giving anaesthesia, unexplained cardiac arrest during anaesthesia leading to death is negligence. [8] Where an explosion occurred during the course of administering anaesthetic to the patient when the technique had been frequently been used without any mishap. [9]

Here the burden of proof does not lie on the plaintiff but defendant physician has to prove that the accident did not occur due to his negligence. [10] In a case patient developed meningitis after spinal anaesthesia, court found that anaesthetic agent was not contaminated and the staff had taken the usual precautions to disinfect themselves before the operation, acquitted anaesthetist and passed sentence against hospital for some fault in sterilization procedure. [11]

3. **Precaution & Defense:** Anaesthetist should update his professional knowledge all the

time, keep full and accurate records of his patients. He must check the instruments prior to use do the sensitivity test for a drug known to cause anaphylactic reactions and do not leave patient till recovered from effect of anaesthesia.

When an anaesthetist is sued for negligence, he can defend himself by proving that he has applied reasonable degree of skill & care during anaesthetic procedures. A doctor is not negligent if he is acting in accordance with a practice accepted as PROPER by responsible body of medical men skilled in that art even though other doctors adapt a different practice". This is the Bolam's Law. [12]

The damage to the patient may also occur due to error in judgment, therapeutic misadventure, medical mal-occurrence, unforeseeable harm or when a new disease appears but doctor is not liable as long as he applied a reasonable standard of skill and care.

Investigation and Examination of Anesthetic Death:

As per Sec.39 CrPC all deaths occurring in due course of surgery and anaesthesia should be treated as unnatural deaths and should be reported to the police.

Failing of which the doctor can be punished under **Section 202 IPC** for intentional omission to give information of offence to police by the person who is bound to inform.

In investigation and examination of anaesthetic death a Forensic person should take several factors into consideration. The American Society of Anesthesiologists (ASA) has devised a classification system to grade the preoperative condition of the patient. [4]

- **ASA1:** Those with no pre-existing serious disease and have a minor, localized condition requiring surgery e.g. fit man with inguinal hernia.
- **ASA2:** Those with a serious disease but have no limitation of their activities (the condition may be pre-existing or the result of the condition requiring surgery), e.g. mild angina, mild hypertension, chronic bronchitis.
- **ASA3:** Those with a serious disease causing some limitation of their activities, e.g. moderate angina, previous myocardial infarction (heart attack), severe chronic bronchitis.
- **ASA4:** Those with a serious disease that limits their activities and is already a threat to life, e.g. severe angina at rest, acute myocarditis, chronic bronchitis with respiratory failure, perforated peptic ulcer.

- **ASA5:** Moribund patient with little chance of survival, submitted to surgery as a last resort, e.g. ruptured aortic aneurysm, severe trauma, massive pulmonary embolism, severe peritonitis due to perforated colon.

Class 1 - 3 requires full medico-legal investigation. Class 4 and 5, where death is anticipated, there is less need for full investigation.

Autopsy Examination & Procedure: [6, 7, 13]

A number of difficulties are encountered during the examination and interpretation of anaesthetic deaths such as naked eye changes may be minimal or absent in autopsy examination, the findings of surgery and anaesthesia may superimposed on pre-existing natural disease or trauma and no communication between forensic person conducting autopsy with concerned anaesthetists and surgeons, especially in Indian scenario.

It is advised that:

1. Autopsy is performed without delay. Medical intervention should be left intact by medical & nursing staff.
2. Relevant clinical case notes, x-rays, laboratory tests etc. should be studied prior to autopsy.
3. Professional first hand discussions with anaesthetist and surgeon involved are encouraged. They should be invited to attend autopsy and to discuss the findings politely.
4. For further investigations relative specimens e.g. toxicology, histology, biochemistry, and microbiology should be retained appropriately.

Surgical mistakes are gross and anatomical and hence are observable at the postmortem, while Anaesthetic mistakes being physiological/biochemical are no longer appreciable after death except there overdose with specific drug is involved.

So look for or exclude some of the natural disease or mechanical obstruction. Autopsy must be preferably done by a Forensic expert and it must, however, be remembered that the findings of the autopsy surgeon alone will not be sufficient to explain death.

It is imperative to hold a discussion across the autopsy table involving Forensic expert/autopsy surgeon, anaesthetist and the surgeon concerned. It is often stated that deaths under anaesthesia were more often the fault of the anaesthetist than the anaesthesia alone.

Post-mortem Examination:

Autopsy in a case of an anaesthetic death must be performed methodically adopting all the standard procedures. Note the odor,

specific odor of anaesthetic agent will help in detection at autopsy. Examine all the body cavities in situ & measure the contents or fluids if any and preserve for analysis. Examine the site of surgical intervention in situ, dissect all the organs and inspect every surgical suture, look for any evidence of pulmonary embolism, hemorrhage, peritonitis, retained swabs/instruments, asphyxia due to aspiration of regurgitated material or hypersensitivity reaction.

Though the evidences of vagal inhibition, fall in blood pressure, cardiac arrhythmias, spasm in coronary arteries and laryngeal spasms, etc. could not be detected during an autopsy, they should be cared off.

Collect the sample from all viscera for histo-pathological study particularly to exclude any cardiovascular disorder including occult conditions like myocarditis as well as relevant specimens for assessing the severity of disease for which the operation was carried out.

Histological examination of the brain is imperative which is primarily intended to demonstrate the effects of hypoxia, particularly in the region of Sommer's area of the hippocampal gyrus and the cerebellum, where changes are expected even if the victim suffers hypoxia for short period.

Morphological changes in the brains of victims, who suffered hypoxia for a short period but survived for long periods after anaesthesia, are diffuse, severe leuco-encephalopathy of cerebral hemispheres with sparing of the immediate sub-cortical connecting fibers.

Demyelination and obliteration of axons was also observed and at times, infraction of the basal ganglia. Damage appeared limited to the white matter, which is explained on the basis of greater glycolysis in the white matter during hypoxia as compared with the grey matter.^[14]

Chemical Analysis:

Prior to autopsy to avoid loss of gases due to exposure of the tissues to the air, it may be necessary to obtain samples of every viscera by the biopsy techniques and frozen immediately. Collect the alveolar air with a syringe by pulmonary puncture before opening the chest. A lung is removed and collected by clamping the main bronchus and retained in a nylon bag and sealed so that the headspace gas can be analyzed. At autopsy some portion of fat from the mesentery, skeletal muscle tissue, brain, liver, half of each kidney are retained. Blood should be collected under liquid paraffin.

Urine should be collected in containers with as little headspace as possible, sealed and immediately refrigerated or frozen.

Blood, urine and other body fluids should also be collected for bacteriological examination. Beside these residual solutions, medication containers, samples of gases used for the anaesthesia and samples of the operating room air may have to be collected in occasional cases.

Conclusion:

Anaesthesiologist must know and follow a reasonable standards expected of them by the public, their profession and the law. [15]

He should assess, optimize and assure the patient before taking up for surgery. It is expected from anaesthetist to take pre- and postoperative rounds, develop good patient relationships, take valid and informed consent; keep the things which are necessary during and after the operation; check the equipment and monitors; label all the drugs, supervise the juniors & avoid critical incident sand maintain up-to-date records.

By the introduction of the ASA "Standards for Basic Intra-Operative Monitoring" a decrease in the number of anaesthesia-related liability claims. Improved monitoring, especially the greater use of pulse oxymetry and capnography, has undoubtedly contributed to the decrease in severe complications and associated large awards.

Threat of law suits against anesthesiologists seems to have declined somewhat in the USA and it can be accounted for in-part by greater attention to monitoring and other standards of anaesthetic practice, including continuing medical education. [16]

For the investigation of cause of death discussion between forensic pathologist, surgeon and anaesthetist may arrive at an amicable conclusion that will be the best consensus of opinion to offer the investigating authority and courts of law.

The Indian Society of anaesthesiologist must come out with protocols to be followed by its members in different clinical situations. Once this is done the courts will decide the issues of medical negligence by the fact whether the protocol was followed or not. This will also improve the patient care and the outcome.

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